NewTREND

NEW INTEGRATED METHODOLOGY AND TOOLS FOR RETROFIT DESIGN TOWARDS A NEXT GENERATION OF ENERGY EFFICIENT AND SUSTAINABLE BUILDINGS AND DISTRICTS

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Engagement of Stakeholders (Including Occupants)

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EXECUTIVE SUMMARY

This deliverable reports on the planning and implementation of activities designed to explore the most appropriate means of engaging stakeholders. Particular focus was placed on the building occupants and users in the three demo sites of the NewTREND project. These activities comprised the second strand of stakeholder engagements for WP6. Task 6.2 placed an emphasis on engaging with those stakeholders who are more often overlooked in more traditional stakeholder engagement processes. Traditionally, the experiences of professionals and stakeholders have invariably come to the fore, with those categorised as users/occupants having less of a voice. Therefore, Task 6.2 has tried to remedy that somewhat and focus of the user/occupier experiences.

For context, the first strand of stakeholder engagement in WP6 focussed on traditional stakeholders and decision makers i.e. the professionals, designer teams and building owners, whose experiences were captured in the engagements with the Local Advisory Teams (LATs) in each of the demo sites and have been reported on in deliverables 7.5 through to 7.9. Comprising project stakeholders and design team members, work carried out in the LATs provided important feedback to the research team and was key to the development of the project's methodology and in particular its toolset. Work carried out in Task 6.2, was designed to complement and enhance the information gleaned from the LATs. This work included workshops, interviews, sessions where iterations of the software tool were tested and evaluated, in addition to other group-orientated activities. In combination, these activities contributed to a key objective of the NewTREND project, supporting the integrated design process (IDP), and as a result the research team was able to realistically define the design priorities and benchmarks and collate the relevant legally obligatory energy efficiency requirements.

The document is presented in five chapters. **Chapter 1** provides the context for each of the three demo sites with descriptions of the historical and cultural perspectives of the buildings involved. **Chapter 2** explores the stakeholder participation activities engaged in for Task 6.2, providing an overview of the integrated design process (IDP) and a discussion on participatory concepts and co-design. **Chapter 3** outlines the key methods adopted for this task, while **Chapter 4** reports on the engagements undertaken. **Chapter 5** concludes the document with an overview of key findings, along with the lessons learned from the engagements carried out at the demo site locations.

The engagement process began with identifying the relevant stakeholders, using brainstorming and mind-mapping techniques, which were then followed up by the project partners who reached out to the relevant stakeholders at each of the three demo-sites, inviting them to participate in interviews, the building diaries or the group activities. These were then recorded, transcribed and translated to English for analysis. Using NVivo software and a combination of

Realist and Grounded Theory it became apparent that all of the various topics discussed could be collated into three main themes relating to; the building, the people and the project.

Of all the participant engagements, the diary process proved to be the most successful and was the most informative to the research team, with the resulting data being far richer and deeper than would have been possible if we had relied solely on surveys or hosting a large public meeting. The building diaries were also were well received by the participants. The group activities were also successful and demonstrated significant potential for exploring user-oriented issues, with both the occupants and those responsible for the buildings coming together to discuss them. This socially-equalising effect is important as it short-circuits any miscommunication that can arise between the two groups. By selecting the range of different and complementary methods chosen for each project, as deemed appropriate by the research team, this introduced a useful degree of flexibility to the engagements that enabled the researchers to capture unforeseen issues or topics as they emerged during the process. The users and occupants demonstrated, in each of the demo sites, their mistrust of traditional approaches to user engagement, as well as their confidence in the approaches taken for NewTREND.

The results discussed in this document concern the engagements carried out in the three demos sites only, and therefore should be considered a snapshot in time of the issues that most concern the occupants and users over the period in which the NewTREND project was active. It is not an exhaustive list of concerns by the occupants. Issues and concerns will undoubtedly change as new occupants begin to use the building and the installed technologies age or are replaced.

1 INTRODUCTION

A significant objective of the NewTREND project is to support the integrated design process (IDP) – consequently, involvement of stakeholders in the design process is considered vital. Task 6.2 was charged with the planning and implementation of activities that foster the most appropriate means of engaging stakeholders, with particular focus placed on building occupants and users.

This deliverable reports on the activities of the aforementioned task, including an overview of Local Advisory Teams (LATs) established for each of the demo sites. These LATs comprising project stakeholders and design team members, provided important feedback to the research team for each of the sites. Information gained through interaction with the LATs was key to the development of the project's methodology and, most particularly its toolset. Other activities, which also complimented and supported work in the LATs, included workshops, interviews and sessions where iterations of the software tool were tested and evaluated.

The involvement of occupants and users (building users, as opposed to software users), in the IDP was gauged through a suite of activities that captured user preferences and their habits in relation to the buildings they occupy. Where available this was informed by supplementary statistical information detailing the energy usage patterns of the buildings and districts. In this way, the design priorities and benchmarks were realistically defined in addition to the collation of the relevant legally obligatory energy efficiency requirements.

1.1 STRUCTURE OF THE DOCUMENT

The document is divided into five chapters.

- **Chapter 1** provides the context for the three demo sites with descriptions of each along with historical and cultural perspectives of the buildings involved in each;
- **Chapter 2** explores stakeholder participation activities engaged in for Task 6.2, providing an overview of the integrated design process (IDP), in addition to a discussion on participatory concepts and co-design;
- **Chapter 3** outlines the key methods adopted for this task;
- **Chapter 4** reports on the engagements undertaken;
- **Chapter 5** concludes the document with an overview of key findings, along with the lessons learned from the engagements carried out at the demo site locations.

1.2 CONTEXT

1.2.1 BUDAPEST DEMO SITE

The demo site buildings in Budapest are part of a group of 24 (103,61 m^2 gross footprint) buildings owned by the municipality in Pestszentlőrinc, located in the XVIII district of Budapest. This is a wealthy suburban low-density neighbourhood, with a lot of residential dwellings and green areas. It is not heavily frequented by tourists, and is generally perceived as a quiet area. The buildings in the case study district include a school, and various public park buildings such as a Buffet Building, Tennis Club, Swimming Pools, and Ski and Snowboarding Facility. The buildings currently undergoing energy retrofit are the school buildings. There are two classroom buildings, and one gym building in the school. It is an elementary (primary) school building with approximately 500 pupils between the ages of 6 and 14 years old, 22 teachers and some administration and maintenance staff.

FIGURE 1 BUDAPEST BUILDINGS INTERIOR PHOTOS

The school building is primarily occupied during normal school hours and closed at weekends and school holidays. However, it is also used in the evenings for art and music lessons and rehearsals as well as staff working on lesson plans or correcting class work, as well as pupils who require access to the library and computer labs. It is also used for special occasions such as school graduation ceremonies, end of term parties, and parent teacher meetings, *etc*.

FIGURE 2 BUDAPEST BUILDINGS EXTERNAL PHOTOS

The school was built in the 1880s and has historical and cultural significance to the area, and due to this, energy retro-fitting must be undertaken with care. It is not possible for example to use external wrap insulation due to restrictions on interfering with the external façades. Parking is not very available at or near the school, but the area is well served by several bus and trams lines, so it is very accessible to building users by public transport. Internet coverage is good, and there are several local facilities within walking distance such as shops and restaurants.

1.2.2 SEINÄJOKI DEMO SITE

The Finish demo site is located in a district of Seinäjoki, a small city in Southern Ostrobothnia. Situated approximately 350km to the north of Helsinki, it has a population of 61,500. Seinäjoki grew around several important railway junctions and has been a municipality since 1868. The demo site buildings were originally constructed between 1923 and 1931 as part of a hospital campus, on a site adjacent to the river (the literal translation for the name Seinäjoki is "Wallriver"). The overall building footprint considered in the case study is 12,789m^2. The campus

ceased operating as a hospital in the mid-1980s when the hospital moved to new buildings elsewhere in the city. The buildings are owned by the City of Seinäjoki. There are 15 buildings in total on the site, and the NewTREND project has focused on some of the larger of these buildings, four in total. The first building is now occupied by SeAMK (School of Applied Sciences) and the Music School. The second building is mainly occupied by the Dental School and a number of administration offices, while the third comprised the heat distribution and plant building. The fourth building is known as Kivirikko House, which was originally built as a residence for the senior physician of the hospital, but is now used by The Mannerheim League, a children's charity.

FIGURE 3 SEINÄJOKI BUILDINGS EXTERIOR PHOTOS

The buildings are in relatively good condition, probably the best condition of the three educational buildings engaged with in the NewTREND demo sites. However, in occupant surveys conducted during the very early stages of the engagement process it was highlighted that the building's users complained about bad indoor air conditions such as moisture and humidity problems, (this is especially important in the case of the music school, where room temperatures and humidity levels can have a detrimental effect on musical instruments, and vocalists performance), in addition to thermal comfort issues (too hot in summer, too cold in winter).

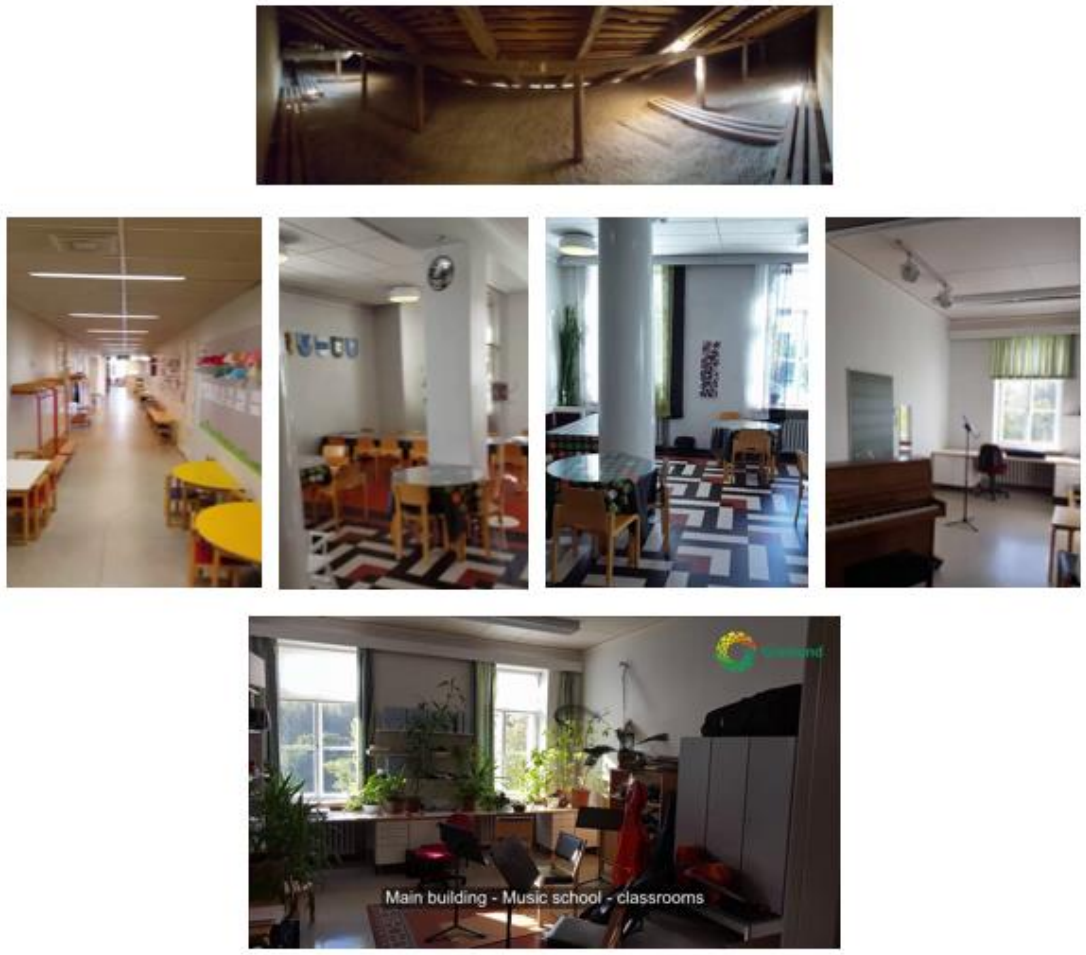

FIGURE 4 SEINÄJOKI BUILDINGS INTERIOR PHOTOS

Seinäjoki is also known for several acclaimed buildings designed by world renowned Finnish architect and designer Alvar Aalto in the 1960s – including the Finnish Defence Corp Building (1924–1925), home to The Defence Corps and Lotta Svärd museum. Also, of note is the civic centre complex, comprising six buildings and home to the City Library (1964-1965); Lakeuden Risti Church (1957-1960), City Hall (1961-1962), Parish Centre (1965–1966), City & State Office Building (1966-1968), and the City Theatre (1986-1987). Aalto's original library has more recently been extended into a new building known as the Apila by JKMM Architects, which has also garnered many awards in its own right. This is the context surrounding the Finnish NewTREND demo site buildings.

1.2.3 SANT CUGAT DEMO SITE

The third demo site comprises several buildings across three separate locations in Sant Cugat del Vallès, near Barcelona. The first is a set of three linked apartment blocks located in the Can Trabal neighbourhood near the Golf Club and Collserola Natural Park. Each of the three apartment blocks is three stories above ground, with nine private parking spaces and parking at basement level in one of the buildings. There are 35 apartments in total. Each apartment has one bedroom. The buildings follow the gradient of the street, and are linked by stairs and elevator cores. The apartments are owned by the municipality and are rented by young tenants at a subsidise rate for a maximum of five years. Each of the three buildings is undergoing an energy retrofit. In addition to the apartments, the case study also includes Pins del Vallès School (State School), located to the north of Sant Cugat's centre and close to the RENFE railway line (Line R8), adjacent to Volpelleres forest. It is a secluded part of the city, surrounded by a number of green areas, in addition to forest and sports facilities. The school, which has 450 pupils consists of four buildings: primary school building; (2) administration building; (3) sports pavilion; (4) kindergarten.

FIGURE 5 SANT CUGAT APARTMENTS

The last group of buildings in the demo site are two private houses in the Les Planes neighbourhood. These are located to the south of the municipality, surrounded by Collserola Natural Park (mentioned above). Les Planes has 1,228 inhabitants, about one percent of the Sant Cugat population. Most of the housing in this area comprise single-family housing and the neighbourhood is in a low socio-economic bracket. The occupants of these houses are especially vulnerable to energy poverty. The houses need total refurbishment and are also part of a pilot

project linking energy, economics, health and social issues, with all the work being carried out by unemployed people living in the neighbourhood.

FIGURE 6 SANT CUGAT SCHOOL

FIGURE 7 SANT CUGAT HOUSES

2 STAKEHOLDER PARTICIPATION IN THE PILOTS

2.1 INTRODUCTION

This chapter provides an outline of the types of stakeholder participation undertaken as part of the design process. It describes the analytical methods and approaches utilised demonstrating how NewTREND's Integrated Design Methodology (IDM) fits into the wider understandings of the integrated design process.

2.2 OVERVIEW OF THE INTEGRATED DESIGN PROCESS AND THE NEWTREND APPROACH

2.2.1 BACKGROUND

Considered by many as an amalgamation of practice and education, The Integrated Design Process (IDP) has been taken up by architects operating at the interdisciplinary coalface of sustainable design. Developed in 1993, as part of the C2000 program in Canada, to better facilitate the integration of engineering and architecture expertise in the design of sustainable buildings (Hansen & Knudstrup, 2005). It is particularly useful for helping identify the stakeholders in an energy retrofit and to understand their relationships to energy in the buildings they occupy. In order to do this, it is helpful to break down the project into its component stages and distinguish the activities that take place during each phase of development.

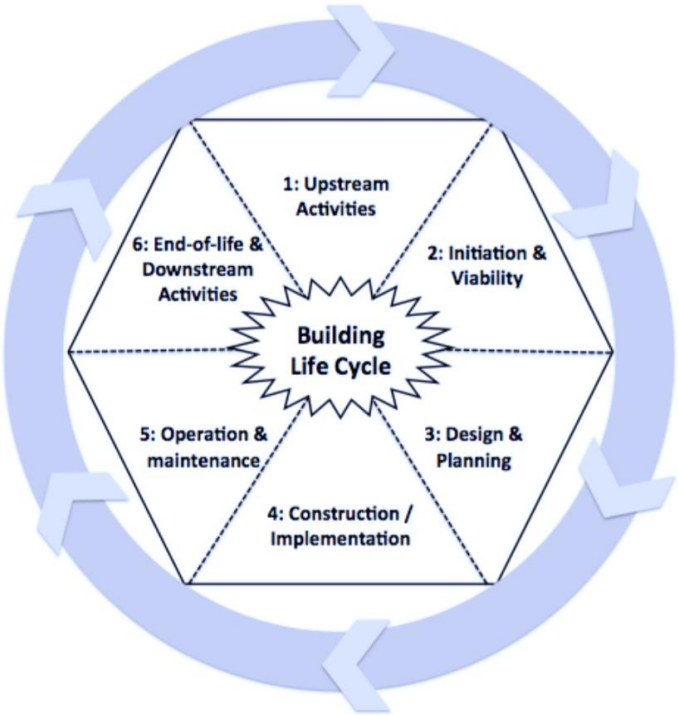

FIGURE 8 : THE UMBRELLA HUBS OF ACTIVITY SIX-STAGE MODEL OF THE LIFECYCLE OF A BUILDING (DUNPHY *ET AL.*, 2013)

Undergoing a broad-based review of the literature, including an estimated twenty different models of the building life cycle, Dunphy *et al.* (2013) mapped six stages in the life cycle of a

generic building, which they termed the Hubs of Activity (HoA) model as shown in Figure 8 above. Over its entire lifecycle a building may oscillate between the various stages a number of times. Also, as part of its lifecycle, a building can be designed, built, occupied, sold, then later redesigned, extended, refurbished, reoccupied and so on. The model is presented in a circular configuration to allow for a cradle-to-cradle approach, where both the buildings, and/or the components can be used, reused, recycled, and up-cycled numerous times. The NewTREND H2020 project's IDM expands on stages two to five of the HoA model, dividing the Design & Planning phase into a series of intersecting sub-stages; preparation, diagnosis, strategic definition, concept design and decision-making. The first and last stages of the HoA model (for example: upstream activities like mining and raw materials extraction, and downstream activities such as incineration and/or recycling) were considered relevant to NewTREND. The table below outlines the six stages of the HoA model by Dunphy *et al*. (2013), which is cross-referenced with the 10-stage NewTREND model.

Hubs of Activity Building Lifecycle Stages	**NewTREND IDM Model Phases**
Upstream Activities	N/A to NewTREND
Initiation & Viability	Initiation
Design & Planning	Preparation, Diagnosis, Strategic Definition, Concept, Decision Making
Construction & Installation	Construction / Implementation
Operation & Maintenance	Handover & Closeout, In-Use
Downstream & End-of-Life	N/A to NewTREND

TABLE 1 HOA MODEL & NEWTREND STAGES (SOURCE: O'CONNOR *ET AL*., 2017)

For the purposes of the NewTREND project, the process is divided into ten different phases. They comprise: (1) the initiation phase; (2) the preparation phase; (3) the diagnoses phase; (4) the strategic definition phase; (5) the concept phase; (6) the decision-making phase; (7) the design development and tendering phase; (8) the construction phase, which are in turn followed by (9) the handover and close out phase; and finally (10) the in-use phase.

However, one should also note that, as mentioned previously, a key focus of NewTREND is on the processes related to energy in retrofit projects. Therefore, while there is considerable potential for crossover into other applications, the NewTREND process does not present itself as a complete or overarching model of the retrofit process. A more detailed description of each of the ten phases of the NewTREND process is presented in *Deliverable 2.6 Integrated Design Methodology*. For the purposes of this report an abridged description of each phase is provided in the following section.

2.2.2 *INITIATION PHASE:*

The project initiation phase marks the beginning project with the project goals and scope being defined. After the project scope and the stakeholder analysis has been conducted the "Project Coordinator" and "NewTREND Provider" initiate a soft launch of the project's website; the first iteration of the project website is completed and the different stakeholders are assigned their roles, with the desired NewTREND project mode being selected. Clear physical boundaries for the project are set and the surrounding buildings and infrastructure of relevance to the project are set. Establishing the correct boundary for the neighbourhood is a complicated but essential task, ignoring it can result in the design team wasting considerable amounts of time collecting might prove to be unnecessary, and time-consuming, data-consuming information. The NewTREND project has defined the scope of the neighbourhood level to be around 10 buildings. Consequently, the project team can then register a project domain, tailor the platform to their needs and familiarise themselves with the platform functionality.

The project team must then decide the mode of NewTREND operation (the application options are: Basic, Advanced, or Premium). Under most of the models, direct engagement with occupants and users will usually not take place at this stage. However, in the case of the **Community Design Model**, a community appraisal will be initiated to assess the challenges and development potential of a particular community or building. Community appraisal is most often used where a group of building occupants or users are the initiators of a project, or where occupants and users are strongly organised and in a position to have their voice heard at this early stage of a project.

2.2.3 *PREPARATION PHASE:*

This next phase sees a fully functioning NewTREND platform being launched, with project stakeholders assigned their project roles and provided with the appropriate access rights to the project platform, along with the relevant information on the building and its surroundings that will then be used in the diagnosis phase. In addition to spatial information, acquiring other neighbourhood data such as energy infrastructure and heat networks maps can be challenging, as this type of data is not always publicly available or easily accessible[1]. Minimum data sets of neighbourhood data required to carry useful neighbourhood analysis include: (1) building footprint; (2) land use maps; (3) noise maps; (4) district system boundaries; (5) district morphology; (6) location of heating & power plants; (7) power plant fuel type; (8) supply and return temperature; (9) connected power; (10) services infrastructure; (11) hours of operation; (12) heat difference; (13) number of connected consumers; (14) area and azimuth of solar /photovoltaic panels; (15) solar panel type; and (16) wind turbine generator output.

[1] Deliverable 2.1 *New Approaches for an Advanced Data Collection Process* provides a detailed list of data gathering techniques and data requirements for the neighbourhood level. However, in some cases the required data may not be available or is hard to obtain.

- **Basic mode** may be the most suitable for project teams that have only limited information on their building and is interested primarily in assessing the energy performance of the building in more basic terms.

- **Advanced mode** is more applicable when the planning team have detailed information about the building and would like to assess the building's energy performance and thermal comfort in detail.

- The **Premium mode** can be used when real-time, monitored values of the building are available. It is also worth noting, that as a project progresses, the project team can choose to change the NewTREND mode from a lower detailed mode to a more detailed mode (*e.g.*, from Basic to Advanced). However, changing from a higher to lower mode may result in data loss.

