EUB SuperHub

European Building Sustainability performance and energy certification Hub

Use Case Scenarios and Definitions

This project has received funding from the European Union's H2020 research and innovation programme under Grant Agreement No. 101033916.

Project no. 101033916

Project acronym: EUB SuperHub

Project title: European Building Sustainability performance and energy certification Hub

Call: H2020-LC-SC3-B4E-4-2020

Start date of project: 01.06.2021.

Duration: 36 months

Deliverable title: D2.1 - *Use case scenarios and definitions*

Due date of deliverable: May 2022

Organisation name of lead contractor for this deliverable: HM (*Hochschule München*)

1. table

Name	Organization
Ahmed Khoja	***HM***
Sabine Erber	***EIV***
Elena Bazzan	***iiSBE***
Andrea Moro	***iiSBE***
Paola Borgaro	***iiSBE***
Bese Pál	***FeliC***
Peter Gyuris	***GEO***
Breffní Lenon	***UCC***
Niall Dunphy	***UCC***
Sylviane Nibel	***CSTB***
Maria Annunziata Longo	***RegCal***
Marina Malinovec Puček	***EIHP***
Natalie Essig	***HM***

2 table

Dissemination level		
PU	Public	
CO	Confidential, restricted under conditions set out in Model Grant Agreement	X
CI	Classified, information as referred to in Commission Decision 2001/844/EC	

3. table

History			
Version	Date	Reason	Revised by
01	21/04/2022	Draft	HM
02	28/07/2022	Review	iiSBE, FeliC
03	12/09/2022	Final	GEO

Table of Contents

Glossary 3
1 Introduction 4
2 The EUB SuperHub modules a brief overview 5
2.1.1 The E-passport cockpit (E-cockpit) 5
2.1.2 The planning and verification tool (PVT) 5
2.1.3 The Virtual marketplace (VM) 6
2.1.4 E-learning 6
3 Methodology of defining use case scenarios, user roles and access rights 7
3.1 LAT meeting in the participating regions 7
3.2 Persona Stories and User Point of View 8
3.2.1 Persona and User Stories 9
3.2.2 User Point of View 13
3.2.3 Conclusion 22
4 User Roles and Access Rights 23
4.1 User roles and access rights used in the PVT, E-cockpit and VM modules 23
4.1.1 Breakdown of Access rights per platform feature and user role 25
4.2 User roles and access rights used in E-learning module 28
5 Use Cases for the PVT, E-cockpit and VM modules 29
5.1 The PVT Use cases 29
5.2 The E-Cockpit Use cases 45
5.3 The VM Use cases 48

6 Annex 1 54
6.1 LAT meeting Austria 54
6.2 LAT meeting Croatia 54
6.3 LAT meeting Germany 55
6.4 LAT meeting France 56
6.5 LAT meeting Hungary 56
6.6 LAT meeting Italy 57
6.7 LAT meeting Ireland 58

Glossary

A	Austria
A(Vbg)	Austria, Vorarlberg
DE	Germany
FR	France
HR	Croatia
HU	Hungary
IE	Ireland
IT	Italy
UC	Use Case
E-cockpit	E-passport cockpit
SC	Sustainability certificate
KPI	Key performance indicators
RE	Renewable energy
EPBD	Energy Performance of Buildings Directive
POV	Point of View
LCA	Life cycle assessment
LCC	Life cycle cost
LAT	Local Advisory Team
BER	Building Energy Rating
DHW	Domestic hot water
BRP	Building Renovation Passport
UM	Urban Mining
PVT	planning and verification tool
GDPR	General Data Protection Regulation
PPs	Project Partners
B2B	Business-To-Business
EPCs	Energy Performance Certificates
VM	Virtual marketplace
SC	Sustainability Certificate
GIS	geographic information system

1 Introduction

This deliverable presents a summary of the work done in Task 2.1: Use case definition, user roles and access rights. The task objective is to investigate possible use case scenarios to ensure that the EUB SuperHub platform one stop shop features will meet different users' requirements. The definition of the use cases will support the specification of the methodological, sociological, technical, scientific and other requirements of the platform functions. For the identification of the use case, a variety of methods were used such as brainstorming, user stories, user point of views and personal meetings with Local Advisory Teams (LAT). Chapter 3 of this report contain a detailed description of the methods used to develop the use case and the feedback received from possible platform users and stakeholders. Chapter 4 outlines the seven user roles used in the platform PVT, E-cockpit and VM module which are:

1. Administrator
2. Owner
3. Auditor
4. Planner
5. Solution Provider
6. User
7. Visitor

For each user role, chapter 4 summarises the characteristics and the access rights for the developed user role in each of the platform modules. The chapter also provides the reader with a preliminary list of use cases how a user or group of users (user roles) will perform certain tasks on the platform to achieve a desired result. The final list of UCs is to be defined in Task 3.1 (D3.1 respectively). The outcomes of this task will feed into the development of Task 3.1. Plan of the business logic of the tool taking into consideration ICT standards and GDPR issues is covered by WP3.