The preparation phase is one of the most important in terms of occupant and user participation, since the data collected at this stage is what enables the simulation to take place. In addition to technical data on the building and neighbourhood, information relating to occupant and users' needs, desires, energy practices, attitudes and proposed solutions is important. Collecting information from the occupants is highly advisable and is recommended regardless of the chosen mode of NewTREND. Occupants can provide the design team with essential insights that are not always discoverable by looking at a building's physical and thermal characteristics alone. A significant amount of direct engagement with occupants and users will therefore take place at this phase. However, the format will vary depending on the objectives and characteristics of the project and the level occupant and user participation that is desired.

2.2.4 *The Diagnosis Phase:*

Once the data entry process has been completed the diagnosis phase can then start. The main aim of this phase is to analyse the current condition of the building and the surrounding neighbourhood. The first step in this phase is to carry out a simulation to ensure results appear plausible and can be applied during further steps in the diagnoses. On completion, this current state is then analysed according to its global sustainability using the NewTREND KPIs on building and neighbourhood level[2]. Consequently, all KPIs are calculated by the Simulation & Design Hub based on the simulation results. The user of the Simulation & Design Hub can then identify the strengths and weaknesses of the district in terms of energy efficiency, cost efficiency and overall sustainability. A low KPI value indicates to the user that the results which the KPI addresses must be improved. To support the visualisation of KPI results, the NewTREND Collaborative Design Platform (CDP) provides a KPI Analysis Tool which is used every time the user needs to check KPI results on a building or at the neighbourhood level.

[2] These were defined in *Task 2.2 Definition of sustainability Key Performance Indicators (KPIs)*.

At the end of the diagnoses phase the project team is expected to have achieve three main objectives:

1. An analysis of the current state of the Neighbourhood
2. An analysis of the current state of the Building
3. Informed all relevant stakeholders about the results of the diagnoses phase

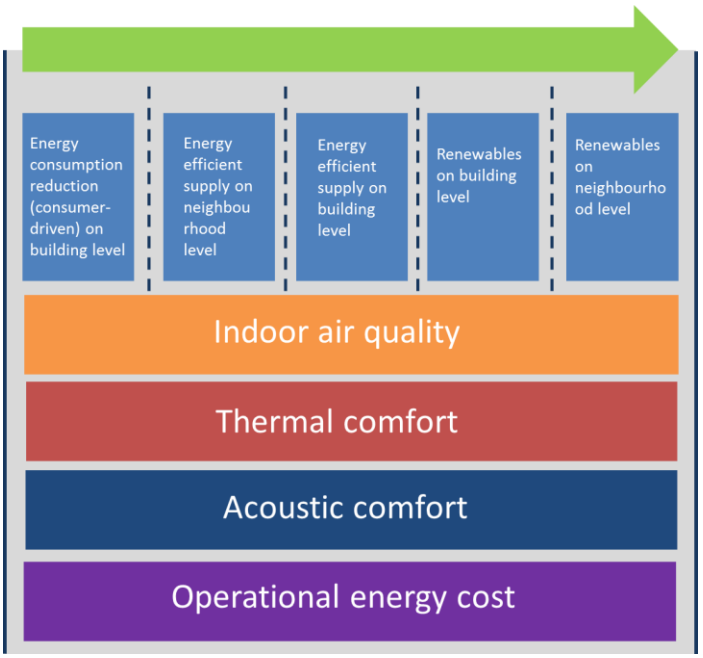

FIGURE 9 INTERACTION BETWEEN ENERGY INTERVENTION AND OTHER CROSS-CUTTING KPIS (MITTERMEIER *ET AL.*, 2017)

2.2.5 *THE STRATEGIC DEFINITION PHASE:*

The Strategic Definition Phase follows on from the Diagnosis Phase in NewTREND's Integrated Retrofit Design Methodology (IDM) process. The main goal of the Strategic Definition Phase is to define the main framework conditions for the retrofitting design, which itself is based on the results of the diagnosis phase. The Strategic Definition therefore serves as pointer for the design phases later in the project by establishing meaningful targets for the retrofitting, identifying the main constraints and restrictions that may limit or act as a barrier to the retrofitting design.

To get a clear understanding of which direction the energy retrofitting project should develop – for both neighbourhood or single building scenarios – the target issues have to be transformed into measurable figures. Therefore, any target should be SMART, *i.e.,*

- **S**pecific – target must be clearly defined, not vague
- **M**easurable – targets must be quantifiable
- **A**ttainable – target must be realistic and achievable
- **R**elevant – are the targets relevant for energy retrofitting of urban districts and buildings
- **T**ime-bound – specify when the result(s) can be achieved

In conjunction with this approach, the design team need to incorporate the views of the building users as key strategic stakeholders. The types of engagements the team can undertake for this are numerous, but the purposes of this report, Table 2 below presents the most relevant to NewTREND.

TABLE 2 KEY TASKS IN OCCUPANT AND USER ENGAGEMENT – STRATEGIC DEFINITION STAGE

	Task	Person Responsible	Report to	Step by step guide
Community Design Model	Open Space Meeting	Occupant/user representative Identified member of design team	Occupant/user community Design team	NewTREND Deliverables 2.5 & 2.6
Collaborative Design Model	Design charrette	Project manager Identified member of design team	Design team Occupant/user community	NewTREND Deliverables 2.5 & 2.6
Deliberative Model	Community Advisory Group	Project manager Identified member of design team	Project manager Design team	NewTREND Deliverables 2.5 & 2.6
Research Model	Public forum	Project manager Identified members of design team	Project manager Design team	NewTREND Deliverables 2.5 & 2.6
Information & Consultation Model	Public forum	Project manager Identified members of design team	Project manager Design team	NewTREND Deliverables 2.5 & 2.6
All Models	Social media Online forum	Project manager Identified member of design team	Project manager Design team	NewTREND Deliverables 2.5 & 2.6

It should be noted here that in addition to the SMART targets, the design team must identify the main constraints that occur in energy retrofitting projects. These should emerge from both the SMART target analysis and the occupant and user engagements, and usually fall into one of the following five categories: (1) Legal constraints; (2) Technical constraints; (3) Financial constraints; (4) Environmental condition constraints; and (5) Stakeholder based restrictions.

By the end of the strategic definition phase the project team should be able to achieve two main objectives: (1) to define all constraints and restrictions relating to the project; and (2) to define the project's SMART targets

2.2.6 *The Concept Phase:*

In this phase, the design team must develop the design concept that fulfils the defined SMART targets in the strategic definition phase. As is often the case, the design team might decide on a number of different concept variants, all of which fulfil the SMART targets. As a result, any valid variants that are identified will then later be assessed in the subsequent decision-making phase, confirming which concept will ultimately be developed. The number of variants will vary from project to project.

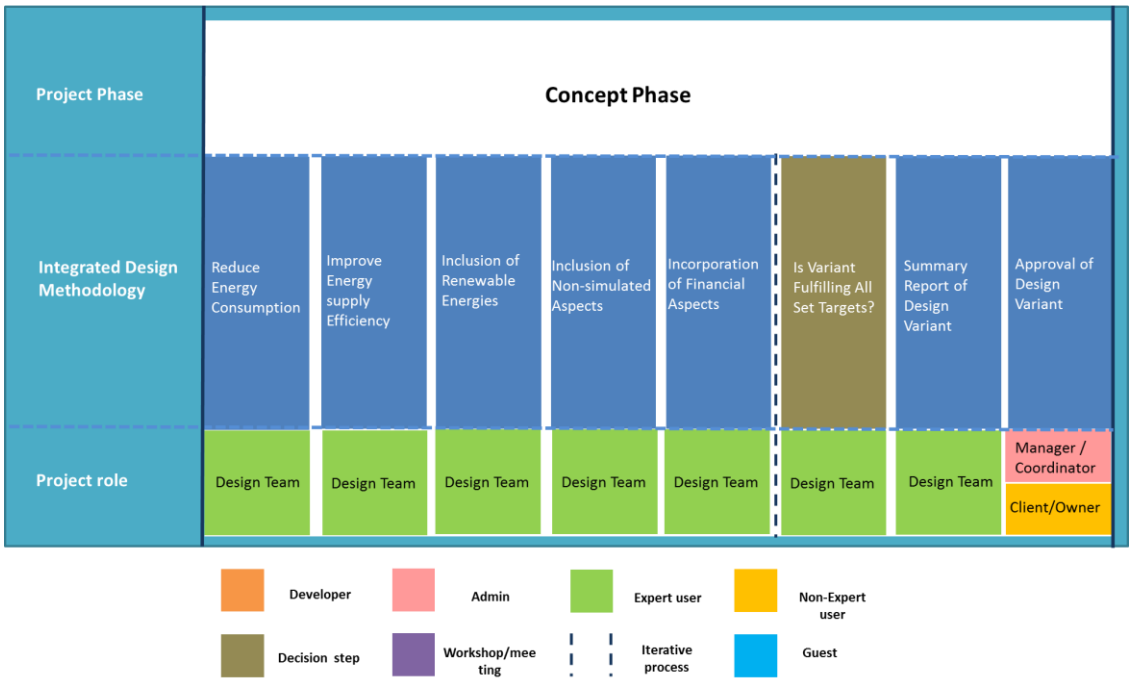

FIGURE 10 AN OVERVIEW OF THE IDM PROCESS IN THE CONCEPT PHASE

At the conclusion of the strategic definition phase, the project team should have achieved the following objective: To develop a number of design variants that fulfil the SMART targets, as defined in strategic definition phase.

2.2.7 *The Decision-Making Phase:*

Once the decision-making phase begins, the occupant and user participation become increasingly important again. It is at this phase of the process that the decision is made on which design concept is to be used. As part of this process, input from the occupants/users need to be collected, outlining their perspective on the chosen design concept and carefully considered before a final decision is made. A critical consideration at this point is the extent in the level of influence occupants/users are afforded vis-à-vis other stakeholders, especially the client/owner. In some instance, particularly under the community visioning model, the final say over the

design may lie with building occupants and users. This is made easier if they are also the owners of the buildings in question. In the collaborative and deliberative models, the views of occupants/users should carry considerable weight, but how much will depend on other criteria outlined in the project and the final say may rest with a building owner. With behavioural research, and information and consultation models, the views of occupants/users hold even less weight. Occupants/users usually having on a more consultative role with the design team and the client ultimately deciding how much of their feedback should be incorporated into the final design.

TABLE 3 KEY TASKS IN OCCUPANT AND USER ENGAGEMENT – DECISION-MAKING STAGE (MITTERMEIER *ET AL.*, 2017)

	Typical Tasks	**Persons Responsible**	**Report to**
Community Design Model	Community Advisory Group Public Forum	Occupant/user representative Identified member of design team	Occupant/user community Design team
Collaborative Design Model	Community Advisory Group	Project manager Identified member of design team	Design team Occupant/user community
Deliberative Model	Consensus Conference	Project manager Identified member of design team	Project manager Design team
Research Model	Open Day	Project manager Identified members of design team	Project manager Design team
Information and Consultation Model	Open Day	Project manager Identified members of design team	Project manager Design team

2.2.8 *The Design Development & Tendering Phase:*

This phase of a project includes the two most typical phases of any construction activity, both in terms of new build projects or retrofitting existing buildings, the design development and tending phases. In these phases, the aim of the "Project team" is to create the requisite set of drawings and documents that will enable the tendering building contractors to plan and price the proposed work appropriately, and ultimately to enable them to carry out the work later.

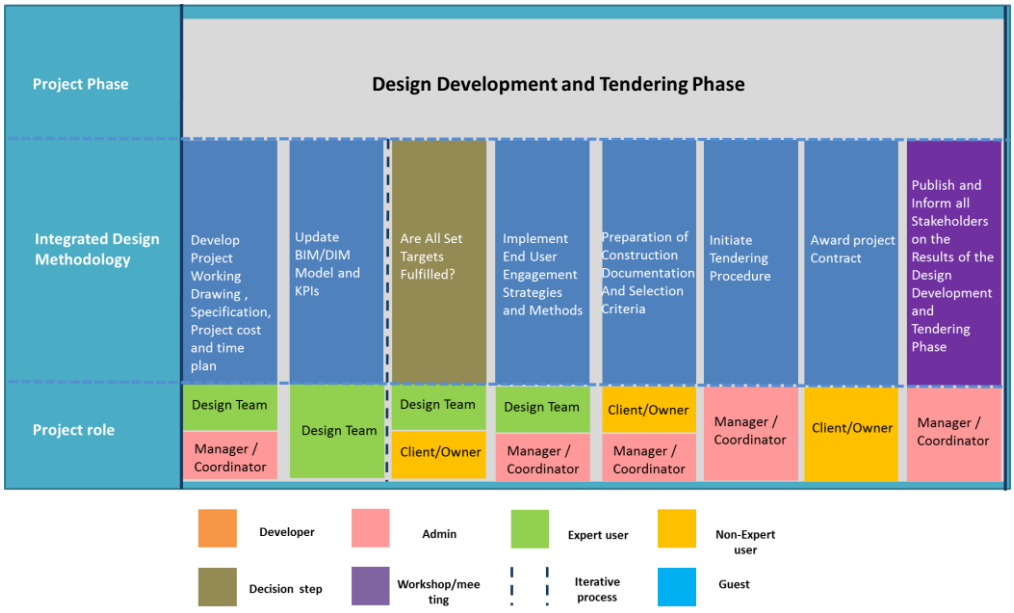

FIGURE 11 OVERVIEW OF THE IDM PROCESS IN THE DESIGN DEVELOPMENT PHASE (MITTERMEIER *ET AL.*, 2017)

Figure 11 above outlines the activities associated with the Design Development and Tendering phase and require the approval of the "client/owner", taking into account "end user" preferences before progressing to the Tendering phase. By the end of this phase the design team should have achieved the following objectives:

1. Develop working drawings and specification documents that describe in detail the project's architectural, mechanical, electrical, and structural systems and also allows for the project realisation;
2. To ensure that the developed design reflects the end user requirements and is in line with the project performance targets as set out during the previous phases;
3. To develop and implement end user engagement strategies and methods
4. To develop a project budget breakdown;
5. To obtain client/owner approval on all planned interventions;
6. To publish and communicate the results.

After the final design of the project has been approved, work can begin on the preparing the detailed construction documentation and the tendering process. The project manager/coordinator initiates the tendering process once these documents are ready and the project's "Constructor" (building contractor, or simply 'the contractor') is contracted. Tendering

can vary depending on the nature of the tendering (e.g. open, selective, selected, etc.), the nature of the project (public, private, PPP, *etc*.) and any local-specific regulations/by-laws at the project's location. It is important that the project manager/coordinator, in cooperation with the owner, sets out very clear, fair, and transparent criteria on how contracts are to be awarded and keep all stakeholders informed on the results of the tendering process.

2.2.9 *The Construction Phase:*

Once the tendering process has been completed and all offers have been evaluated a successful bidder is selected and the construction can phase begin. The chosen bidder is given the contractual document and the project team must now begin work towards achieving the following objectives for this phase of the project:

1. Hold a kick-off meeting with all involved project parties;
2. Develop and implement a construction phase plan;
3. Develop and implement a complaint management procedure;
4. Update and maintain the BIM/DIM model;
5. Update the project time line and budget;
6. Develop the hand over and in-use strategies;
7. Hold regular meetings with the building's end users;
8. Publish information about the progress of the construction work;
9. Complete the construction work.

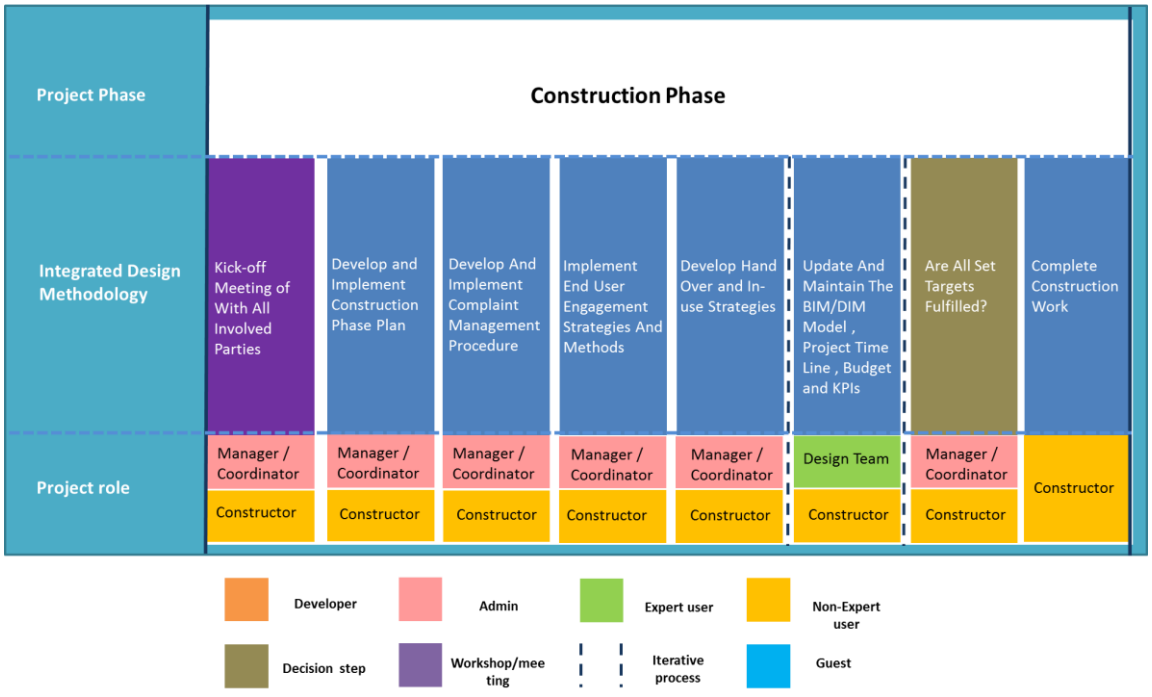

FIGURE 12: OVERVIEW OF THE IDM PROCESS IN THE CONSTRUCTION PHASE (MITTERMEIER *ET AL.*, 2017)

2.2.10 THE HANDOVER & CLOSE OUT PHASE:

Towards the end of the construction phase, when the majority of building work is completed, the hand over and close out phase should begin. Handover of a project to the owner is a very important stage of the project. A well-crafted, efficient and effective transfer of information from project works to the end users and the owner is essential. The transfer of the project, from contractor to client, must consider the health and safety, reliability, standards of operation, maintenance and operational cost efficiencies of the project. The commissioning and fine-tuning operations during handover can have a significant impact on occupants and users if not managed correctly.

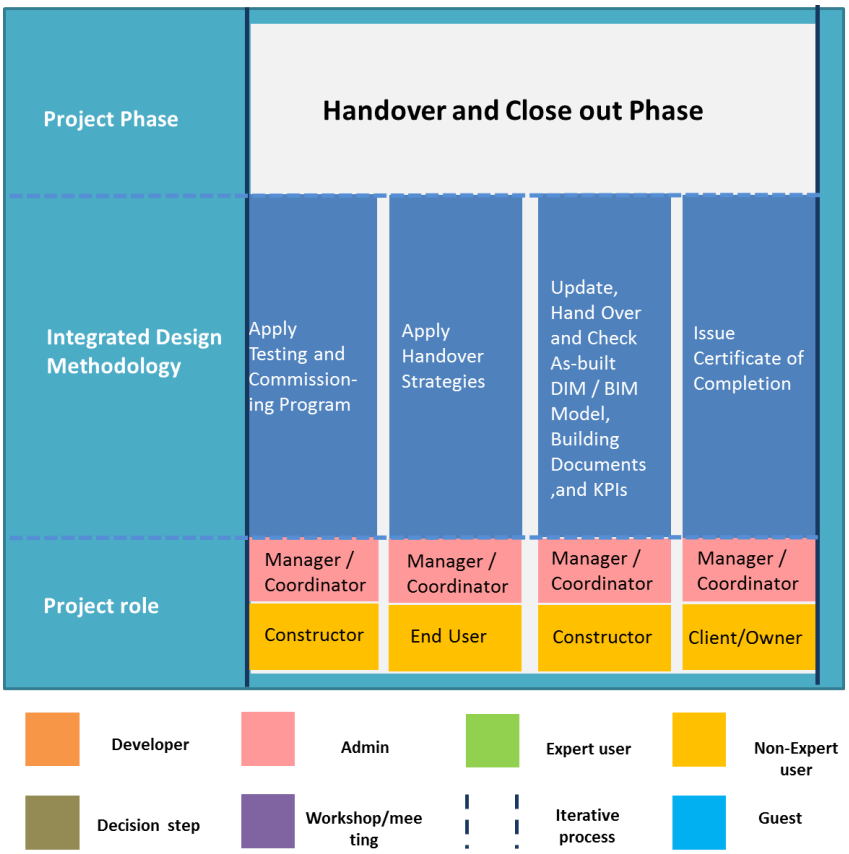

FIGURE 13: OVERVIEW OF THE IDM PROCESS IN THE HANDOVER AND CLOSEOUT PHASE (MITTERMEIER *ET AL.*, 2017)

2.2.11 THE IN-USE PHASE:

It should be noted that meticulous planning during the in-use phase is vitally important. Poor planning for post-occupancy management of the newly installed systems and retrofit measures can lead to misuse, undermining the achievable energy saving targets. Newly installed technologies and measures often require users to be trained on appropriate usage. Therefore, continuous monitoring and feedback plays a significant role during in-use phase activities. To achieve this, one can utilise the NewTREND Premium mode, where all simulated parameters are replaced with real-world data that enables the project manager to monitor project performance and identify weakness relatively early on in a project. Also, it is important that the building's project manager applies continuous post occupancy monitoring to avoid sub-optimal use and

ensure optimal use of the building and its systems. Using the DIM/BIM model of the building is particularly useful here as any changes that occur to the building over its life can be incorporated into the model and it is important that the owner/facility manager of the project, taking on the project management role, maintains updating of all building documentation and modelling data.

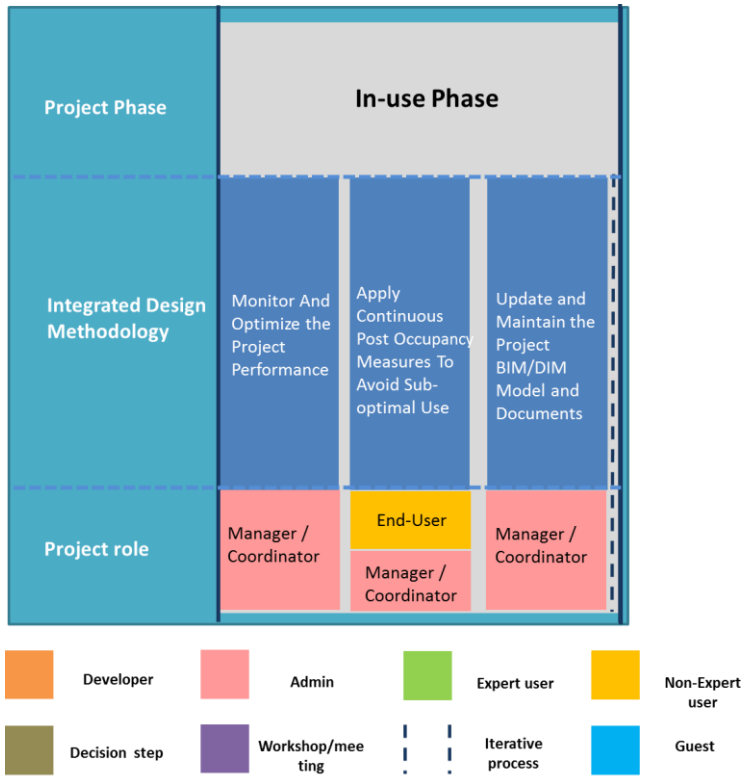

FIGURE 14: OVERVIEW OF THE IDM PROCESS IN THE IN-USE PHASE (MITTERMEIER *ET AL.*, 2017)

Important outcomes for the project team during the In-use phase should include the following objectives:

1. Monitor and optimise project performance to achieve and maintain the designed performance targets;
2. To apply continuous post occupancy investigation measures to avoid sub-optimal use;
3. To update the project BIM/DIM model and project documentation.

2.3 PARTICIPATORY CONCEPTS

The concept of co-design and an overview of participatory methods are outlined in Deliverable 2.5 *Approaches to Occupants Involvement* of the NewTREND H2020 project. O'Connor *et al*. (2016) present methodologies that inform these types of stakeholder engagement and list the types of co-design methods available to the design team, ranging from public forums and focus groups to visioning engagements, design charrettes and citizen juries. Notable early contributions to this field include Arnstein's ladder of participation (1969) and more recently Lindsay's pyramid of user-led design (2003). Both are useful tools for conceptualising the range of levels and kinds of participation available in the design process. Lindsay's model is a step

forward from Arnstein's ladder of participation as it links participation to the specific methods deployed by designers, or researchers, when engaging with users. Having said that neither model is necessarily concerned with building design or building retrofits per se, but they do offer us insights into achieving best practice in terms of user engagement. It is also important to acknowledge that the level of user engagement that can be incorporated into a design process does depend on the openness of the design team (in engaging with users), their experience in doing so and the characteristics of the users themselves. Engagement amongst occupants and users can vary from project to project. Some may be motivated to act as co-designers throughout the design process, while others may not. Some may not be aware of their potential to contribute, they may not wish to contribute, or they may not know how to contribute.

Participatory Design marks a significant step away from the more traditional roles of stakeholders in the design process. This can be challenging for all parties involved. One notable departure is that it promotes the active involvement of stakeholders be they ordinary citizens, employees, customers or building end users all of whom do not occupy a central role in traditional design processes.

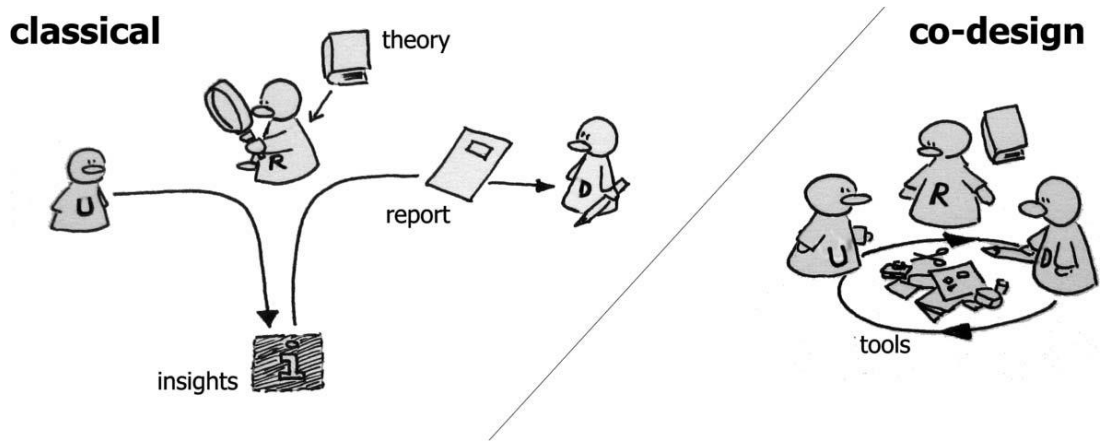

FIGURE 15 TRADITIONAL ROLES OF USERS, RESEARCHERS, AND DESIGNERS IN THE DESIGN PROCESS COMPARED TO THE CO-DESIGN PROCESS (SANDERS AND STAPPERS, 2008: 11 – FIGURE 3).

Referring to Sanders and Stappers (2008) O'Connor *et al.* (2016, p. 13) point out that traditional approaches to user perspectives in building projects, and especially during the design process, can be characterised as follows:

- the users are passive objects of study;
- the researcher (design team) brings knowledge from theories and develops more knowledge through observation and interviews;
- the designer is then the recipient of this knowledge (in the form of a report) and in turn adds an understanding of technology and the creative thinking needed to generate ideas.

By comparison, when adopting a co-design approach 'the roles get mixed up' (Sanders & Stappers, 2008, p. 12). In essence:

- the person who will ultimately be served through the design process is given the position of 'expert of his/her experience' and plays a central role in knowledge development and idea generation;
- the researcher's role within this process is to support the 'expert of his/her experience' by providing tools for ideation and expression;
- the designer and researcher collaborate on the tools for ideation as design skills are central in the development of tools, with the designer continuing to play a pivotal role in giving form to the resulting ideas.

As Robertson and Simonsen (2012) point out, Participatory Design is as much a political process as it is a process for change and as O'Connor *et al.* (2016) also note how participatory design threatens existing power structures by shifting control over the design of a project from the 'professional' stakeholders to customers, consumers or end-users. This can be hugely challenging (and perhaps, even threatening) for stakeholders such as architects, engineers, building owners and commissioning bodies who traditionally have full control over the design process. Participatory design, therefore, entitles the building users and occupants to engage and participate in a project using their knowledge and expertise. Janda (2011, p. 17) argues, 'buildings don't use energy, people do'. Writing from an architectural perspective she explains that despite the central involvement of people in energy use, the role of building occupants and users is poorly understood and frequently overlooked (Janda, 2011). Likewise, Bull and Azennound (2016) claim that there continues to exist an overly narrow view of how technology and user-engagement can interact within the planning, design and development of the built environment, with an associated predisposition to viewing the behaviour of users as a hurdle to be overcome rather than a resource to be utilised. Occupants and building users tend to be regarded as objects about whom data can be gathered, or as data gathering tools themselves. However, for co-design to take place the occupants and users need to be involved in a meaningful way as design consultants themselves and experts on their own lived experiences with the buildings because, as Baird (2015, p. 78) states 'for many aspects of a building the true experts are the people who know most about using it – the users'.

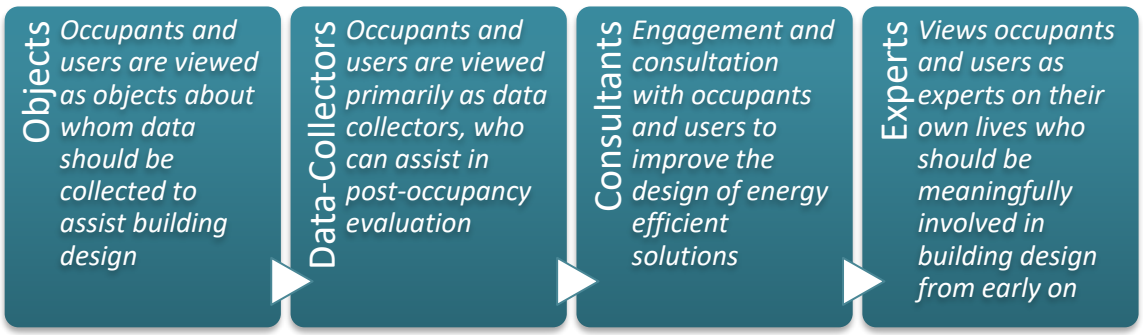

FIGURE 16 ILLUSTRATION OF THE SHIFT IN PERSPECTIVE OF END USERS, FROM TRADITIONAL APPROACHES TO THE PARTICIPATORY CO-DESIGN MODEL

3 KEY METHODS

The following subsections outline the key participatory research methods employed over the course of this project in the context of the demo sites.

3.1 BUILDING DIARY & INTERVIEWS

Occupants and users who took part in this activity were provided with notebooks, and asked to document their day-to-day experiences with the building over the period of a week. They were not asked to focus on energy, they were instead asked to write whatever they wanted to about their experiences with the building. They were also encouraged to draw sketches, or take photos if they wished to do so. They were later interviewed about their diary experience to discuss what they had written, (or sketched, or photographed), and the diary process itself.

The interviews were carried out away from public spaces, in more private settings that were both familiar and comfortable for the interviewees. This approach was chosen in the expectation that the interviewees might become more candid with their responses than if they were in a group setting or an unfamiliar environment. The interviews provided the team with the opportunity to treat those, whose perspectives and experiences were being sought, as having clear agency in the process; essentially being knowledgeable, capable, and reflective participants in the research process (Wiles, Rosenberg, & Kearns, 2005, p. 90). The user-led approach, adopted by the research team, demonstrated the very clear importance of achieving in-depth qualitative understandings of the many ways people use energy and interact with energy technologies. This had very real, applicable merit as opposed to more usual practice of conceptualising users primarily as sources of quantitative data, or assembling an 'average' potential user based on statistical averages.

By incorporating a user-led approach in the design process, the design team should seek to understand the everyday routines of building occupants and users, most notably as such routines influence their use of energy, in addition to their understanding of concepts of utility, comfort, cleanliness, and convenience. This approach presupposes the occupants/users are the experts on their own interactions with the building and it allows designers to determine – in conjunction with those same building occupants and users – which are the most appropriate energy-saving and renewable energy technologies to incorporate into the retrofitted building. This is also the springboard to initiate meaningful changes to energy-related behaviours, especially in terms of effective operation of new technology.

As a qualitative method, interviews are widely acknowledged to enable researchers 'reach the parts which other methods cannot reach [and] probe an interviewee's thoughts, values, prejudices, perceptions, views, feelings and perspectives' (Wellington & Szczerbinski, 2007, p. 81). "

TABLE 4 SUGGESTED CONSIDERATIONS FOR INTERVIEWING

NewTREND Recommendations for Interviewing
• Persons who take part in the interview process are to be referred to as interviewers and interviewees (as opposed to participants / respondents which will be used for focus groups etc) • Face to face interviews are preferable, however, where this is not possible – telephone or conference call interviews are permitted. • Questions should be kept relatively short, simple and neutral. • Only ask one question at a time. • Use probing questions to delve deeper into an answer where relevant – do not be afraid to stray from the suggestion questions. These are semi-structured interviews, deviations, where relevant, are welcome. • Avoid jargon, industry-specific terms and acronyms. • Try to accommodate the interviewee by letting them chose the location for the interview that suits them – however avoid noisy and distracting locations such as restaurants, open plan offices (as these will also be difficult to transcribe). • All interviews to be recorded – audio only. Video recordings are not necessary, and may intimidate interviewees. • Interviewers can make notes of non-verbal communication in lieu of video recording. • All interviews to be transcribed verbatim. No summaries, or omissions of seemingly irrelevant remarks. • Obtain written consent from interviewees • All interviewees and participants to remain anonymous thereafter, use code names e.g. NT18-6.2-001 where NT stands for NewTREND, 18 for the year 2018, 6.2 is the task number, and 001 is a randomly assigned number for an interviewee in place of their name.

3.2 Focus Groups

A focus group can be described rather simply as an in-depth group discussion, under the guidance of a moderator, talking about specific topics of interest to the participants and to the researcher (Folch-Lyon & Trost, 1981). *"The focus group is a qualitative research method for eliciting descriptive data from population subgroups"* (Bendre & Ewbank, 1994, p. 63). The population subgroups relevant to the NewTREND project, and this document in particular, are the stakeholders associated with the three demo-sites in Hungary, Finland and Spain. DoCamillo (DoCamillo, 1995, pp. 616–617) describes focus groups as a powerful exploratory research tool to identify and provide insights into the opinions, attitudes, motivations, participation, behaviour and views of the public, or in this demo-site, a specific group of stakeholders.

The purpose is not to reach consensus (A. C. Lindsay & Hubley, 2006, p. 442) or solutions to a particular problem – those are the aims of a workshop, to be discussed later in this report, but to get the group to discuss their opinions on a particular topic. The moderator is there to create and maintain a non-threatening environment, guide the discussion, keep it on topic, ensure as many voices are heard as possible, and encourage interaction between the group (Goldman, 1962; Montell, 1999; Wilson, 1997). The moderator should not actually be taking apart in the discussion or offering their own personal opinions. *"The hallmark of focus groups is the explicit use of the group interaction to produce data and insights that would be less accessible without*

the interaction found in a group" (Morgan, 1988; in Montell, 1999, p. 63). In a successful focus group the interaction should be between the participants in the group, and not individually between the participants and the moderator. "In contrast to the individual interview in which the flow of information is unidirectional, from the interviewee to the interviewer, the group setting causes the opinions of each person to be considered in the group discussion. Each individual is exposed to the ideas of the others and submits his ideas for consideration of the group" (Goldman, 1962, p. 61).

3.2.1 How Many Should Attend?

The literature suggests that focus groups should have anywhere from four participants as a minimum, to twelve as a maximum. Smaller groups are considered by some (Montell, 1999) to be more appropriate for emotionally charged topics, while larger ones are suitable for more neutral topics. Others feel that too few participants might make it difficult to achieve a suitable level of interaction, while a group too large might be too difficult for the moderator to control (Folch-Lyon & Trost, 1981). The following table indicates some of the examples given in the literature.

TABLE 5 RECOMMENDED NUMBERS FOR FOCUS GROUPS

Recommended # participants	Source	Additional comments
8-12	(Bendre & Ewbank, 1994, p. 63)	
6-12	(Folch-Lyon & Trost, 1981, p. 444)	With fewer than six, difficult or uninteresting topics may not trigger a sufficiently active dialogue, and the interactions between participants will be stymied. With more than 12, not all participants have a chance to present their point of view, and the discussion be- comes difficult for the moderator to control (Folch-Lyon & Trost, 1981, p. 446)
4-8	(Bedford and Burgess, 2001 in Hopkins, 2007, p. 529)	
6-10	(Cameron, 2005 in Hopkins, 2007, p. 530)	
Approx. 10	(Kitchin & Tate 2001 in Hopkins, 2007, p. 530)	
8-12 **4-6**	(A. C. Lindsay & Hubley, 2006, p. 442)	Although traditionally they have consisted of about 8-12 people, smaller groups of 4-6 can also be used.
4-8	(Bedford and Burgess, 2001 in Hopkins, 2007, p. 529)	A focus groups is defined as: "a one-off meeting between four and eight individuals who are brought together to discuss a particular topic chosen by the researcher(s) who moderate or structure the discussion"

Recommended # participants	Source	Additional comments
6-8	(Krueger, 1994 in Umaña-Taylor & Bámaca, 2004, p. 269)	
6-8	Launch Marketing Website 2013	
6-8	(Community Tool Box, 2017)	
8-10	(Meyer, n.d.)	
6-12	Wikipedia & Wikihow	Aside from the participants, facilitator and recorder "no one else should be present unless they have a clear role, such as managing snacks and sign-in sheets. Unnecessary spectators can make participants nervous" (Wikihow.com, n.d.)
6-10	(Drake, n.d.)	
5-10	(Usability.gov, 2017)	
10-12	(Fortune.com, 2016)	
8-10	(NAR, n.d.)	

3.2.2 *Focus Group Aims & Objectives*

The purpose of a focus group is to explore issues that are not well-known to the investigator, such as locally held beliefs, or to elicit opinions on known topics in order to develop an understanding of the participants' perspectives (Bendre & Ewbank, 1994, p. 63), or in this case, issues specific to the use and occupancy of specific buildings. Focus groups are often used to generate a hypothesis for further research and testing using more quantitative approaches (DoCamillo, 1995, p. 617; Umaña-Taylor & Bámaca, 2004, p. 261). For NewTREND, the focus group was designed based on the data that emerged from the interviews, and subsequently informed the design of the workshop to follow. Focus groups are a valuable source of knowledge about determinants of behaviour, and can be helpful in answering questions of how and, in particular, why people behave as they do, (Folch-Lyon & Trost, 1981, p. 443). Its basic function is to indicate "why" rather than "how many." That is, it focuses on understanding the motives of behaviour rather than cataloguing the number of individuals who behave in a particular way, (Goldman, 1962, p. 67). In an interview the interviewee might be tempted to speak without thinking, or to answer in a way that they feel might please the interviewer. In a group setting they can have some more time to consider, explore and clarify their views (Kitzinger, 1995, p. 299). The topic should be of interest to both the investigators (researchers) and the respondents' (participants) (Bendre & Ewbank, 1994, p. 64). Research shows the higher the level of interest, the more detailed and informative the answers will be.

Focus groups are also useful as an Action Research method in that the participants are somewhat empowered by their participation, and having their voices heard (Kitzinger, 1995, p. 300). For example, for our Spanish focus group, participants included occupants and users of municipality owned buildings, as well as municipality personnel. This offered users a platform for communication on an equal footing with their landlords, an opportunity to voice their

opinions and open new communication channels previously unavailable. In a focus group, the participants are consulted as experts, rather than being viewed merely as objects and data collectors as described earlier. Group settings help to encourage a variety of communication form participants, to tap into a wide rate of understanding, as well as to identify group norms and cultural values, or other group insights such as what information seems to be censored or muted within a group, or who the leaders and followers are. A "*group setting is emotionally provocative in a way that an individual interview cannot be*". It can also encourage the participants to generate and explore their own questions and develop their own analysis of common experiences (Kitzinger, 1995). This can help to foster a greater sense of ownership over the issues being discussed. If carefully managed focus groups can also facilitate the expression of ideas and experiences that might be left underdeveloped in an interview and to illuminate the research participants' perspective through the debate within the group (Kitzinger, 1995, p. 302), especially where a voice is now given to a previously hidden or overlooked stakeholder.

In a group setting, "*… the interaction among group members stimulates new ideas regarding the topic under discussion that may never be mentioned in individual interviewing. When a group member does bring, up a new idea, however tangential, the group as a whole is given the opportunity to react to it in a variety of ways that indicate its interest to the group*" (Goldman, 1962, p. 62). The possible reactions to a new idea "*may also demonstrate a second value of group interviewing-the opportunity to observe directly the group process. In the individual interview, respondents tell how they would or did behave in a particular social situation. In the group interview, respondents react to each other, and their behaviour is directly observed*" (Goldman, 1962, p. 62).

3.2.3 *Focus Group Design*

There are numerous and varied suggestions in both academic and industry literature with regards the best methods for designing and carrying out focus groups. There are several areas where the majority of the literature consulted are in agreement however. For example, almost all suggest setting ground rules at the start of the session, especially pointing out that there are no wrong answers, and that everyone's input is valuable, despite whatever hierarchies might exist outside of the focus group. Ideas can come from anyone in the group, not just the highest paid person there (Weissman, 2015). Best practice suggests that group members should be able to sit facing one another, ideally in a circle rather than in rows, in order to encourage maximum interaction (Stewart & Shamdasani, 1990, in Bendre & Ewbank, 1994, p. 65; Kitzinger, 1995, p. 301), and also to create an environment where members feel free to express opinions without concern regarding the approval, disapproval, agreement, disagreement or ridicule of the groups, or facilitator. Ideally the recorder will sit to one side, unobtrusive in their note-taking and recording, while the facilitator will be free to walk around and mingle with the group, interjecting with instruction and encouragement when required (Wilson, 1997, p. 214). Making food and drink available during the session is also considered to be best practice, either during a designated break, or throughout the session.

Some, but not all, of the literature recommends that focus groups should be homogenous, i.e. consisting of participants who are all of the same age, sex, socio-economic group etc. This would not have been possible or even useful with the NewTREND focus groups for various reasons – therefore the homogeneity of the groups will be argued to be defined regarding their roles as stakeholders of a particular demo-site in either Spain, Finland or Hungary, and the members of groups sharing a common interest (i.e. a criterion of "groupness" according to Goldman (1962, p. 61). Therefore, the following statement should be considered: "Most researchers recommend aiming for homogeneity within each group in order to capitalise on peoples shared experiences. However, it can also be advantageous to bring together diverse groups …. to maximise exploration of different perspectives within a group setting" (Kitzinger, 1995, p. 300).

It is also recommended that focus groups have a facilitator and a recorder. This may be the same person, but ideally it should be two different people. For NewTREND we chose the latter. The recorder would also act as the transcriber and translator. The facilitator is responsible for conduction the focus group, for encouraging quieter respondents to speak up, and for quieting garrulous talkers, while exercising caution not to be too involved and generating data that reflects their own opinions or interests. The recorder is responsible for recording the discussion, observing the process and taking notes (Bendre & Ewbank, 1994, p. 68).

Video recording was not used lest it make participants feel uncomfortable, and less willing to speak freely. Audio recording was deemed to be sufficient (e.g. using a Dictaphone, smart-phone, or similar device). Recorders also took notes on the day to be added to the transcriptions later. These notes included non-verbal actions (pointing, smiling, gesturing) and descriptions of activities taking place during the interviews, focus groups or workshops, such as moving to a different room, people entering or exiting, phones ringing and so on. Facilitators, also referred to as moderators, were required to ensure that pacing as appropriate, not to move too quickly from topic to topic, and yet not to linger too long on a topic. They were also instructed to be willing to wait, encourage or cajole participants in order to elicit responses (Bendre & Ewbank, 1994, p. 68).