2 The EUB SuperHub modules a brief overview

The EUB SuperHub platform consist of 4 main modules: E-passport cockpit (E-cockpit), planning and verification tool (PVT) module, the Virtual marketplace (VM) and the e-learning module. The EUB SuperHub PVT, E-cockpit and VM modules are intended to work together as interlocking system presenting a unique EU wide EPC and other building certifications interactive cloud data hub. These modules will be supported with the e-learning module that will publish the training material developed in WP5. This chapter present a high-level description of the 4 above mentioned modules and the main features that they offer. Since the actual development of the EUB SuperHub modules and features are to take place in another WP2 task, namely the T2.3, therefore, it is important to treat the presented description in this section as a preliminary list as these features and functions will most likely be subject to change as the project development progress.

2.1.1 The E-passport cockpit (E-cockpit)

The E-cockpit platform will pave the way for the full digitalization of the EPCs by promoting its transparency and storage as well as the practical application of the EPCs and other building ratings such as grant and funding procedures or rent and sale transactions The E-cockpit will act as a real time digital twin cloud system for building performance ratings. It is a multi-scale cloud- based geo referenced interactive database. The E-cockpit module will allow to store, view key information about the existing building stock and related certificates (EPC, SRI, etc). The certificate values can be viewed using the national or the common harmonized KPIs rating developed in T2.2. The information presented in the E-cockpit module will tie the EPCs information, sustainability and smartness rating with the building geometry and BIM model in a geo referenced database and provide policy makers and public users with reliable “intelligence” about the state of the building stock. The building information presented in the E-cockpit will originate from the PVT module. The owner of the building can control which information about their building can be published and viewed. Thus, EUB SuperHub E-cockpit can be seen as an open access data and communication hub in which information can be exchanged in real time between building users, planners, investors, and policy makers.

2.1.2 The planning and verification tool (PVT)

The EUB SuperHub planning, and verification module (PVT) is in essence an extension of the E-cockpit module, however, it can be viewed as a separate part of the platform. In contrast to the E-cockpit, the PVT will enable building owners to claim their buildings in the platform, upload the related information and decide on the type of building information they would like to share with the public in the E-Cockpit. Moreover, within the PVT the user can evaluate the actual performance of their buildings based on the actual building information that is stored in the building logbook or by means of what-if simulations to evaluate possible technology neutral interventions and retrofitting options. The PVT module will provide the user with plain language data entry interface to populate the building

information and connect it to the building logbook. Based on the information stored in the logbook, the user shall be supported with the creation of a beta LCC and LCA and energy rating values and first assessment of the building performance in the three domains (energy, sustainability, and smartness). The personal beta-version of the EPC can be shared with an accredited auditor which will verify the input values and other supporting documents to issue the related certification. These verified documents can then be shared with the public within the E-cockpit module. Moreover, based on the logbook data and the simulation engine, an EPC auditor or building planner can verify and monitor the building performance and flag out concerning data.

Moreover, thanks to the wealth of information stored in the PVT database, the PVT user can conduct a multi building analysis in which a group of building can be selected and analysed in terms of CO2 emissions, energy performance rating, smartness, possible synergies, or other benchmarks. This will facilitate providing holistic suggestions for performance improvements that target more than one building at a time. Another advantage of having extensive information stored in the PVT module is that it will allow to conduct on-the-fly hourly energy simulation for a large number of building stock and compare them to reference benchmarks to flag out any performance discrepancies. This will enable both the user and the EPC issuer to apply appropriate corrective measures. The logbook date and the issued certificate can be shared via the PVT platform with service providers in GDPR compliant environment via the virtual marketplace (VM) to find an energy or consultant or other service providers. The user can also choose to share a selected set of data with the general public via the E-cockpit.