The facilitator must ensure that the focus group is conducted as an open conversation in which any participant may comment, ask questions or respond to others. Interaction among the participants is key. It is not appropriate for all conversations to only take place between the participants and the facilitator (Montell, 1999). The facilitator is there to facilitate the discussion only. They must remain neutral and keep the conversation on topic, or at least within reason. Some diversions may be welcome where a new topic seems unrelated, but is actually revealing unconscious motives or attitudes. In addition, they facilitator must not show any bias, as participants will be sensitive to this, and it could compromise the resultant data (Goldman, 1962, p. 64). With regards the specific logistics and technicalities of focus groups, the minimum time recommended is generally one hour, with two hours being the maximum time allowed for conducting a focus group.

3.2.4 *Focus Group Tactics*

TABLE 6 FOCUS GROUP TACTICS

Tactic	Description (also applies to Workshops, and any other group based engagement activities)	Source
Direct Questions	Questions should be open-ended and neutral. Questions should be singular, about one topic at a time. Questions must be clear.	(Rosenthal, 2016, p. 511)
Illustrative Case Method	Several people are described who differ from each other according to the intensity or consistency of some behaviour. Then the group members are asked to describe the other characteristics of the person."	(Goldman, 1962, p. 65)
Stereotype Photographs	show pictures of people who typify a particular age, income or vocational group and ask questions like, which one of these would be most likely to use/do X Y Z	(Goldman, 1962, p. 65)
Deprivation Questions	which of the following things would you miss if it was no longer available to you is more provocative than which of these is more important to you	(Goldman, 1962, p. 64)
Calculated deception	'playing devil's advocate' to test the participants / respondents' conviction	(Goldman, 1962, p. 65)
Sophisticated Naivete	asking the group to explain the obvious; 'what do you mean, I am afraid that I did not understand' 'this isn't my area of expertise' *etc*.	(Goldman, 1962, p. 66)
Body Language	Using gestures – a raised eyebrow, leaning forward, a shrugged shoulder	(Goldman, 1962, p. 66)
Structured Eaves Dropping	the researcher takes a back seat, encouraging the group to talk	(Kitzinger, 1995, p. 301)
Interventionist	Adopting an interventionist approach, intervening when appropriate to move the discussion on, encourage the group to discuss inconstancies	(Kitzinger, 1995, p. 301)
Statement Cards	Presenting the group with statements written in cards and asking the group members, collectively, to sort the cards into different piles depending on their level of agreement or disagreement with the statements, or the levels of importance	(Kitzinger, 1995, p. 301)
Ice-breakers	Use ice-breaker questions (e.g. personal introductions) or activities to set the tone, and maintain it with conversational language throughout.	(Taylor, 2016)
Experience or Behaviour Questions	Experience or behaviour questions are designed to get at an interviewee's actions, either past or present. In particular, a participant's responses should reflect a direct observation that could have been made by watching the participant.	(Rosenthal, 2016, p. 510)
Sensory Questions	Behaviour questions are often followed by sensory questions. This is a particularly useful questioning strategy because sensory questions focus on things that the interviewee	(Rosenthal, 2016, p. 510)

Tactic	Description (also applies to Workshops, and any other group based engagement activities)	Source
	physically experienced, and can help them to better remember other experiences or behaviours.	
Opinion or Value Questions	Opinion or value questions, as the title implies, are designed to elicit interviewees' understanding of a particular phenomenon or experience, and provide specific insight into their goals and intentions.	(Rosenthal, 2016, p. 510)
Knowledge Questions	Knowledge questions seek factual information from interviewees.	
Feeling Questions	Feeling questions are slightly different than opinion or value questions as they are intended to elicit a description of an emotion from the participant. As such, it is particularly important to develop the wording of these questions carefully. Consider the following example: Interviewer: How do you feel about that? Interviewee: I think that's probably the best we could expect. Here the interviewer was looking for the interviewee to reply to this question with something like, "Well that experience made me feel really happy." However, the interviewee's interpretation of the question led them to provide their opinion about the circumstances, that is, "[It was] the best we could expect." To avoid such a situation the interviewer should have reworded the question to ask, "What emotion did that situation evoke?"	(Rosenthal, 2016, p. 510)
Background or Demographic Questions	background or demographic questions allow for the characterization of the people participating in the in- depth interview or focus group. However, if a careful and thoughtful sampling strategy has been utilized much of this information should already been known by the researcher. In general these questions should be kept to a minimum as they can be interpreted as boring, and potentially insulting to participants. If additional background information is required consider asking interviewees to complete a screening form before the in-depth interview or focus group.	(Rosenthal, 2016, p. 510)
Avoid leading or laden questions	Examples of leading questions are "The first part was much better than the second, wasn't it?" ; "Do you agree that the first part was better?" ; "Most people think the first part was better, what do you think?" Avoid questions which use emotionally charged or value laden words, for example, questions such as: "Would you be for or against unhelpful management practices which force...."	(HSE UK, n.d.)
Probes	Probes are questions where the facilitator asks for more information or more detail. They can be very useful in assisting with the flow of the discussion and for encouraging participants who give brief or ambiguous contributions to say more. Examples of probes are: "Could you tell me a bit more	(HSE UK, n.d.)

Tactic	Description (also applies to Workshops, and any other group based engagement activities)	Source
	about that?"; "I'm not quite sure what you mean....?"; "Could you explain a bit more?" "How does that work in practice?" "Can you give us an example?"	
Overcoming dominant personalities	This is typical in any group, there's always one person who tries to dominate the discussion: Shift attention to other speakers, call on them by name to share their opinion and/or Decrease eye contact.	(Taylor, 2016)
Overcoming quiet / shy personalities	It can be uncomfortable for some people to open up in a group setting: Explicitly invite this person to answer. Encourage them with smile and nods.	(Taylor, 2016)
Overcoming "ramblers" and incessant talkers	Don't let a rambler derail the focus group: Wait for them to take a breath, and then quickly interrupt and call on another participant. And/or Repeat the question and call on some else.	(Taylor, 2016)
Overcoming Groupthink	It's easy for one person to sway other members of the group to start thinking and feeling the way they do and it's important not to let that happen: Ensure participants that their individual opinion is essential to the success of the focus group. Don't allow a single group member to be the centre of attention for very long. Call on individuals instead of allowing them to just speak out, for example, "Dan, can you tell us about your last conference experience?".	(Taylor, 2016)
Summarise	Summarize what you think you have heard, and ask if the group agrees, Phrase the same question in a different way, ask if anyone else has any comments on that question, ask a follow-up question, look around the room, and make brief eye contact, especially with those who may not have spoken.	(Community Tool Box, 2017)

3.3 WORKSHOPS

3.3.1 DEFINITIONS

A workshop is not a focus group and vice versa. However, there are many similarities between the two. Much of the previous section on Focus Groups will apply also to Workshops in terms of selecting participants and venues, numbers, handling and managing the conversation and other tactics. Therefore, this section will avoid repetition where there is an overlap between the two methods, and will only discuss where a workshop varies from a Focus Group. In general, workshops are required to consist of about 8 to 12 participants, rather similar to a focus group, and the specific aims and objectives are to be decided on a case by case basis, in NewTREND, the aims and objectives of the workshop were derived from the outcomes of the previous engagements, the diary process, interviews and focus group.

The main difference between a focus group and a work shop is that the focus group is all about the conversation, eliciting opinions, different viewpoints and so on, whereas a workshop is more about achieving a task, reaching goals or arriving at a consensus. Workshops are also often

considered to have an educational function, and tend to go on for longer than focus groups, perhaps three hours, a half-day or more. According to Bekrun, (2013), *"A 3 hour lecture is not a workshop. The word workshop implies that **work** will be done in a **shop** like atmosphere. This means the centre of attention should be on the students doing work, not on the expert gloating in their own ego. A cooking workshop means students cook things. A writing workshop means students write things. If most of your "workshop" is people not actually making anything, you should perhaps call it a class, a lecture, or a mistake."*

3.3.2 Workshop Design

In addition to the focus group design notes discussed in the previous section, it should be noted that workshops are by their very nature suitable for participatory action research because the participants are required to participate and be active in the process in order for the workshop to be a success. The participants bring valuable experience and ideas to the table. The workshop should be thought of as a shared enterprise between the organisers and the participants, rather than an opportunity for so-called experts to lecture (NAGT, 2017). The organisers must be prepared, and prepare the participants. Send them an agenda, or some reading material, or any other information that might prepare them for what will take place in the workshop. This will ensure that less time is wasted on the day trying to get everyone in the correct frame of mind. It is then up to everyone, organiser, facilitator, and participant to ensure that they are each prepared for the event (Weissman, 2015). Consider the background and potential participants, and ensure that the material is not graded inappropriately, i.e. that it is not too technical, too scientific, too specialist. In some situations, it may be necessary to do some background research on your participants or to undertake a pre-workshop survey in order to ensure that the agenda will be suitable. This was not necessary for the NewTREND workshop however, as the information was to be graded for the general public, and therefore would not, for example, exclude those who do not have a technical or building construction background, such as building occupants and users.

Workshop activities should be varied, and include physical movement. Participants should be encouraged to work with their hands, and to move around the room. Multiple techniques are encouraged, from sketching, to writing, to watching short animations, presentations or video clips, or any other presentation method that might be deemed appropriate, inclusive, and interesting to the participants at the very least, and innovative and entertaining if possible.

3.3.3 Workshop Tactics & Activities

Workshop tactics are generally the same as focus groups in terms of how to deal with particular obstacles, and questioning techniques. As workshops are usually longer than focus groups, it is recommended to give time markers throughout. Such as telling people that an activity is about the end in two minutes, or that there will be lunch in 20 minutes. This will help to maintain focus as people know that they do not have long to wait for an activity to finish or food to arrive for example.

TABLE 7 SUMMARY DESCRIPTION OF TYPICAL STAKEHOLDER ENGAGMENT ACTIVITIES

Typical Activities (Many also be suited to focus groups)	Summary Description (Note: Extended descriptions with examples, images, and diagrams of each of these activities were created as part of the guidelines given to the facilitators and recorders of each NewTREND stakeholder event)
Brainstorming & Ideation	The purpose of this activity is to generate ideas rather than to analyse or make decisions. It encourages out-of-the-box thinking, and is focused on quantities of ideas rather than quality (for now). Everyone is equal in brainstorming. All ideas to be teased out and developed. Do not let the group fixate on one idea, on assumptions, or on constraints, e.g. how would you fix this problem if you had full control and an unlimited budget for example.
Design Charette	A charrette is an intensive design process where people from different backgrounds, industries, or professions, are brought together over a short period of time to solve a specific design problem. It is similar to brainstorming, but specific to a design issue. Technical presentations, architectural or engineering drawings, virtual or physical models may be required.
The Graffiti Wall	This is a "check-in" activity that introduces a topic in a broad manner. It can be a whiteboard, a pin board, or simply a wall with post-it notes stuck to it. As participants enter, introduce yourself, ask them a question like "what does this project/building mean to you?" and give them 5 post-it notes for their answers. The answers generated will fuel a discussion, but no analysis or judgement, and I the process gets the participants acting and thinking about the topic.
Punctual Paulo	This is another "check-in" activity to help participants and organisers to remember each other's names. Everyone (organisers included) sits in a circle, and they are asked to think of an adjective that starts with the same letter as their first name, e.g. Hi, I am Punctual Paulo. First everyone says their own name and their adjective, then everyone takes turns to introduce the person to their right, and then to their left.
Other Check-In Activities	Examples include; Cross Your Arms, The Anonymous Note, One Word Check-in, and Safety Check
Who Am I?	This is an "ice-breaker" activity. Write the names of famous people or characters on post-it notes, e.g. Superman, Harry Potter, Prince Charles. Get people to stick them on their foreheads so they cannot see who they are, and get people to guess their identity by asking Yes or No questions. This can also be used as a refresher activity after a break, or in long sessions.
The Elephant in the Room	This is also an "ice-breaker" that can be used to approach a contentious topic. Participants are asked to think about their elephants, say in a building it could be lack of maintenance, and label their elephants under the following headings; CIA for control, influence and accept. Discuss.
Other Ice-breakers or Refresher Activities	Examples include; Visual Phone, Tall Tales (aka "and then" tales), The Radio Station, Expectations Exchange, Barriers & Beliefs, and Paper Tearing
The Peer Introduction Game	This is a team-building activity for team formation where the team members do not already know one another. Split the group into pairs. Get the pairs to chat to each other and find out basic information about the other person, e.g their

Typical Activities (Many also be suited to focus groups)	Summary Description (Note: Extended descriptions with examples, images, and diagrams of each of these activities were created as part of the guidelines given to the facilitators and recorders of each NewTREND stakeholder event)
	name, nationality, organisation. Then get everyone to introduce their paired partner.
Other Team Building Activities	Examples include; The Roles We Play, Ground Rules
WWW, LLL, LLLL, KALM, DAKI & Repeat/Avoid	This is a retrospective activity where participants are asked to think about things that were done in the past and grade them on their success or failure as either: WWW (Worked well, kind of Worked, and didn't Work in the past), LLL (Liked, Learned, Lacked), LLLL (Liked, Learned, Lacked, Longed for), KALM (Keep, Add, More, Less), DAKI (Drop, Add, Keep, Remove) or Repeat Vs Avoid.
Other Retrospective Activities	Examples include; Known Issue / Marginal Gains
5-Whys Root Cause Analysis	This is an analytic activity to help understand the root causes of a problem, not just the symptoms so that improvements or corrections can be made in the future. Start off with describing what the problem is, e.g. staining on ceiling that keeps needing to be re-painted, answer, e.g. why? Because there is a leak. Why? Because the roof was damaged in a storm. Solution: Fix the roof (root cause) not re-painting (deal with symptoms).
Fishbone or Ishikawa Diagram	This is similar to the 5-Whys Root Cause Analysis and has arisen out of Lean Management Principles. Write the problem on the left, and draw a horizontal line to the right of the page with a series of lines above and below at around 45 degrees from the horizontal (which resembles a fishbone). Write the key factors at the top of each of these lines, and then write the subsidiary factors are lines angled from those lines.
Factor or Issue Identification	These can be used in the previous two activities to identify the issues. The 6 Ms (used in manufacturing): Machine, Method, Material, Man power, Measurement, Mother nature) The 7 Ps (used in marketing): Product (incl. service), Price, Place, Promotion, People (incl. personnel), Positioning, and Packaging. The 5 Ss (Used in Services): Surroundings, Suppliers, Systems, Skills & Safety
The World Café	Set up small café style tables in the room, tables that seat 4 to 5 people with large sheets/rolls of paper, or paper table cloths that can be written on. These tables will be the conversation clusters. Less than four people limits conversation diversity – more than five limits personal interaction. Create a café atmosphere; play background music, or place drinks and snacks at the tables (no messy food). Hold three rounds of conversation of approximately 10 minutes each. As items are being discussed, participants are encouraged to write, draw, sketch, graph their ideas and thoughts on paper/tablecloth. After the first conversation ends, the facilitator askes one person to remain at each table as the "host", and all others to move to another table. The host of each table welcomes their new guests and introduces them to the ideas already on the

Typical Activities (Many also be suited to focus groups)	Summary Description (Note: Extended descriptions with examples, images, and diagrams of each of these activities were created as part of the guidelines given to the facilitators and recorders of each NewTREND stakeholder event)
	table from the previous conversation. Then the new participants continue the process adding new ideas (writing, drawing on the paper/tablecloth) to the existing ideas already on the table.
Mind-Mapping	Start in the middle of the page so that there is plenty of room to work outward in all directions. Use images, drawings or pictures, especially for the central idea, as this will help to inspire the imagination, focus and concentration. Use curved lines rather than straight ones – and write along the lines (or branches). Use plenty of colours Make sure to connect the branches because the brain works by association, connecting things together, associating things with one another. Try to use only one keyword per line/branch. Single words give the mind map more flexibility.
Other Action Planning & Analysis Activities	Examples include; Hopes and Concerns, Telos Thinking, Project Plan Template, PTSB (Problem Solving Team Building), RACI Matrix used to decide which stakeholders are; Responsible, Accountable, Consulted, or Informed.
Filtering and Ranking Activities	These activities are used to sort, filter and rank ideas. Examples include; Feasible X Useful Graph, Most Likes Vs Dislikes, The Options Framework, and SWOT Analysis (Strengths, Weaknesses, Opportunities, and Threats).
Check-Out Activities	These can range from very simple, such as summarises the session or asking participants to give it a rating, say how they are feeling (the one word check-out) to asking them to fill out a feedback/completion survey.
Open Space Technology	See Summary of the Stakeholder Engagement Through the LAT Meetings.

4 REPORT ON ENGAGEMENTS

4.1 STAKEHOLDER IDENTIFICATION & CATEGORISATION

The stakeholder engagement activities in this project were divided into two strands. Firstly, there were specific stakeholder engagements associated with the development of the NewTREND tools, primarily the Local Advisory Team (LAT) meetings and surveys. This strand of activities focused on the types of stakeholders who would normally be involved in project teams, such as those designing, building and financing projects. This process is described in detail in the deliverables for Task 6.3 and Tasks 7.5 to 7.9. The second strand of activities primarily focused on building occupants and users, the often-overlooked stakeholders. This is the strand of stakeholder engagement most pertinent to this report.

The following table summarises and categorises all previous stakeholder types engaged with for previous NewTREND deliverables. Divided into five basic groups they include: those who **use** buildings, those who **own** buildings, those who **design** them, those who **build** them, and everyone else. While this is based on the lifecycle of any building, and is not specific to the use of the NewTREND tools, or financing options, it is intended for broad and all-encompassing stakeholder identification purposes at the start of any building or retrofitting project. Stakeholders may be grouped in other numerous formats based on the specific task at hand, such as allocating access privileges to the NewTREND tools or assessing financial business models for the works. This simplification, however, is very useful for casting a wide net to capture as many stakeholders as possible, and for ensuring none are overlooked from early on. By using this same categorisation, and delving into the roles of each of the five groups, it is also possible to get a broad overview of value creation by each of the stakeholder groups, as indicated in the proceeding table.

TABLE 8 STAKEHOLDER TYPES AND ROLES

Occupants & Users	
Occupants	Residents, Tenants, In-Patients
Users	Staff, Students, Visitors, Patrons, Out-Patients
Sub-Groups	Representatives e.g. Building Rep.
Owners	
Client	Project instigators, Building owner, developer, long-term lease-holder
Owners Representatives	Project Managers, Assistants, Client Representatives
Sub-Group	Admin, PA, Accounts
Designers	
Architectural	Architect, Technician, Technologist, Interiors, Landscape,
Engineering	Engineers; civil, structural, mechanical, electrical etc,
Visuals	Draughtspersons, Architectural Artists, BIM tech, CAD tech, Model Makers, Graphic Designers
IT	UX Design, Web Design, Social Media Platforms
Sub-Group	Admin, PA, Team Specialists, Document Control
Builders	
Main Contractor	Main Contractor, Sub-Contractors, Maintenance Contractors

Specialist Contractors	Demolition, Ground works, Enabling works, Installers (curtain walling, elevators, HVAC etc)
Sub-Group	Admin, PA, Team Specialists, Document Control
Others	
Local Authorities	Building Control, Health & Safety, Municipalities and Local Government, Traffic Management, Planning Authority, Permits etc
Public Interest Groups	Neighbours, Residents Associations, Business Associations, Sports and other Local Clubs and Societies, Neighbourhood Watch, NGO's, Politicians etc
Sub-Group	Representatives, Points of Contact for large groups etc

Value creation on a construction project, and the definition of value, varies in the perception of each stakeholder. While one may value monetary gain such as increased property value or decreased running costs over all, another may place greater value on thermal comfort or the associated health benefits. Additionally, while the financiers and owners provide financial value to the project, others provide physical labour, knowledge and expertise, and value is created in the form of physical elements (foundations, walls, roof) while others create value in the form of design input, or profile or reputation.

TABLE 9 VALUE CREATION ON A TYPICAL CONSTRUCTION PROJECT

Value of & Created by…	Initiation & Viability Stage	Design & Planning Stage	Construction & Installation Stage	Operation & Maintenance Stage
Owners / Client	Initiates project, secures funding, delegates work, personal and business contacts, personal and professional knowledge and experiences, project brief	Pay PM and design team, approval of works, signing of documentation, making decisions	Pay PM, construction team and design team, approval of works, signing of documentation, making decisions	Ownership and upkeep of buildings, use of energy, asset management
Occupants / Users	Demand, urgency, impetus, money (rent *etc.*), design input	Personal experience, knowledge, and observation, requirements	Facilitate smooth operations on site	Occupation, use and upkeep of buildings, use of energy, rent/lease payments
Designers	Professional experience, qualifications, skills, talents, reputation, design ideas, options	Professional experience, qualifications, skills, talents, designs	Professional experience, qualifications, skills, talents, updated designs	Certification, warranties, post-occupancy works, post-occupancy evaluation, monitoring and lessons learned

Builders	Professional experience, qualifications, skills, talents, reputation, build ideas, options	Professional experience, qualifications, skills, talents, design input	Professional experience, qualifications, skills, talents, built/installed elements	Certification, warranties, post-occupancy works, post-occupancy evaluation, monitoring and lessons learned
Others	Demand (e.g., market demand, societal demand, community needs *etc.*)	Feedback, comment, constructive critique, goodwill	Feedback, comment, constructive critique, goodwill	Development & use of the district, market values, on-going business

NewTREND's approach to stakeholder engagement has been designed to be flexible, focusing on assisting stakeholders through the critical questions that need to be asked in planning a process of occupant and user engagement. In addition, emphasis was placed on helping stakeholders navigate the options available to them, and ultimately deciding from those options to devise their own tailor-made solutions. At each step in the process, a number of options are presented, which enables stakeholders develop a process of occupant and user engagement that is customised to the needs associated with their individual project. The three main steps involved are:

1. Deciding what level of occupant and user engagement is suitable for the project;
2. Choosing the appropriate suite of methods to use;
3. Combining these into a tailored engagement plan.

From the outset of a project, it is necessary for the project manager to estimate what level of occupant and user engagement is feasible and, indeed, desirable. This will depend on three factors: the characteristics of the building; the characteristics of the traditional stakeholders (most notably the client and the design & build teams), and the characteristics of the occupants/users of the building itself. Obviously, the associated budget and timescale will also have a bearing on this. Deliverable 2.6 offers a detailed outline of the types of engagement that can be utilised to ensure the participation of as many stakeholders as possible and is heavily influenced by the principles of inclusion, and co-design, the following graphic summarises these options.