2.1.3 The Virtual marketplace (VM)

The VM will facilitate the match making connection between the building users, auditors, solution providers, funding providers as well as other market actors and service providers. The virtual marketplace (VM) will be open to wide range of service providers who can deliver auditing, consulting, and funding across the EU (SMEs, constructors, professionals, auditors, banks etc.). These actors can join the VM for free and offer their solutions and technologies to the users in form of digital yellow pages via the VM. Building owner and users can also join the VM to search for a qualified service provider for their project. For example, the owner can share the building EPC and other certificates via the VM platform. Consequently in the VM, funding agencies and/or service providers would be able to elaborate service quotation, in GDPR compliant environment. Moreover, the VM can be used by building planner to find an auditor or specialized contractor. The VM will work out qualification criteria and required for service providers to be registered in the VM.

2.1.4 E-learning

The E-learning module is an independent part of the EUB SuperHub platform that serves two main objectives. The first objective is to provide training material for the platform users on how to use the EUB SuperHub platform (E-cockpit, VM and PVT modules). The second objective of the E-learning module is to provide the new generation of energy, sustainability, smart solution experts and assessors with a set of advanced learning and training materials relevant for their field of expertise and

collaboration module. To achieve both objectives, the E-learning module will be publicly accessible and can be extended during the project and after the project duration. It will incorporate e-learning methods like video-tutorials, webinars, and podcasts and will allow working in a multi-language environment. The training material used in the E-learning module will be developed in WP5.

3 Methodology of defining use case scenarios, user roles and access rights

This chapter will elaborate on the methodology used to define the use case scenarios such as the LAT meetings, Peer meetings and the creation of user stories and mapping users' point of view.

3.1 LAT meeting in the participating regions

As described in Task 6.4 Common dissemination activities, Local Advisory Teams (LAT) are a key EUB SuperHub strategy to actively involve target groups in the project and to ensure active exchange, disseminate and secure developments of the project results and milestones. Actually, LATs are fundamental to facilitate the implementation of the project's activities and to maximise the impact of its results, establishing liaison with relevant stakeholders and actively engaging them in certain project activities. Within T2.1 seven LAT meetings where held, one in each participating region (Austria, Croatia, Germany, France, Hungary, Italy and Ireland). In each LAT meeting a group of distinguished experts, representing a wide array of stakeholder from whole value chain of the construction industry where invited. The goal of the LAT meeting is to support the EUB SuperHub research team by providing insights on the main features of the EUB SuperHub platform one-stop-shop and provide feedback on ways to improve it.

For ensuring the usability of the LAT meetings results, the LAT meeting moderators were provided with a standard set of slides that describe the project, a proposed meeting agenda and a list of guiding questions to get the attendees feedback (see Annex 1 for example of the slides used in the meeting).

The proposed LAT meeting agenda contained the following points:

1. A Brief introduction of the participants
2. An introduction to the EUB SuperHub Project
3. A list of 5 questions related to the next generation of EPCs which are:
    - In your opinion have EPCs helped you in your day-to -day work? Has it been successful?
    - How can we make EPC more attractive/ more useful?
    - What kind of indicators and information can we include in the EPC in addition to energy?
    - In which extend do you think it is necessary to improve the process of EPCs and its quality/ credibility, knowing that it could be more expensive?
    - How do you imagine an EU building passport? What should it look like and how to use it?

4. An overview about the EUB SuperHub one-stop shop platform and its 4 main modules
5. An overview about the functions and features of each module
6. A list of questions about the EUB SuperHub platform and features which included:
    - Is this Platform relevant for your work? How? Which problem can it solve for you?
    - Which of the EUB SuperHub 4 Module (s) is/are most relevant to your work? Why?
    - Which Module of the EUB SuperHub platform is least relevant to your work?
    - Which features of the PVT module are of most interest to you? Why? How can it help you? And what is missing
    - Which features of the E-Cockpit module are of most interest to you? Why? How can it help you? And what is missing
    - Which features of the VM module are of most interest to you? Why? How can it help you? And what is missing
    - Which features of the E-learning module are of most interest to you? Why? How can it help you? And what is missing

The answers gathered from the participants where then used by the research team to create persona stories and user point of view statements as described in the sub-section 3.2. In Annex 2 of this report a list of the attendees in each LAT meeting is provided