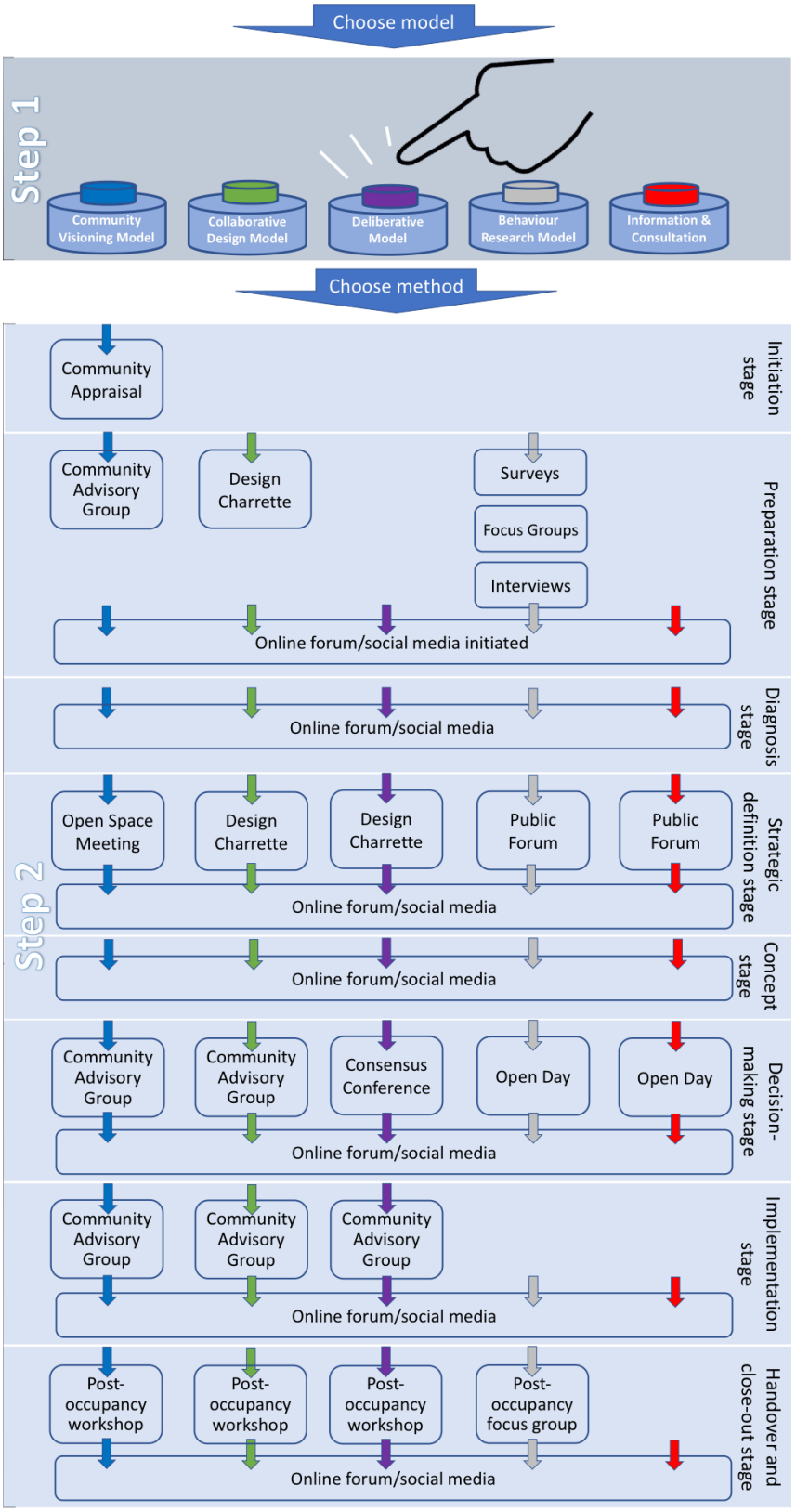

FIGURE 17 OVERVIEW OF NEWTREND ENGAGEMENT APPROACHES (O'CONNOR, MACSWEENEY, & DUNPHY, 2016)

4.2 Specific Stakeholder Engagement Activities Undertaken

This process is summarised in Figure 17 above, with the step-by-step diagram offering a baseline indication of the types of stakeholder engagement models available. Using the engagement models outlined in previous deliverables, the NewTREND team designed and implemented a series of in-depth engagements with stakeholders; primarily in Spain, Finland, Hungary, Germany, Italy and Ireland for Work Packages 1, 2 and 6. The criteria for engagement was informed by the feasibility within the project's budget and time frame, the limitations of the retro-fit projects at each of the three case-study demo-sites, in addition to being dependent on the availability of participants. The table below indicates the suite of methods used, as outlined in Figure 17.

The techniques available to us are; Public Forum, Focus Group, Workshop, Brainstorming, Visioning, Open-Space Technology, Design Charrette, One-on-one Consultation, Interviews, Surveys, Open-Days, Participant Observation, Walk-through, Design games, Opinion Poll / Online Poll, Community Appraisal, Citizen Advisory Group, DEMOCs, Deliberative Polling, 21st Century Town Meeting, Consensus Conference, Appreciative Enquiry, Citizens Jury, E-Panel, Online Forum, Public Participation GIS, Hackathon, Citizens Summits, & Social Media.

TABLE 10 THE SUITE OF METHODS AVAILABLE, AS OUTLINED IN TASKS 2.5 AND 2.5 OF THE NEWTREND H2020 PROJECT.

Approach	Description	Used in WP6
Public Forum	Not used. See deliverables T2.5 for more detail on this method.	No
Focus Group	Described in more detail in the previous chapter	Yes
Workshop	Described in more detail in the previous chapter	Yes
Brainstorming Session	Utilised as an activity within Focus Groups and Workshops rather than a stand-alone activity	Yes - Adapted
Visioning	Utilised as an activity within Focus Groups and Workshops rather than a stand-alone activity – described later	Yes - Adapted
Open Space Technology	See details on the Local Advisory Teams LATs, utilised primarily for T6.3 & T7.9, and not analysed here in T6.2	Yes T6.3 & 7.9
Design Charrette	Was not feasible / suitable due to the nature of the projects being undertaken	No
One-on-One Consultation	Adapted for purpose of the building Diary process and face-to-face interviews	Yes - Adapted
Interviews	Described in more detail in the previous chapter	Yes
Surveys	Used earlier in the project as part of another deliverable, and also used as part of the LAT process, as part of deliverable D6.3	N/A T6.2
Open-Day	Used earlier in the project as part of another deliverable	N/A T6.2
Participant Observation	Used throughout (participation observations are noted in the following chapter)	Yes, but not specific to T6.2
Walk-Through	Not used. See deliverables T2.5 for more detail on this method.	No
Design Games	Not used. See deliverables T2.5 for more detail on this method.	No
Opinion Poll / Online Poll	Used earlier in the project as part of another deliverable	N/A T6.2

Approach	Description	Used in WP6
Community Appraisal	Community Appraisal is type of participatory research that involves capturing the perspectives of members of a community on particular issues. As part of the scope of NewTREND, three communities were chosen, in Spain, Finland, and Hungary.	Yes, in the early stages not part of this deliverable.
Citizen Advisory Group	Not used. See deliverables T2.5 for more detail on this method.	No
DEMOCs	Not used. See deliverables T2.5 for more detail on this method.	No
Deliberative Polling	Not used. See deliverables T2.5 for more detail on this method.	No
21st Century Town Meeting	Not used. See deliverables T2.5 for more detail on this method.	No
Consensus Conference	Not used. See deliverables T2.5 for more detail on this method.	No
Appreciative Inquiry	Not used. See deliverables T2.5 for more detail on this method.	No
Citizen's Jury	Not used. See deliverables T2.5 for more detail on this method.	No
E-Panel	Not used. See deliverables T2.5 for more detail on this method.	No
Online Consultation / Online Forum	Not used. See deliverables T2.5 for more detail on this method.	No
Public Participation GIS	Not used.	No
Hackathon	A Virtual Hackathon process was used in the software and tool development as the participants were spread across Europe in Ireland (UCD), the UK (IES), and Italy (STAM, iiSBE, UniVPM).	Yes - Adapted
Social Media	Webpage: http://newtrend-project.eu Twitter Account: @NewTREND_EU LinkedIn: www.linkedin.com/company/newtrend-eu-h2020/ Facebook: www.facebook.com/NewTREND.EU/	Yes

The strand of engagement for the occupants and users began with occupants and users being asked to carry out a diary exercise in which they were asked to write about their daily experiences with their buildings. Observations could include their thoughts, emotions, and any topic they wished that offered the team an insight into their relationships to the buildings they resided in. They were encouraged to write openly and candidly, as well as to draw, or take photos. They were then interviewed about the process, about what they wrote, and about their buildings. The outcomes of the diary exercise in turn informed the design of the focus groups and workshops that were carried out afterwards. These group exercises were designed with great care to ensure effective participation and communication; and to avoid common pitfalls associated with such events, where the organisers revert to giving what are essentially long lectures and presentations with minimal interaction from participants. The organisers' key role was to encourage and facilitate dialogue.

Each diary, interview and group event was recorded, transcribed and translated to English. Generally speaking, transcribing takes approximately four hours for every one hour of audio. However, this can vary depending on the quality of the audio, speed, the accent of speakers or the volume of speech, crosstalk, and typist speed. Translation quality varies according to the level of linguistic proficiency of the translator, and the quality of the transcription, especially for group events where there are several people speaking. This process also adds significant time to the extrapolation of data from each of the stakeholder engagements. The completed translated transcripts were then imported into Nvivo software for coding purposes. This was carried out by highlighting individual segments of each transcript and assigning a code for topics of discussion such as “decision-making”, “insulation”, or “thermal comfort”. Once all segments of text in all of the translated transcripts are coded data analysis of the findings can take place.

4.3 Summary of the Stakeholder Engagement Through the LAT Meetings

4.3.1 Background

The strand of engagement which focussed on the more traditionally involved stakeholders, such as designers was carried out through what were called LAT meetings. These engagements are discussed in more detail in the deliverables for Tasks 7.5 through to Task 7.9, and summarised here. The level of success the design team experiences when engaging a Local Advisory Teams very much depends on the degree of ‘active’ participation on the part of the stakeholders. Involving users in this activity is an essential part of the process since it provides a platform for receiving important feedback on both the positive and critical aspects of the project. In addition, it allows for greater understanding, on the part of the team, of the available pathways to bring digital plans and ideas into real-world contexts. To this, it is important that the organising of stakeholder involvement is done correctly, beginning with which stakeholders should be chosen to contribute. For the stakeholder selection, the following questions need to be addressed:

- How will the stakeholders be affected by the outputs of NewTREND?
- Are they the target group of the project? If so, are they the sole target?
- Will they be able to contribute fully to the final results of the project?

The importance of including the perspective of the various stakeholders should not be underestimated, as this can significantly impact on the relative success or failure of the project management team’s strategies. Therefore, encompassing as many different (but relevant) stakeholders as possible is vital. In the context of the LAT process, ensuring the simultaneous presence of all the four target groups has not always possible given the reluctance to participate in LAT meetings that occurred in some demo-site areas.

The contributions made to the topics explored during the LAT meetings varied reflected the variety of experiences of the participants involved and from target group to target group. Therefore, it was necessary to adopt a multi-perspective approach to the analysis and understanding of these contributions, which in turn allowed for more useful feedback to improve the overall goals of the project.

4.3.2 *STAKEHOLDER COMPOSITION*

Stakeholders involved in LATs meeting were categorised into four main target groups: 1.) professionals, 2.) occupants, 3.) financial organisations, and 4.) administration and policy makers. It should be noted that the most active stakeholders were those who were involved in the process from the very beginning. This may in part be explained by these participants wishing to see how the NewTREND project developed and as a result having a certain degree of "ownership" from their initial contribution in the first LAT. A combination of this curiosity and careful planning on the part of the organisers helped ensure these participants engaging in subsequent meetings. Consequently, those who took part in the LATs from the beginning have a strong understanding of the project, especially its overall goals and the tools that have been developed. This familiarity and proximity to the project also helped create a space where participants could comfortably consider, debate and ultimately cooperate on shared views on current issues, in addition to deliberating on future application of the systems implemented by the project.

4.3.3 *ENGAGEMENT PROCESS*

Initially, invitations were made directly through the networks of those organising the engagements with communication comprised, in the main, via telephone. Other communication tools that can be adopted, especially where subjects who are not directly known to the promoter of the LAT, with e-mail taking precedence. E-mail has the added advantage of sharing accurate additional information referencing the NewTREND website and the project's various social network platforms (*e.g.* LinkedIn, Twitter, Facebook, *etc*.). The Participants were also given the *Agenda* and project flyer with an outline of the following:

- the date, place and duration of the meeting
- the timescale involved, especially the distribution of activities to be carried out and the time involved for each
- the main topics to be discussed

Invitations were shared at least two weeks before the event, to allow participants to reorganise their work schedules and be in a position to participate. Word-of-mouth is another useful recruitment activity and can also be helpful in sharing information with work colleagues and others in their various networks with potential interest in the project.

Initial training of participants on the themes addressed by the project were, in the main, conducted through the Microsoft PowerPoint platform. Once the topics to be addressed during the LAT meeting had been agreed by the NewTREND team, this master template was then subdivided into different parts among each the relevant partners. These contributions were then reassembled into a single presentation to be used by all the Partners conducting LAT meetings in their respective local contexts.

All text and the contents of the presentation are written in English, which were then translated for use in each of partner's local languages. Where translations could not be done, the project partner provided an explanation of the content in the language the participants used.

Comprehension of the contents is essential for stakeholders to be able to provide quality feedback that supports the goals of the project and can be used to improve the final expected results. In addition to the PowerPoint presentations, the team also showed a number of short, practical videos concerning the operation of the different components of the NewTREND Platform. Participants were also given questionnaires to provide feedback on the presentation content. This feedback provided a variety of perspectives that reflected the skillset and goals the participating stakeholder brought to the LAT.

4.3.4 *Detailed Surveys for the Stakeholders Involvement*

The importance of the questionnaire proved to be of considerable significance to the project team given the need for feedback regarding the operation of the Tools of the NewTREND platform and also to understand if the communication system adopted was effective or not. In order to get quality feedback from a survey that is both applicable and measurable it is essential that the questionnaire is designed properly. This can be a difficult balance between keeping the questionnaire as short as possible – so as not to deter the person filling out the questionnaire – while at the same time capturing as much relevant information as possible. Therefore, it is important that a clearly defined set of objectives are decided on. This will then inform what questions need to be included in the survey.

Two different types of questions were used to collect information. The first are called structured or fixed response questions, while the second comprised of non-structured or open questions. Structured or fixed response questions provide a closed set of responses from which to choose, such as using a rating system to measure how much the respondent likes or dislikes something. These types of questions can usually be answered by ticking a box or circling a number on a scale. Whereas, non-structured questions use simple, direct language to get the respondent to think before she/he provides their answer. A blank space usually follows these types of questions to give the respondent to opportunity to write a more detailed answer. The questionnaires were mainly addressed to the participants of the LATs, especially to those who knew the goals of the project well. However, they can (and were) given to stakeholders at their first LAT experience. The surveys were also conceived as means of gaining useful feedback from stakeholders involved in the Training activity, which usually took place during the fourth LAT meeting.

During the 3rd and 4th LAT meetings two different typologies of Detailed Surveys were produced and distributed, and were also sent to the stakeholders involved in the e-learning training activity. Engaging in the e-learning training provided an additional opportunity to test the functionalities of the NewTREND platform first-hand. Participant experiences were then collected using Testing Feedback Templates (TFTs) for the Data Manager and for the Collaborative Design Platform, both developed for Task 6.4 and the Detailed Surveys.

The **3rd LAT questionnaire** asked for mainly perceptual feedback, since the stakeholders involved only saw some demos showing the operation of the different components of the NewTREND platform. As a consequence, respondents could only give limited feedback relating to the real experimentation of the platform's functionalities. Despite this, questions were

included asked respondents to look critically at exploitation and future applications of the NewTREND's Tool. Four questionnaires were distributed, one for each target groups as illustrated in Figure 18 below.

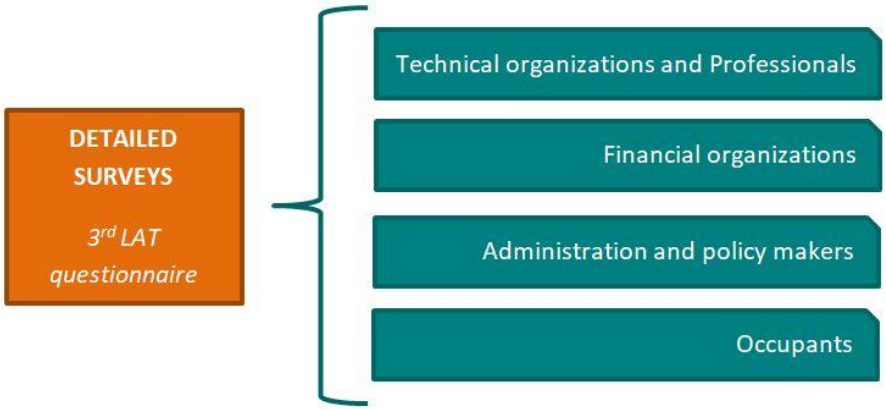

FIGURE 18 FOUR TARGET GROUPS INVOLVED IN THE DETAILED SURVEYS

The 4th LAT questionnaire built on earlier engagements and coincided with the Training activity. The content of this Detailed Survey changed somewhat from the previous ones with **questions becoming much more specific** since respondents when now given credentials access to the platform and, as a result, were able to test each of the platform's functions. Unlike the third LAT, users involved in this 4th LAT belonged to two categories: **technicians** and **decision makers**, as shown in Figure 19 below.

FIGURE 19 THE TWO TARGET GROUPS INVOLVED IN THE DETAILED SURVEYS FOR THE 4TH LAT

While the 4th LAT questionnaire specifically targeted those in category represented by the Decision Makers, other stakeholders who had an account on the NewTREND platform were also able to complete the Testing Feedback Templates already prepared for the DM and the CDP. As a result of these field trials, which coincided with a **training activity**, stakeholders were able to provide useful contributions that fed into the further upgrading of the tool. Also, it should be noted that while there were instances where some of the questions asked during the 3rd LAT may have been repeated during the 4th LAT, this only occurred when **the participants** in the training activity **were not the same ones who took part in the previous LATs**. In both cases **the content of the surveys differed according to the role played by the stakeholders themselves** and feedback was calibrated according to their specific skillsets and goals. Analysis of the survey

data generated in the LAT meetings is summarised in Deliverable 7.9 *Final Report on LATs activities*.

4.4 CONCLUSIONS

The diary process was the most successful type of engagement used in this task and was the most informative and constructive. The resulting data is far richer and deeper than would have been possible with only a survey or hosting a large public meeting. Building diaries are also less time consuming and costly for both the organiser and the participant than say a group exercise such as a focus group or a workshop. The participant usually only needs to write a few lines into their diary each day, at a time of their own choosing, while the face-to-face interviews at the end of the process take place at a time and location of the participant's choosing, and is not likely to last more than an hour. For the organiser, it requires very little logistical organisation. One does not have to co-ordinate the schedules of entire groups of people to find a suitable date and location, or to arrange a venue, catering, stationary and other facilities.

The diary process was also well received by those who took part as they said that they felt their opinions were genuinely being heard and that they were able to speak openly and candidly about both the good and bad aspects of their buildings. Even emotive topics such as feelings of shame about the condition of their home or workplace could be expressed. Therefore, it can be used to create a constructive two-way dialogue between the traditionally powerful stakeholders in a project (i.e. the owners and designers) and the disempowered, or powerless, who are often overlooked (i.e. the occupants and users). The diary process could be used on an on-going post-occupancy basis in order to collect a significant amount of data for the virtual model, such as exact locations of leaks and water damage, and broken fixtures and fittings or issues with poor insulation, or acoustics, condensation, draughts, cold-bridging and so on. During the diary interview process for this project one participant became quite emotional, and was brought to tears through the sheer frustration of using a building that was falling into disrepair and their being powerless to do anything about it.

Unfortunately, it was much more difficult to get stakeholders to participate in focus groups and workshops because they could not see the benefit of these types of activities. Also, they require a much greater commitment; such as taking a time off work or college, booking child-minders, traveling to and from the venue. All these add up to make it much more difficult for people to commit to these types of engagements. The causes for this difficulty are varied. Stakeholders can become fatigued with engagement when they feel they have not been genuinely or meaningfully consulted in the past; or, where there have been engagements, but they not appear to have produced any results or any further actions; or where there has been no feedback or continued dialogue. Ideally, engagement should foster the creation of a co-design team of stakeholders that will remain in place not just during the project, but throughout the lifespan of the building. Individuals would inevitably come and go, but the team as a unit would remain.

Stakeholders might also be uncomfortable with the idea of focus groups and workshops for various reasons. They may not like the types of activities that are often used such as role-playing; or they may feel that they will have nothing important to contribute; or worry that their contributions to the group will not be valued. There may be existing acrimonious relationships among stakeholders, they may not like large gatherings, or it may be otherwise psychologically or physically difficult for them to attend. For example, one interviewee in this process was practically housebound and was only able to participate because the interview took place at their home at a time of their choosing. However, apart from the final interview, the majority of the diary process may be completed by stakeholders from the comfort of their own home, and without the same level of intrusion, coercion or judgement that one might fear in a (badly managed) group setting. Despite these differences, there is no sufficient reason to abandon all other group forms of engagement as each method has its own merits. A selection of different and complementary methods should be chosen for each individual project as is deemed appropriate. It is merely an observation that perceptions of group engagement activities might not be very positive due to past experiences with either poorly managed engagement, or superficial “information deficit” models of engagement that would rank very low on Arnstein’s Ladder. While it may be somewhat difficult to persuade a wide range of stakeholders to take part, it is highly recommended to do so, and to do it well in order to change the negative perception of such activities, and increase the levels of occupant and user engagement.

5 FINDINGS

5.1 INTRODUCTION

The analysis of the stakeholder engagement process was based on a combination of the Realist Approach and the Grounder Theory Approach. In preparing the interview questions, and designing the group sessions, the research team adopted a 'realist' approach as outlined by (Sunikka-Blank & Galvin, 2016)), rather than a purely grounded theory approach, as the latter would assume that the researcher will analyse the transcripts without any preconceived ideas as to what the content and emphasis might be – i.e. identifying these from the ground up, which was the case for the diary process only. For the purposes of this task, the questions included were designed to elicit details of the stakeholders involved in the building refurbishment process; their interactions; their interests, drivers and motivations; and the engagement of occupants and users in the demo-site projects, or projects in general at their buildings. Each of the interviewees and participants was given a code name in the transcripts, for example, NT17-6.2-001 refers to NewTREND engagement, 17 to the year in which the engagement took place (2017), and 001 a randomly applied numeric identifier. During the data analysis process, it became clear that all of the many topics discussed could be roughly divided into three main thematic areas; building, people, and project related topics.

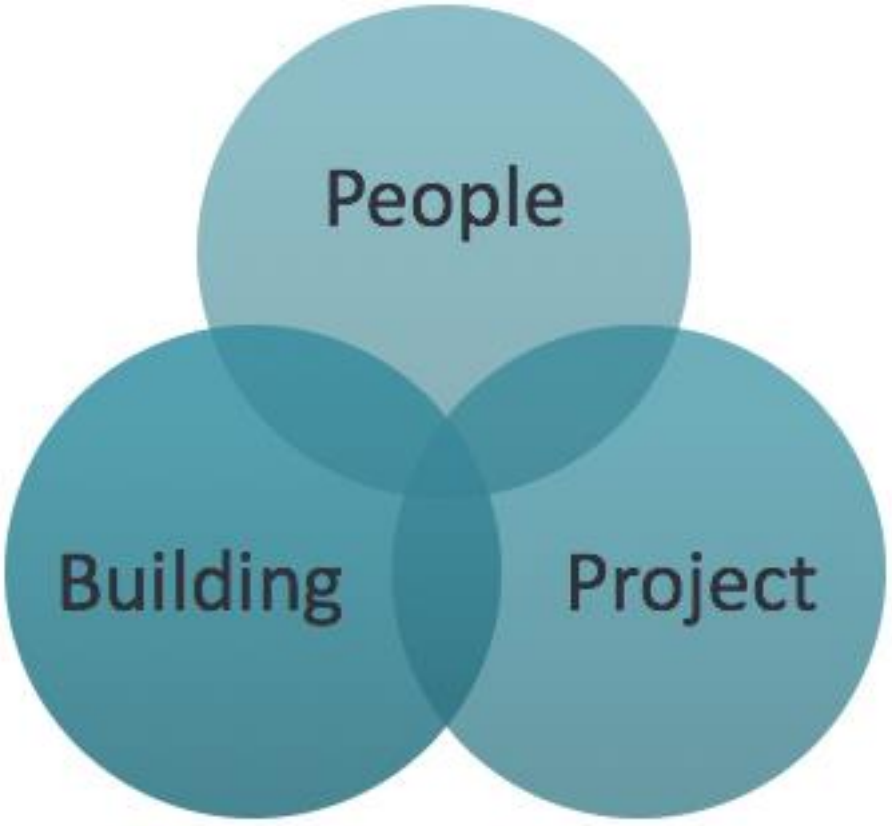

FIGURE 20 THREE KEY THEMATIC AREAS THAT EMERGED FROM THE STAKEHOLDER ENGAGMENTS

TABLE 11 TOPICS AND THEMES DISCUSSED IN TRANSCRIPTS

The Building	The People	The Project
Acoustics	Attitude of Opinions	Information provision
Building Services	Awareness	Post retrofit changes
Comfort Heating Cooling	Communication, Engagement, Consultation	Priorities
Energy efficiency & renewables	Anti-social behaviour, annoying neighbours	Project champion
Condensation Mould Dampness	Decision Making	Project specifics
Frequency of use and tenure	Education & Training	Success (or lack of)
Historical or cultural aspects	Experience	Timelines, Deadlines
Lighting (including natural and artificial)	Health & Safety	Who was involved in the project
Location or siting & … affluence, social housing etc, local infrastructure, nature / biodiversity, quiet / noisy area, views from windows, balconies ***etc***.	Occupants & Users, including their behaviour, & Occupant & User Expertise	Whose ideas were considered, who can I talk to, who should be involved, who was involved
Spatial layout, size, footprint, design	Public / Municipality policies, procurement, spending etc	About the NewTREND project
Ventilation	Satisfaction (or lack of)	About the interview / diary process
Maintenance, Cleaning, Decorating & Ongoing Repairs	Communal or community culture	Previous, future or ongoing engagement
Monitoring, metering, energy auditing	Too many opinions	Appropriate data collection and use
Health & Safety	Discussion on global warming, climate change	Coordination
Money, cost, bills, rent, mortgage	Apathy	Dissemination
Lovable buildings	Behaviour change – nudges	Project Feedback
Specific building issues	Emotive topics	Genuine consultation Vs Time-wasting
Type of building Vs Type of user	Climate change and global warming concerns	Other related projects locally

Water	Energy Habits & Turning off appliances	Post occupancy evaluation
Working conditions (& trade unions), living conditions (, Sick building syndrome, energy poverty)	Maintaining relationships (between owner & occupant, between occupants etc.)	Project budget
	The human senses	Suggestion Box
	Poverty	

5.2 The Building

5.2.1 Maintenance

Maintenance, or more precisely, lack of maintenance, was mentioned as being a big problem by several of the interviewees and participants with regards to different buildings at all three demo sites. The problem is twofold. In the first instance, there appears to be a very low level of maintenance, where small problems progressively worsen and become rather large problems. For example, a reoccurring leak that is not dealt with quickly will eventually cause damage to walls, floors and ceilings, and to fixtures and fittings. It could also become a health and safety issue were someone to slip and fall on a wet floor, or to touch an electrical component that has become wet. Two diary participants took photos of such damage caused by a leak in their building. One of them discussed how they felt ashamed, because even though it did not cause any damage to their apartment, and it was not in their control to fix it, it was in the common area, and their visitors would see it. Another diary participant mentioned a similar issue in another building, where they too were ashamed, and visibly upset at the condition of parts of their building due to water damage and bad smells caused by lack of maintenance and repairs.

FIGURE 21: NT18-6.2-001 PHOTO OF WATER DAMAGE

FIGURE 22: NT18-6.2-002 PHOTO OF WATER DAMAGE

The second part of the dilemma is that there appears to be a communication barrier. Building users felt that they were being ignored, and that their buildings were being ignored, and left to decay and fall into disrepair, even relatively new buildings. They discussed how they had to keep contacting their landlords and local authorities over and over, and to keep putting pressure on them to fix issues such as leaks, breakages, and other damage, and that even then it could literally take years, and multiple communications, to get something done.

> *"And well, all the complaints to (name omitted), and sending photos and so on, and well, I am telling you that they've fixed it NOW, I've been living here for four years. People who have been five years living here have been suffering it all because it happened EVERY winter…"* (NT18-6.2-001)

> …" about *the state of the building, it's good, I guess… certain things that haven't worked or that we were discussing the other day… I mean,* ***to fix them has taken a long time****… I think that the* ***maintenance is a bit scant****, or at least the communication with the administration is. I have to contact the administration many times, contact them many times and in the end, things end up being fixed but… they take time… not so much for us but sometimes when you have to see someone… we had some works done and it seemed like there had been a bombing, so…"* (NT18-6.2-002)

> *"Cleaning and maintenance of outdoor areas is sometimes poor"* (NT18-6.2-020)

5.2.2 ACCESS TO THE NATURAL ENVIRONMENT

Several building users mentioned their preference for access to nature and green spaces. The balconies on their apartments were cited by occupants as being as significant bonus to the layout of their apartments. Occupants discussed how they would eat meals, grow vegetables, and enjoy the surrounding nature from their balconies. Whilst they love their urban location, and proximity to amenities and facilities, it is still very important to them to have a connection with nature. As part of the diary process, one occupant took a photo of a rabbit to show how much they like having natural wildlife near the building. Photos of vegetables growing were also received. Studies repeatedly show there are psychophysiological benefits to building occupants who are able to see and access nature (Ulrich, R.S., 1981 & 2002).

> *"I can adapt to my flat as even if it's small or it might I don't know maybe it hasn't all the light, but I don't know,* ***I want to open a window and I want my relationship with the environment to be positive for me personally****. For instance, it's, is, is more important than the inner environment because, the exterior gives me the interior. That space, you can't change it, that is oriented that way and in this point of the planet. That means that this is unchangeable, but you go inside and you can change it more or less, you can change it or adapt it……"* Participant FG1.2

> *"Yes, that* ***the balcony is fantastic*** *… It's quite big, in summer we can have dinner, at weekends we can have breakfast, we have a small…. let's say… just a few things, it's very rewarding, the truth is that it's a great success, I think."* NT18-6.2-002

> *"We've discovered that there are many* ***birds*** *around here and we* ***enjoy looking at them****, and…"* NT18-6.2-002

FIGURE 23: NT18-6.2-002 PHOTO OF RABBIT VIEWED FROM BALCONY

FIGURE 24: NT18-6.2-002 PHOTO OF VEGETABLES GROWING ON THE BALCONY

While discussions such as this may not appear to be related to energy use within buildings, it could in fact be connected to several energy related areas of design. Where occupants and users are likely to have potted plants or herb and vegetable garden boxes, they may also be likely to have a preference for balconies, deep window sills, good solar orientation, and outward or top half opening windows. One might also infer other building occupant / user traits, requirements, and preferences from information such as this. As a simplified, illustrative example, the following figure indicates, a mind-mapping exercise on the topic of vegetables (and how they relate to building design), show that it might be possible that occupants who like to grow vegetables might also like roof gardens, green roofs, allotments, potting sheds, balconies, window boxes, natural light and ventilation, composting facilities, and rainwater harvesting – all of which have an effect on energy use, and building and district design. This is obviously a very simplified example, based on one diary process, and should not be taken as a literal design tool. However, it could be helpful in opening up a creative dialogue with occupants and users with regards what might and might not be suitable design options, based on their actual requirements, and not what they are being told should be their requirements.

FIGURE 25 'VEGETABLE' MIND MAPPING EXCERCISE

Roof gardens, and green roofs could provide additional insulation, and could help to alleviate flooding due to the natural retention and slower release of storm-water in its vegetation layer than would be the case with more traditional impermeable roofs. They also help to improve air quality, which helps to take pressure off mechanical air filtration systems. A district full of green roofs would also lessen the effects of the Urban Heat Island phenomena, and decrease the need for mechanical cooling. They can be very difficult to retrofit however, particularly as there are structural loading implications.

Balconies may also pose some structural loading difficulties in a retrofit, and even in a new-build, they must be carefully designed in order to avoid thermal bridging; however, a balcony could also be partially or intermittently closed off and used as a sun-room, conservatory, green-house, or buffer zone where it's air could be utilised in a heat recovery and ventilation system. It could also be used as shading for the spaces underneath to protect against over-heating. Deep sills could easily be incorporated into thick walls with thick layers of insulation, high levels of thermal mass, and the window in line the outer leaf of the wall; all contributing to better thermal values. However, they are less likely on thin walls, with low levels of insulation, and low levels of thermal mass. Plants will need natural sunlight and fresh air to thrive.

The size and direction of window opening sections will have an impact on window opening behaviours. If windows open inwards and occupants have plant pots or other items on the window sills they are less likely to move them in order to open the windows to facilitate purge

ventilation (Galvin, R, 2013). This can lead to increased use of air conditioning, and HVAC systems for cooling and ventilation, or decreased ventilation, and increased levels of indoor moisture, humidity, carbon dioxide, VOCs, carbon monoxide, radon gas and other indoor air pollutants. Window opening behaviours can also be attributed to individual personality traits also of course. During the monitoring phase of the NewTREND project it was noted that two class rooms in one of the demo-site buildings, which should have been quite similar in terms of room temperature, ventilation and so on, were actually showing a marked difference. This was attributed to the fact that one teacher only allowed for windows to be open at set times of the day, such as lunch breaks, while the other teacher opened windows accordingly with changes in the indoor and outdoor climate throughout the day.

5.2.3 *Design Layout & Acoustics*

There was some discussion about the spatial layout of buildings, both the positive and negative aspects. Acoustic performance also factored into the discussion, especially with regards noise from domestic pets in neighbouring apartments. There were several comments about dogs that barked incessantly. In contrast, during the engagement in Finland, it was discovered by the stakeholders in the music school that an old boiler room has some great acoustic qualities, and so they now wish to incorporate this building into their campus for reuse.

In terms of the physical internal layout, occupants talked about things like wanting a divider between the living and sleeping spaces in their apartments, worrying about the children running around in the gym because of all the columns in the middle of the space, and common area layouts. There were also comments on how it was difficult to navigate between and within buildings in one district. The occupants felt that there should be more signage for wayfinding within the buildings, and outside to direct people to the different buildings. They also felt that getting around buildings from a fire safety evacuation (or other threat situations) point of view could be difficult, and potentially dangerous (NT18-6.2-020). Almost all of the building occupants who took part in this process had a comment on the layout of their building. Building occupants and users are by their nature most experienced in the way spaces are used within their buildings, how spaces relate to one another, and the accessibility and flows from one space to the next. This ties in with the next section of the document on the people-related topics that came up during the engagement process.

> *"It's difficult for us for example we saw one (flat), one near the architecture (faculty) area, which surprised me a lot because right after coming in you had to put the bed… And I said "Man, I think it's very aggressive, don't you?" Not for you, but if you feel like inviting your friends… Obviously, I mean, they are passing by … your most personal part, … And well, then you went and then you had a space like a very large dining room, and I say wow, you have here a hall to put a bed, that above you can't even a bed … And then you have such a big space as dining room and … It's very bad, I mean such a weird distribution." …" I mean, go so far as not having a place where you can dry your clothes? … I tell you, you had to go down, leave the house with all your clothes and, and hang*

clothes on a clothesline that your neighbour has, and you put your underwear together with the, ... well, ..." NT18-6.2-001

"About distribution I think it's quite ok. Well, a bit of intimacy is missing when there are two people, you know? Or when someone pays a visit or something like this, it's the fact of going to the toilet, or whatever, you know? That's what's missing, if the flat was a bit bigger… we could improve the organisation. I see that there are many flats that have like a shelf or something to divide the areas, but in the end, we didn't want to do it, but yes… a bit more of intimacy in any case." NT18-6.2-002 (Note the translation used the word intimacy, however, privacy is probably what was intended.)

"in the end… you adapt it to your taste and… what I was saying before "wow, it's very small, 40 metres, we won't fit…". Well, this has also been helpful to see what we need and what we don't need so, we adapt to what we've got …" NT18-6.2-002

"Yes, well we continue with day 4, I wrote, well, about domestic animals. As you can see I don't have any animal, as you can see I am not keen on them… I mean, I like animals and all that but, it's true that there are neighbours who have dogs. Then I've written: The domestic animals issue, I am in favour of each one having an animal, but it can't be a damage for the neighbours' coexistence. And in this building, there are several dogs that bark a lot during the day, there's one that I hear a lot every day." NT18-6.2-001

"……there are many dogs in the building, but they are not a problem, we had some problems with a neighbour because her dogs barked day and night, but apart from that, no problems with the rest of the neighbours." NT18-6.2-002

5.3 The People

5.3.1 User Experience, Expertise and Perception

The building occupants are the experts with regards their own lived experience of the buildings, whether it be their home, office, school, or other building they occupy or use on a regular basis. Their opinions of the buildings are formed by their experiences with it, and perceptions of it.

"… the ones who know the most are the people that are living in the building or in the school, parents and people who work there are the specialists or even the children, right? We sometimes forget this part." Participant FG1.8

"Finally, the person who uses the building is the one who have more information. For example, with a roof leak that we used to have" Participant FG1.2

Where occupants and users feel that they have not been consulted, this can lead to negativity and tension in the short term, and lack of trust, or breakdowns of relationships between owners and occupants, or tenants, or employees, as well as underperformance of the buildings (and the people within).

"Everybody had negative feelings about this project. We had several conflicts with the designer, when they didn't deliver in time or when we argued with them about the plans they delivered. Unfortunately, at the end we had to accept the plans he delivered even though we didn't like them at all, but there was the deadline for submission". NT17-6.2-010

"There were some people who were involved too late, such as people from the urban asset management or the principal architect and when they were asking changes it was too late to be able to react to that." NT17-6.2-011

There is however, a danger in having too many voices, too many opinions, and having to decide which or whose opinions matter the most. This research elaborates on how the opinions of the occupants and users matters, but also that it is not possible to satisfy everyone's demands. That is why stakeholder communication and planning should be carefully planned, and expertly executed, (details on communication planning are to be found in Deliverable 2.6). Even the building users themselves remarked on this point at the focus group, that there can be too many opinions, and peoples' perceptions can vary. For example, when asked about the ventilation in one particular building, some users thought it was well ventilated, while other users of the very same building thought the opposite. The same was true for their opinions of whether the building had historical or cultural significance. Some said yes, some said no.

"They can come but when they see it we can tell at what time does it happen, eeeh, if it happens when it rains or not. When there are other parts participating we can't know everything, everyone has its opinion not everywhere, but I think that everyone can give their point of view about the same thing..." Participant FG1.7

"... I mean, there must be a lot of accuracy in the words ... You try to get deep into the information but what you feel in this moment might not be felt by the other person. I mean, I don't know if I am expressing myself rightly, eh! I mean, you must be very careful with information that users give you ..." Participant FG1.3

"Too many opinions... many opinions could twist the... Sometimes you need to focalize into the knowledge too... in order to develop... And it's important to have everyone's opinion but it's what she says (Participant FG1.3), you must be very careful with information eh... Very specific too, all this you must be..." Participant FG1.7

"For me the challenge is in coordination." Participant FG1.7: "That's true..." Participant FG1.2

TABLE 12 ILLUSTRATION OF OPPOSING OCCUPANT/USER VIEWS ON VENTILATION

Question: Is it well ventilated? Answers: (all users of the same building)		
NT17-6.2-001: In winter those classrooms are not warm enough, that are located at the second floor, the farthest from the heating system.	Vs	NT17-6.2-003: Since the walls are very thick, it can keep the cold in the summer. The heating system is very good, so we have no problems in the winter either.
NT17-6.2-002: It is well ventilated	Vs	NT17-6.2-006: It is not really well ventilated.
NT17-6.2-005: If we open the windows, yes.	Vs	NT17-6.2-007: The corridors can't be ventilated, because of the old windows (they can't be opened).

TABLE 13 ILLUSTRATION OF OPPOSING OCCUPANT/USER VIEWS ON HISTORICAL SIGNIFICANCE

Question: What is your general opinion of the building? Does it have historical or cultural significance? Answers: (all users of the same building)		
NT17-6.2-001: It does, it was the first school in the district and the building was built at the beginning of the last century;	Vs	NT17-6.2-002: It isn't historical yet, because it is only 115 years old;
NT17-6.2-004: It has both significance; & NT17-6.2-005: It has cultural significance. In the 19th century the Bokay doctor dynasty lived in this district and they donated this field to the municipality to erect a school here;	Vs	NT17-6.2-006: No;

5.3.2 Social Spaces

The need for functional social spaces in both residential and workplace buildings was discussed by the interviewees and participants. In the case of one apartment building some of the occupants commented on how there was a nice area provided for the occupants' use, and that it would be perfect for social functions such as a Barbeque or similar. However, they noted that because there is a contractual limit to the length of time one can stay in the building, and so residents are constantly moving in and out, and do not really get to know one another well enough to utilise the space. In the case of the two schools in Spain and Hungary, it was noted that there was a desire for larger social spaces for events, and for staff and pupil meal breaks.

> *"I like it a lot, it has a special atmosphere. This was the district's first elementary school, thus it has also a historical relevance. I dislike that I have to walk a lot on the stairs if I go up. The only shortcoming of this building that it cannot host all the classes and we need to walk a lot to the other two buildings when we go for lunch or to certain classes. It doesn't have a dining room, a gym or a common* ***social space*** *that is big enough to host ceremonies or any kind of big school activities".* NT17-6.2-001

"It's a pity that it doesn't really have common spaces where the children could gather or we can have parties or events. Another problem is that we have three different buildings in different locations". NT17-6.2-004

"We have another issue as well, namely the extension of the main building. Currently, we have to walk three streets every time we want to have lunch with the students. It takes approx. 2 hours per day that all the children walk to the other building to have lunch and then they walk back. We have this complain for several years that we want the three buildings of the school get integrated. Even from the cost's point of view it would make a big difference, if the school buildings get integrated. For example, the second building that hosts only 6 classes has much higher energy costs that this huge building". NT17-6.2-003

"Then, sometimes… people say "hi" when you bump into them in the building, there's no problem here. And it's a pity because the few times that we have managed to get together to talk… one neighbour who lived just in front of our apartment but she's not here anymore… one day she had her car in the parking and there were many water leaks from the building upstairs because it was in bad conditions… she slipped and fell. I had already left and I saw her falling, I went to assist her and she told me "ah, I'm sure the (name omitted) people must know me very well because I phone them every day for one thing or the other…" and suddenly you say "oh, I'm not the only one" she's phoning too, you know? So, it's a pity that there's this lack of communication between us but since you are young too and… and that neighbours change fast…" NT18-6.2-002

"…but going back… what I was saying that day that I… when there's something that makes you talk to one neighbour you realise eh… this, the problem with the dogs; one day talking to one neighbour from downstairs "oh, I also hear them and… I don't know what to do…" it's a pity, it's a pity because you see that everyone's thinking the same and you feel alone and then when you have the chance to talk you see that there's more consensus, right? We should take advantage of this and, obviously, everyone who wants to come, if there's anyone who doesn't, don't come then but…" NT18-6.2-002

" School without kids… it is like sad. Kids are in class or at school when I come here, if you come at evenings there is nobody… That noise, … It is like… you know? Sometimes I have come at 8pm right? To a meeting or something and only the cleaning girls are here, so you think, "Ai, what happens here?" (says whispering). Everything makes school, what's new, what's old, the people who lives here, smells, …" NT18-6.2-003A

"The building is very lonely. Usually you can only see a few people and many flats are closed." "The building has a patio with trees. It is a magnificent space but fully wasted. I've only seen someone twice in nearly 4 years." Quotes from Diary 2

"In this building, many times the feeling is like living alone because there aren't a lot of coincidences. With neighbours, in my landing I know 2 out of 4 neighbours that I have

and the ones I know I rarely see them. I have no idea about the rest of tenants, this is a building full of tenant's moving out and coming in all the time." Quote from Diary 1

Social spaces are being increasingly incorporated into buildings, especially workplaces. The terms social architecture and social design are often used. Companies like Google have really popularized the idea, and it is no longer unusual to see companies with open areas where staff work on tablets and laptops while sitting on bean-bags, or having a coffee, or designated break-out spaces where they can read, listen to music, or play pool at their workplace. The idea behind this type of approach is that employees will be happier, more relaxed, more creative and more productive in their work, and that staff retention will be increased. Spaces are designed with the intention of increasing human interaction between occupants, for the financial benefit of the company, but also as a counterbalance to the increasingly virtual world in which we live, (Gatsby, C., 2017). These are sometimes referred to as Third Spaces, providing natural separation between areas, and at the same time, a common area for "breakout session", mini-meetings, meal times away from the desk, and any number of other functions (Pitt, M., 2016). The new library in Seinäjoki, just a short walk from the demo-site buildings in Finland, is a good example of successful and functioning social architecture.

FIGURE 26 SOCIAL SPACES IN OFFICES, (PITT, M., 2016)

FIGURE 27 SEINAJOKI LIBARY (AASARCHITECTURE, 2014)

FIGURE 28 SEINAJOKI LIBRARY, UUSHEIMO, T., (N.D.)

5.3.3 *Emotional Attachment & Response*

Any building can evoke strong emotional responses in people, not just those that have been specifically designed for social interaction. Buildings that are old are familiar, and the familiar is often regarded as safe, and old buildings can become part of the fabric of a community. Buildings that are deemed to be architecturally pleasing, or novel, or inspirational can draw people from many miles away just to see them. Architectural tours are very popular in many large cities, and globally there are many legal protections in place to protect, preserve and conserve valued buildings. What makes them attractive or appealing may not be obvious to those who do not use or occupy the buildings, especially when the buildings are in poor condition, so care must be taken to clarify this issue prior to carrying out works. In one of the demo-site buildings, one particular building user became very involved in the retrofit planning because they were lobbying the relevant authorities to confer protected status on the building to ensure that the retrofit project would not detract from its architectural value by, for example, putting external insulation on the façade. All three of the educational buildings at each of the three demo-sites were viewed with great affection, despite their flaws, which were many in some cases.

The demo-site buildings in Finland have even inspired the creation of a blog (https://www.seinajoenkansalaiskampus.fi/) about the buildings, their past, present and future. Writers for the blog have commented on the historical origins of the buildings, and how the site was selected. Seinajoki was at the crossroads of four major rail lines, and therefore an accessible district for public transport, centrally located within the county from a geographical point of view, and in one of the most populous areas of the county at the time also. The building was designed in 1926 by EA Kranck, construction started in 1928, and it functioned as a hospital until 1983. Other buildings on site, not in the scope of the NewTREND project, are also being

refurbished and repaired for reuse as part of Local Government project to reutilise and reoccupy vacant buildings. During the testing of the NewTREND tools it was observed by the NewTREND team members that the stakeholders were becoming open to new ideas around energy. Previously, due to the historical nature of the building, and the fact that solar panels are not common in the district, solar panels had not been considered. It is often, mistakenly assumed thought that solar energy is not viable in areas like the UK or Scandinavia. However, after being shown the potential benefits of solar energy in the "what if" scenarios in the NewTREND tool they are now considering solar panels on the roof surfaces with the proviso that they cannot be seen from the street, so as to maintain the historical architectural aesthetic.

> "*It is a very nice historical building, but it feels a bit semi-finished. Because of its age it has several blemishes that can't meet modern expectations."* NT17-6.2-004
>
> *"This is the oldest school in the district. We like it a lot, it is such a nice quaint building. But certainly, there are so many things in it which should be renewed".* NT17-6.2-006
>
> *"It's a rare treasure in today's world. It is the oldest school in the district. It has a nice and cozy atmosphere".* NT17-6.2-007*"*
>
> *…. "beautiful and valuable building". I feel "privileged to work in this building"* NT18-6.2-020
>
> *"Yes, so here we are. Now, we love the (building name omitted) we are very at ease… It is true… I wouldn't change this (building name omitted) for anything… And people, we must say that people who come are eager to come back because they feel comfortable, they feel… Working in such a magnificent space, you would like to come back…"* NT18-6.2-003A & 003B (this latter comment was from a post-diary interview that was for the most part discussing the many problems with the building, where the diarist was actually quite upset about the poor condition of parts of the building).
>
> *NT18-6.2-003A & 003B "003A: Well, the space, we are trying to give it a "paint job" you know? For instance, what I've written is that well, I interviewed people in open door events and sometimes… I was ashamed…, 003B: Me too… You get ashamed..., 003A: The feeling of shame when some parent says to you in a straight way… "Well, have you thought about changing the facilities?" Of course, your face is like… It is a feeling… of saying "it doesn't depend on me" …, 003B: When I have open doors..., Interviewee 1: And I say of course "I wish I could change the facilities…" But of course, you explain that it's a building that belongs to the council…."*
>
> *NT18-6.2-001 "Sometimes friends used to come, and I was ashamed…"*

The following graphic displays some of the quotes about the buildings to illustrate the intangible immeasurable qualities of buildings. Despite all of the complaints, users stated that their building was cozy, while also being described as being thermally uncomfortable, too hot in summer, too cold in winter. Buildings were described as being quaint, despite containing several

dilapidated elements. The buildings that they love have bad plumbing, leaky pipes, draughts, dampness, roofs that have caved in, windows that have fallen out, and more, and yet they love them. Emotional attachment and response should not be overlooked when carrying out works to buildings.

FIGURE 29 SELECTED QUOTES FROM THE INTERVIEWS

5.3.4 *Sensory Design*

The diary participants, interviewees, and group participants all discussed various issues around the human senses, such as those identified by Aristotle; sight, sound, touch, taste and smell, although modern-day scientists point to over twenty senses (Humphreys, 2017), for simplicity and clarity, we will refer to the traditional five here.

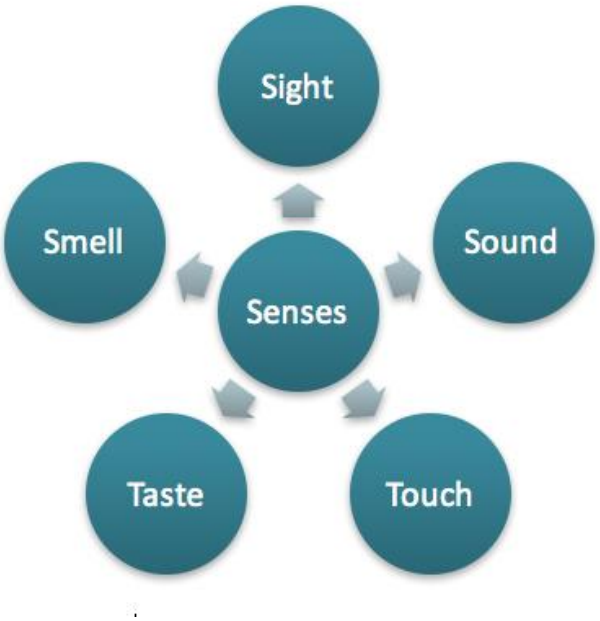

FIGURE 30 THE FIVE (TRADITIONAL) SENSES

Selected quotes from the transcripts relating to the importance of the senses, followed by a table indicating examples of where the senses can translate in design issues and solutions:

(Re: The Diary Process) *"I've tried to capture **visual elements** too because there are a lot of them, we care a lot about visual things, you can also **sense olfactory elements**, right? You can feel the Touch too..."* NT18-6.2-003A

*"We have basically talked about how do we live, **how affects us the lighting, what we see outside, if there is natural light or not,** if there is sun, … eh… it could be good or bad eh. If you have a building that faces north and you don't have sun it could also be nice… A question of the landscape, the views, **if you want to have good views** … On one hand, **aromas, and smells whether they are good or bad**…"* Participant FG1.8

*"It's very beautiful even when it isn't sunny, and **you can see winter's light with grey tones**" …. "I love going to the school lunchroom too and **what I love the most is the smell of coffee in the morning or the smell of soup during the winter**. It's great to interact with the cooks during the break."* Quotes from Diary 3A

*"We did more like a… it isn't like… We did like a negative and positive punctuation: **Illumination, memories, environment, security, comfortability** in any of his aspects, design of materials, neighbour community … And then of course, **light for example is related to something positive and negative… Smells, … the ugly ones ehm are negative and an inadequate lighting could go to something positive as good memories or a nicer side…**"* Participant FG1.4

*"In some way **we looked more to the sensation, that means a smell, could it be good or bad, right? I mean, a memory could help, right?** An affect question, right? I've given the example of the **smell of my grandma's home**, you know? It was **smell of clean** and it was very particular from there, you don't even know how to describe it, and when you are little you are MUCH more **sensitive with him, with smells,** you know? With this teacher I've had… Like you, there are kids that take the sweater from a classmate and say "This is from him or her…" You know? Because they understood that **kid's smell** and this is the reality, and this is when we are older, so that isn't that important, we can talk about rubbish or fertilisers but there is this girl (referring to participant FG1.3) she's said that when she lived in (Place Name Omitted) she **used to feel a smell** because she was living next to the countryside and felt the **stench of the land fertilised** but she's said that **one year later she already got used to the smell and she didn't care, so there is also a question of adaptation,** isn't it?"* Participant FG1.2

"Sometimes we get odours, smells from the kitchen/canteen" (meaning unwanted odours or smells in this case) NT18-6.2-020

TABLE 14 SENSORY DESIGN ISSUES AND POTENTIAL SOLUTIONS

Senses	Potential Design Issue	Potential Design Solution
Sight / Visual	Visibility Brightness / Darkness Connection with the natural world Cultural or historical connection Use of visual imagery & aesthetics Aesthetic and architectural appeal Wayfinding	Artificial lighting & Natural lighting via windows, doors and opening. Natural light promotes productivity and good mood, positive influence on biorhythms Use of light or dark colour & reflective or non-reflective surfaces Use of aesthetically pleasing and natural materials, such as wood Take advantage of external views of nature and green spaces and incorporate internal planting (also has air-cleaning benefits, and may produce a desirable scent) Maintain cultural or historical aspects of the architecture (may also be a regulatory requirement) Use different colours to highlight changes such as where a door meets a wall to aid users with poor sight Use of clear signage and symbols
Sound / Auditory	Stopping unwanted* sound from travelling within a building, or from the building to the outside and vice versa (*unwanted sound only – building users might want to be able to hear some external sounds such as birdsong, or waves breaking) Creating optimum acoustics e.g. for lecture halls, theatres	Space separation / enclosed spaces Acoustic insulation, glazing and seals, Acoustic panels & finishes Spatial layout, amphitheatre design AV equipment & technology Induction loops and tech for the hard of hearing Use of music can increase or decrease building users' levels of certain activities like resting, dancing, shopping, eating, or working, depending on both the type and volume of the music Eliminate noisy machinery and appliances
Touch / Tactile	Elimination of physical hazards Creating optimum and appropriate conditions for the particular building use including infection control	Design for health & safety, for disability access, for childcare, for healthcare e.g. the use of changes in tactile surfaces to alert blind users of potential hazards such as changes of floor level, stairs, pedestrian crossings Optimum conditions: timber floor not concrete for dancefloor, tiles not carpet for bathroom, hard seam free anti-vandal, anti-microbial

Senses	Potential Design Issue	Potential Design Solution
	Comfort e.g. thermal comfort Promote movement for health and fitness	furnishings for hospital emergency rooms (& avoid ledges and horizontal shadow gaps) Specify easy to clean materials and surfaces for heavily trafficked areas (less work for cleaners, less dirt & germs for users) Soft textures may be associated with comfort, home, safety Heating, cooling, insulation, ventilation and draught-proofing Adapt functions to suit users e.g. low-level ironmongery, light switches and windows for children's buildings Avoid hiding stairs and making the lifts a more attractive design feature. Make users want to use the stairs.
Taste / Gustatory	Elimination of sensory memory association with bad tastes often tied in with bad smells (see below) In restaurant for example, one might want to increase appetite and ease digestion	As for the sense of smell below Increase appetite through the use of colour, pictures or displays of food, smells of food (ventilation) Ease digestion through ergonomic and appropriate furniture design, thermal comfort, lighting levels Comfortable communal area provision for eating, canteen, kitchenette, staff room
Smell / Olfactory	Elimination of strong and/or bad odours. Odours can give a (good or bad) impression to building users of the building's cleanliness or lack thereof, age, use, or general atmosphere. May indicate poor indoor air quality.	Use of fixtures, fittings and finishes with low VOC and odour emissions Use of natural and mechanical ventilation Elimination of damp, mould and accumulation of stale air Elimination of thermal bridging and other causes of condensation Good maintenance e.g. fixing leaks and cleaning blocked drains Indoor air quality monitoring also including odour free IAQ threats such as gas, carbon monoxide and radon.

5.4 THE PROJECT

5.4.1 *PROJECT SCOPE / BUDGET*

The scope of the project and the project budget was unsurprisingly discussed in terms of there not being enough time for a thorough design process, and not being enough money for a comprehensive retrofit. The method by which funding is obtained for the works was also cited as being counter-productive. The process is seen to be too detailed, prohibitive, and lengthy, that when combined with rising construction costs, and short windows of opportunity to carry out works (*e.g.* outside of school terms or immediately after storm damage), it has led to a long hiatus in the works for one building in particular. The design period was too short and rushed to produce high quality detailed plans, and the period between tender and commencement was so long that the project can no longer be completed for the prices originally quoted due to industry price increases. All of this has led to stalling the project, and a requirement for renegotiations of both the price with the contractors, and the budget with the funding administration.

> *"When the municipality was applying for EU funds to do retrofits on some public buildings (this school was among them) we designed the plans for the proposal in a way that they meet the call requirements and they can really get the funding. We had to evaluate and plan not only if these buildings could be retrofitted, but also in a way that it meets the requirements. If we translate this we are talking about the adequate thickness of the isolation or the design and quality of the windows. However, the call was written in a way that in case I would have chosen the best option for everything it would have cost too much and then I couldn't have been able to include other elements of the proposal into the project. So, I had to keep the right balance between the energetic and architect parts of the retrofitting."* NT17-6.2-011

> *"I know that they couldn't have included other things into an energy retrofitting projects, but this school would need so many other changes as well, such as the retrofitting of the fence, the construction of a gym, or the extension of the building. The municipality bought an empty parcel next to the school when I was a child (I studied here as well) with the intention to extend the building, however it has been still not realized since then. Finally, the modernization of the classrooms would be also essential, especially the replacement of the old tables and chairs."* NT17-6.2-007

> *"The designer went only one time to the site and checked it out even without measuring anything and he based the plans on his estimations what he remembered from this visit. There were no original plans of the building either which we could have given to him. On top of that he had only less than a month to make the plans, so I guess that given such a short deadline he didn't take this seriously. Probably he thought that it is impossible to do anything serious in such a short period of time, so he didn't even put too much effort in it."* NT17-6.2-010

The retrofitting project in Hungary was subsidized by national development funds from the European Union. Ordinarily projects with such EU funding must be financed by the applicant to the tune of at least 15% of the overall project cost, however, in this case, the National government covered the cost of this financial burden on behalf of the local government (the applicants). In theory, this method of financing should provide equal opportunities to all local governments and municipalities, regardless of their own financial capacity. This is not always the case in reality however.

The Ministry of National Development announced a call (KEHOP) in mid-2016 for energy retrofitting of public building. The budget was allocated on a 'first come, first served' basis. The pre-condition of the call was that there already be a public procurement process in place, and a pre-contract with a building contractor, which in effect limited participation to the wealthier municipalities who could afford to have carried out such a planning and procurement process in advance of the call. While there is technically no down-payment involved in the application, most municipalities would not have the expertise in-house, and would therefore have to pay for the services of architects, engineers and others in order to design the retrofit, and the timescale for the application is so short that only those who have done so in advance can apply. Other municipalities simply could not afford the risk of hiring designers to do come up with retrofitting plans, and tender for contractors without any guarantee of actually securing funding for works. This is compounded by the fact that funding to local government municipalities has been dramatically reduced in recent years. The demo-site in Budapest suffered as a consequence of this, while they were able to secure funding, the design process was carried out so hastily (3 months), that there were many flaws in the proposals which have had to be corrected and negotiated after signing the contract with the builder. Both the City Rehabilitation Office, and those (senior) builder users who were aware of the process had pointed out that there were several problems with the proposed design, however, due to the lack of consultation and the extremely short timeframe, the application went ahead anyway. The City Rehabilitation Office also had issues with the budget calculations:

> "*The call defined maximum 250 million HUF for retrofitting per applicants (districts) and we assumed that all four buildings could be easily retrofitted from this amount. Later the municipality sorted one of the buildings out. After making the list of the eligible buildings we had to give an estimation how much the energy retrofitting of these buildings would cost. According to our calculations all the four buildings could fit into this budget. However, according to the designer all the retrofits would have cost the double of our calculations. I think it was a rough miscalculation. We were laughing loud when we heard this and we said Oh No! But there was no room for reconciliation, if the designer said that, we had to accept it. And certainly, it meant that one of the buildings had to go, because it didn't fit into this budget. It's another thing that at the end even with this calculation the budget went down to 200 million HUF at the end, because during the public procurement the market confirmed our calculations and it wasn't that expensive as the designer expected. But then there was no way back anymore. If we had selected buildings in very bad conditions where everything had to be retrofitted, we could have*

achieved even 100% intensity. However, in the case of these buildings that had some parts already retrofitted, we couldn't save that much money and we could achieve only 70% intensity" (Anon. from the City Rehabilitation Office).

Despite the extremely short time allowed to put in the application, the decision on whether or not to approve the proposal tool almost a year. While the application was ultimately successful, and did receive approval from the Ministry, the year during which the proposals were being reviewed also happened to be an especially good year for the construction industry in Hungary, which meant that construction prices had almost doubled, and now the original tender price submitted was no longer sufficient to carry out the works proposed (let alone the additional changes required to correct the initial flawed design).

5.4.2 Lack of Consultation or Communication

Several of the occupants and users discussed how they felt they should have been consulted more during the planning process, and that vital information was not communicated to them, or at least not before decisions had already been made. It should be noted of course that not all of those we spoke to felt this way, some of the transcripts show that there was also a portion (albeit a smaller one) of people who felt they did not need to be consulted, and they were simply happy to be kept informed only of items that directly affected them after all the details were agreed. Rather than including, or excluding all occupants and users it would be recommend to either include just the nominated representatives of the group as a whole, or invite all occupants and users and allow for them to either accept or decline the invite to participate. It would have to be decided on a project by project basis, and tailored to suit the type of buildings and their usage patterns, the number of potentially involved stakeholders, and feasibility of different engagement methods. Refer also to NewTREND Deliverables 2.5 and 2.6 for more details on the different methods of engagement available to choose from.

*"…. the **lack of communication** with the administration, and with the estate that sometimes is… difficult…"* NT18-6.2-002

*"We have a **total lack of communication** between the Administrator and the owner. When any breakdown is notified we don't get any answer. Only after insisting a lot we can achieve it."* Quote from Diary 2

*"Estate agency and the owners **aren't very communicative** with each other, and they can take long to answer your queries."* Quote from Diary 2

"I found the final plans unacceptable, they were so wrong. Was it because of the short deadline? Yes, but at the same time the team that was recruited to plan and deliver wasn't good enough either from a professional point of view. And they didn't even take this project seriously. But how are they selected? What are the criteria? There are these standard public procurement procedures with asking three tenders, but they are just to keep the formality but everybody knows in advance who will really win." NT17-6.2-010

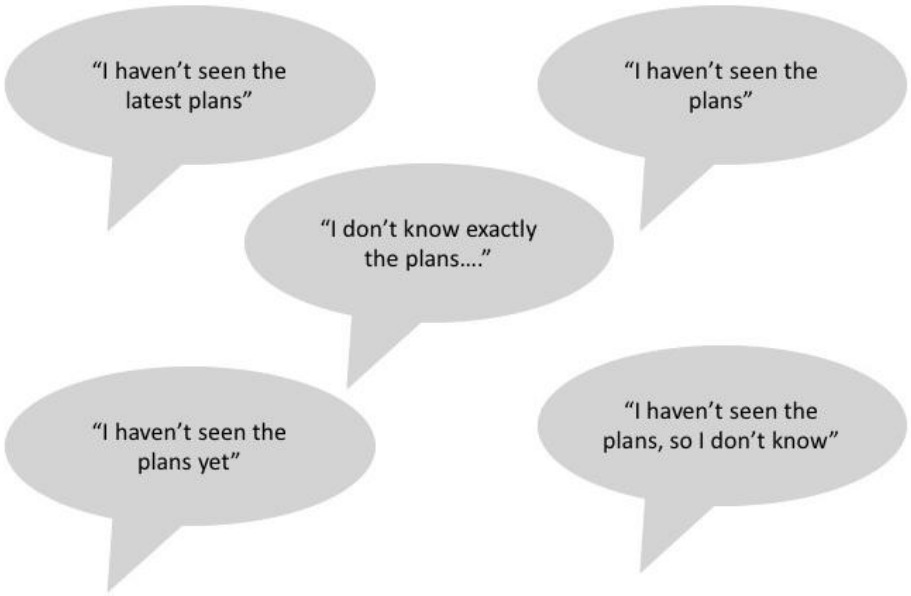

FIGURE 31 SELECTED QUOTES FROM INTERVIEWS

TABLE 15 ILLUSTRATION OF OPPOSING OCCUPANT/USER VIEWS ON CONSULTATION

Question: "Do you think that all the important stakeholders were consulted in the design of the plans? If not - who was missing?"		
"I think we should have been asked." NT17-6.2-001	Vs	"I think the most important stakeholders were involved and nobody else should have been involved" NT17-6.2-006
"The consequence of the short timeframe for the design of the plans was that the users of the building were not consulted, neither the principle architect from the municipality." NT17-6.2-011		"Yes, I think so, but the substantive negotiations and replies were missing." NT17-6.2-010
"Yes, I felt that I wasn't consulted enough, which lead to the situation that when I finally had the opportunity to tell very important aspects to the design team they already had done the first plans and they had to change it, which very much delayed the project and it caused extra costs." NT17-6.2-001		"I don't think that it is a good idea to involve the users into the planning, because they delay the process and it doesn't necessarily lead to a better result. Many times, they focus on some detailed issues and can't see the whole picture, which might even hinder the implementation of a project." NT17-6.2-011.

"It would have been important to involved them (The occupants and users) but we didn't. When the designer visits the site to make assessment before the planning they are supposed to talk to the users of the building or at least ask them about their building using habits." NT17-6.2-010		"I wasn't consulted, but I don't think that it would have been necessary." NT17-6.2-002
"They didn't find us competent in this question." NT17-6.2-001		"No, I didn't wish to be involved more. It wouldn't have made sense" NT17-6.2-003
"We were neither involved or consulted, but we were informed afterwards about the plans. However, when the municipality and its team came to visit the building I was also invited and then I had the opportunity to communicate my ideas. But we are just users of the building not the owners, and we weren't considered competent for the planning." NT17-6.2-001		
"The municipality could have saved the extra round of redesigning the plans if they consulted us immediately and I could have told that the building has this secession façade that cannot be simply isolated. The users have the most up to date information about the building, so it would have been better to ask us at the beginning." NT17-6.2-001		

FIGURE 32 SELECTED QUOTES FROM INTERVIEWS

"I have a question, once the decision on the construction is done. Do you intend to give a feedback justifying your decisions? Because what might happen that users are asked for their opinion and they see that the budget is coherent and there are things left out in the project... Therefore, the one who has contributed could be out and could say "they didn't listen to me then, why did they call me?". So, giving an explanation after the projection. So, the end of the relationship must be an end, because otherwise, next time you call him, he is not going to come" Participant FG1.4

"It depends on the project funding too, I mean, this project funds certain things and maybe what you... (laughs ironically). But in a methodological level saying "well, we are going to do something, I ask for your opinion", and you might leave it in a technical issue. Then the person could feel excluded, to avoid this we should go to the final feedback about why this thing and no other is done. Offer it at least is a greeting to this person who donated his time... And we won't be able to have this person back he doesn't understand the reasons why something has been done... I think it isn't positive, ... I don't know if you have thought about it but giving a final explanation about we have done this and studied this and if something is out of the planning give reasons why, in this case and any other case" Participant FG1.4

"I didn't like the plans, because their quality was very bad, they didn't contain adequate technical information, the parameters that they used weren't in accordance with the reality and they didn't meet the requirements of a public procurement. We remarked on these but the designer team didn't change anything and they also didn't notify or conciliate the principal architect either. Thus there was no personal design consultation on the plans at all. We tried to put pressure on them in mails to correct the mistakes, but they didn't do that. I don't know why they behaved this way. We tried to warn the municipality about the bad quality of the plans, but there was a time pressure on the municipality, because the deadline of the call was approaching. Even though we decided not to approve the plans, the public procurement advisor approved them and the plan could go into the proposal" NT17-6.2-009

5.5 Conclusions & Recommendations

The primary purpose of this document has been to report on the stakeholder engagement process in the demo-sites, and to summarise the results of the engagement activities carried out. The process began with stakeholder identification using brainstorming and mind-mapping techniques, followed by the project partners reaching out to the relevant stakeholders at each of the three demo-sites and inviting them to participate in either interviews, building diaries or groups activities. The resulting activities were recorded, transcribed and translated to English for analysis. Using NVivo software, and a combination of Realist and Grounded Theory, it became apparent that all of the various topics discussed could be grouped into three main themes; the building, the people and the project.

5.5.1 THE BUILDING

Maintenance, or more specifically lack of maintenance was a common thread in all three demo-sites. This was quiet an emotive issue, not just where people live, but also where they work. As one participant mentioned, they spent as many of their waking hours in their workplace as they did at home. Another aspect of the maintenance issue is that the building occupants and users felt that they were powerless to do anything about it. They were either not the owners of the building, not in a position to carry out the required repairs, unable to secure the funds or expertise to carry out the work, or were unable to communicate directly with those who were in a position to do so. Neglected or poorly maintained buildings are also likely to be wasting energy due to, for example, inefficient heating or ventilation services, draughty windows, doors and other avenues of unwanted ventilation and infiltration.

Access to the natural environment has long been recognised to be beneficial to building occupants and users. This is becoming more relevant in an increasingly urbanised (and virtual) world. All three of the demo-sites were in urban areas, and while the building occupants and users that we spoke with liked their building locations – their proximity to amenities, public transport and other urban features – they also appreciated access to the natural environment around them. This could be in the form of views from windows or balconies, landscaping and trees, proximity to wild animals, green areas and other natural amenities. Again, these issues can also be relevant to energy use. Taking one building element as an example, windows, natural light through glazed areas can provide views of nature, and also decrease the need for artificial lighting. The same windows could also provide natural ventilation (and the opportunity to listen to birdsong – as mentioned in one diary) and lessen the need for mechanical ventilation. Solar thermal gains from the glazing can also decrease the need for fossil fuel-based heating systems (assuming the appropriate solar orientation has been considered). However, excessive solar gain will result in excessive need for mechanical ventilation.

Design layout and acoustics were another common topic of discussion. While building designers can do very little about whether one's neighbour has a noisy or neglected dog, the acoustic design of the building can at least increase or decrease the nuisance. The NewTREND tools address acoustic design, and this particular aspect of the tool is discussed in other deliverables in this project, therefore it is not necessary to discuss it here. Not all noises are unwanted however. Interestingly it was discovered during the planning process that the acoustics are especially good in an old boiler room at the Finnish demo-site, resulting in the School of Music are preparing to utilise this area as part of their campus once the retro-fit has been completed. With regards the design layout, this is a particular area where the building occupants are extremely knowledgeable since they are using the space on a regular basis and have a clear idea of how the layout does, or does not, function to meet their needs.

5.5.2 THE PEOPLE

As mentioned in the previous section the building occupants and users are extremely knowledgeable about the buildings, and are experts in their own lived experiences. This does not mean of courses that they are also experts in building design, regulations, standards, and best practice. That is why NewTREND recommends co-design, where both the practical (users

and occupants) and professional (architects and engineers) stakeholders bring their own individual expertise to the table.

Social design or social architecture is becoming an increasingly popular facet of architecture design, and would address some of the concerns voiced by participants about the lack of social spaces in and around buildings. This is an issue that can't be addressed by architecture alone however. On one hand some participants felt that there was a need for more social spaces in their (workplace) building where the occupants could meet up, eat lunch, have events and so on. At the other end of the spectrum, building users commented on how there was a nice social space in their demo-site, but it was unused because of the lack of community stemming from the tenancy contract stipulations with regards maximum length of tenure.

Another facet of architectural design which could be very influential in terms of how buildings are used is sensory design. This is design that primarily addresses and utilised key human senses; sight, sound, touch, smell and taste. For example, participants and interviewees discussed the good memories associated with certain smells (coffee and soup), which ties in with their desire for a designated space for eating lunch and socialising with colleagues (and pupils and parents in the case of the schools), and negative emotions (such as shame) associated with bad smells.

5.5.3 THE PROJECT

The project scope and budget were also discussed. In most cases, occupants and users felt that the project scope could, or at least should have included more works, or in some cases, more appropriate works. In others, items were removed from the scope, such as external insulation which was deemed to be detrimental to the historical façade of the building. The budget of course will always be a topic of discussion as there are very few building projects in the world where the budget is not limited, or at least limiting. Most occupants and users understood this and were not so much critical of the lack of budget, but instead focused on which items were prioritised. This is an issue of consultation in many cases, rather than of finance. If all of the relevant stakeholders are involved in planning, they can have more influence over budget allocation as this is not normally something that can be altered later in a project.

This leads us to the last topic of discussion to be summarised here; consultation. Unsurprisingly, the number of participants here who felt that they were not consulted, and should have been, far outnumbered those who were happy with the level of consultation they received. Work packages 1 and 2 for the NewTREND project, and their resultant deliverables, 1.1, 1.3, 2.5 and 2.6 discuss the need for consultation, the different types of engagement that can entail, and the different levels of engagement that are required for co-design.

5.6 CONCLUSIONS

The diary process was the most successful form of engagement used in this task and was the most informative and constructive. The resulting data is far richer and deeper than would have been possible with only a survey or hosting a large public meeting. Building diaries are also less time consuming and costly for both the organiser and the participant than, say, a group exercise such as a focus group or a workshop. The participant usually only needs to write a few lines into

their diary each day, at a time of their own choosing while the face-to-face interviews at the end of the process take place at a time and location of the participant's choosing, and is not likely to last more than an hour. For the organiser, it requires very little logistical organisation. One does not have to co-ordinate the schedules of entire groups of people to find a suitable date and location, or to arrange a venue, catering, stationary and other facilities.

The diary process was also well received by the participants, many of whom said they felt their opinions were genuinely being heard and that they were able to speak openly and candidly about both the good and bad aspects of their buildings. Even emotive topics such as feelings of shame about the condition of their home or workplace could be expressed. Therefore, it can be used to create a constructive two-way dialogue between the traditionally powerful stakeholders in a project (i.e. the owners and designers) and the disempowered, or powerless, who are more often than not overlooked (i.e. the occupants and users). During the diary and interview process for this project one participant became quite emotional, and was brought to tears through the sheer frustration of using a building that was falling into disrepair and at their being powerless to do anything about it.

Unfortunately, it was much more difficult to get stakeholders to participate in focus groups and workshops because they could not see the benefit of these types of activities as clearly as they did for the diary process. Also, the requirement for a much greater commitment; such as taking a time off work or college, booking child-minders, traveling to and from the venue coloured people's attitudes to this form of engagement. Consequently, people were less predisposed to make a commitment and it should be noted that the causes for this are varied. Stakeholders can become fatigued with engagements when they feel they have not been genuinely or meaningfully consulted in the past; or, where there have been engagements, but they not appear to have produced any results or any further actions; or where there has been no feedback or continued dialogue. Ideally, engagement should foster the creation of a co-design team of stakeholders that will remain in place not just during the project, but throughout the lifespan of the building. Individuals would inevitably come and go, but the team as a unit would remain.

5.7 RECOMMENDATIONS

The diary process could be used on an on-going post-occupancy basis in order to collect a significant amount of data for the virtual model, such as exact locations of leaks and water damage, and broken fixtures and fittings or issues with poor insulation, or acoustics, condensation, draughts, cold-bridging and so on. Stakeholders might be uncomfortable with the idea of focus groups and workshops for various reasons. They may not like the types of activities that are often used such as role-playing; or they may feel that they will have nothing important to contribute; or worry that their contributions to the group will not be valued. There may be existing acrimonious relationships amongst stakeholders, they may not like large gatherings, or it may be otherwise psychologically or physically difficult for them to attend. For example, one interviewee in this process was practically housebound and was only able to participate because the interview took place in their home at a time of their choosing. However, apart from the final

interview, the majority of the diary process may be completed by stakeholders from the comfort of their own home, and without the same level of intrusion, coercion or judgement that one might fear in a (badly managed) group setting. Despite these differences, they are not a sufficient reason to abandon all other forms of group engagement as each method has its own strengths and merits. A selection of different and complementary methods should be chosen for each individual project as is deemed appropriate. It is merely an observation that perceptions of group engagement activities might not be very positive due to past experiences with either poorly managed engagements, or superficial “information deficit” models of engagement that would rank very low on Arnstein’s Ladder. While it may be somewhat difficult to persuade a wide range of stakeholders to take part, it is highly recommended to do so, and to do it well in order to change the negative perception of such activities and increase the levels of occupant and user engagement.

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7 APPENDIX: STAKEHOLDER MAPPING IN THE THREE DEMO SITES

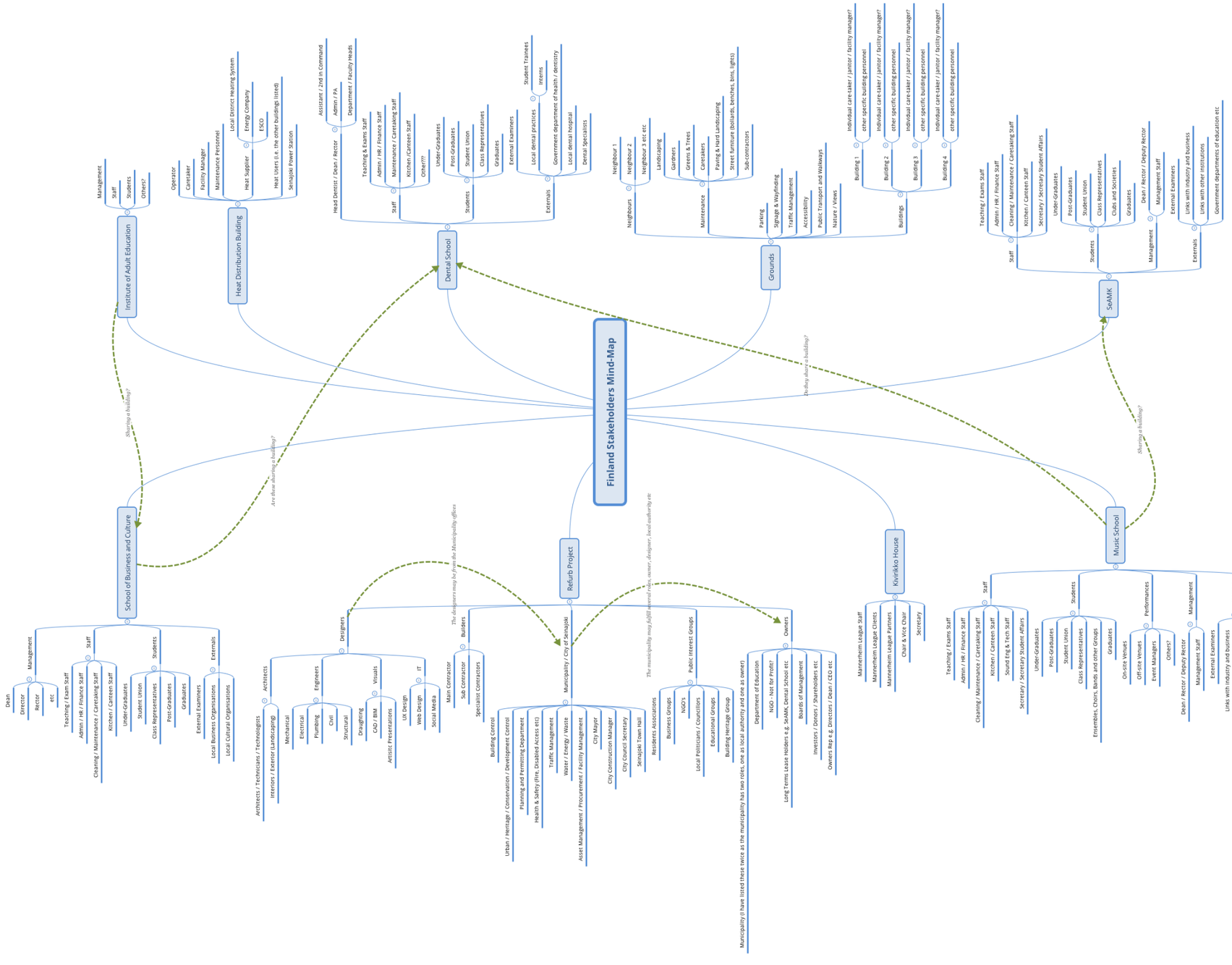

FIGURE 33 STAKEHOLDER MAPPING IN FINLAND

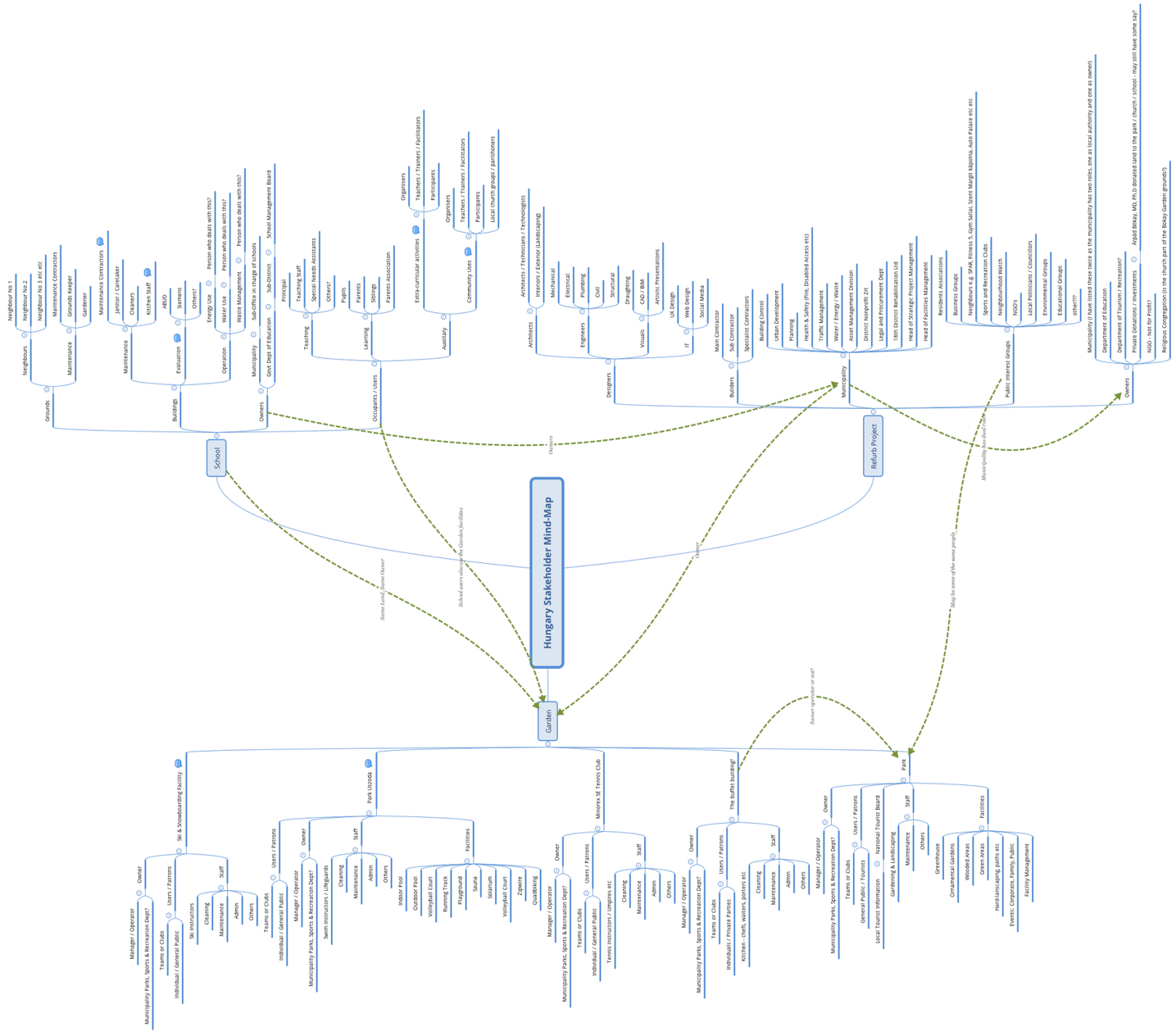

FIGURE 34 STAKEHOLDER MAPPING IN HUNGARY

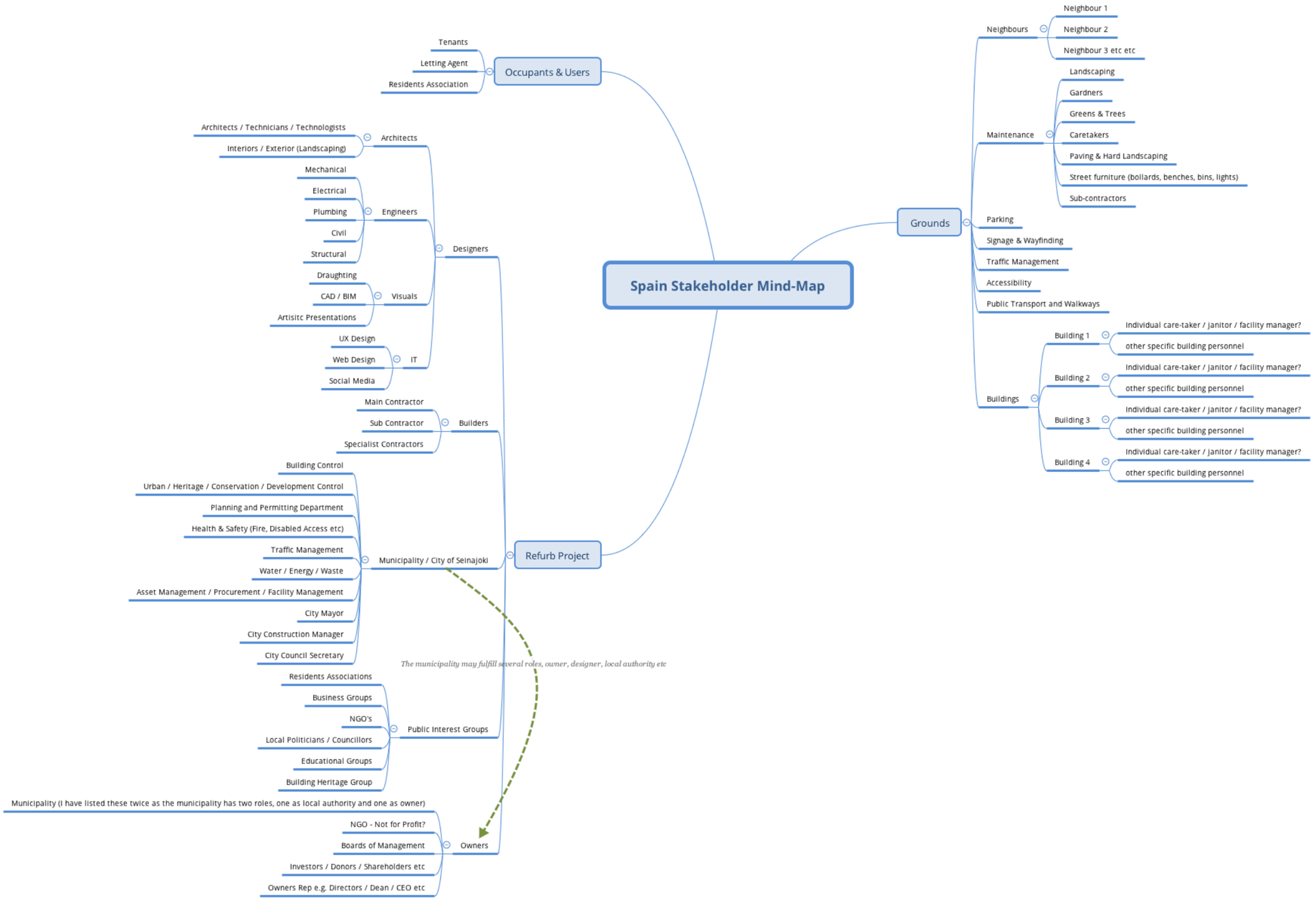

FIGURE 35 STAKEHOLDER MAPPING IN SPAIN