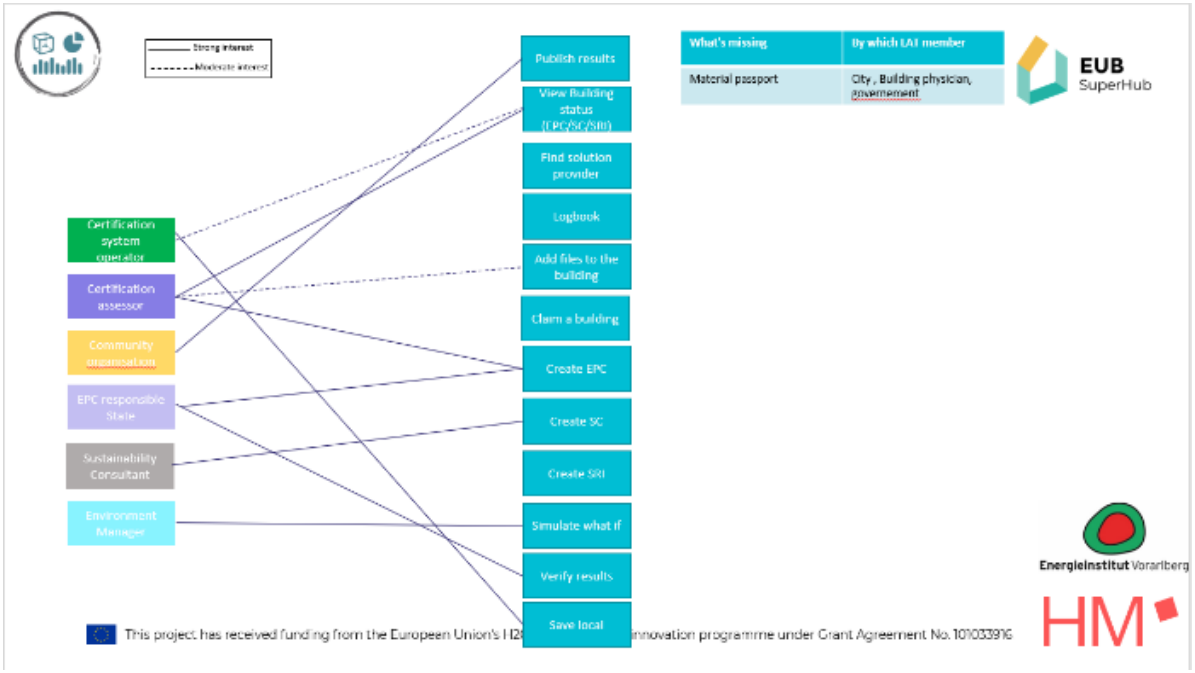
3.2 Persona Stories and User Point of View

The EUB SuperHub platform is designed to address a large group of cross disciplinary stakeholder. These stakeholders have varying needs, backgrounds and expectations from the platform and their interest might in many ways overlap and interact with one another. For the project team to gain a better understanding of these complex and somewhat overlapping requirements, user stories are created. The user stories though derived from real cases they are grouped into common “Personas” that represent a fictional stakeholder whose profile combines the features of an existing group of stakeholders and summarize relevant attributes of the groups they represent. The Personas provide the research team with short stories that describe a Persona completing a task on the platform to accomplish a specific goal. Based on the Persona based user stories the research team summarizes the needs and expectation into list of user’s point of view (POV) statements. The POV represent a meaningful and actionable problem statement. The POV allow the project team to map the platform user challenges and expectations to the EUB SuperHub features and solution. Thus, defining the platform use case scenarios, roles, and the required access rights to fulfil the use cases. To create the user stories and personas the research team used several methods starting from in-house brain storming sessions, interviews with specialists from the academia and industry, meetings with the local advisory teams (LAT) as well as Peer meetings in which two project members conduct a role play with one project member playing the role of an end user and the other member playing the role of the EUB SuperHub service provider. The following provide a summary of the

developed Persona user stories and POV based on the local LAT and Peer meetings held by each participating partner.

3.2.1 Persona and User Stories

As mentioned before Persona and user stories help the project team understand how and for which reason a specific feature or module of the EUB SuperHub can be used in a real case scenario. The Persona is fictional user that is usually derived from a real case and represent a wide group of possible users. The use of the person and their story help to identify the user group problems and their interest in one or more module of the EUB SuperHub platform. The creation of the persona is done based on real case interviews conducted by all the project members with real stakeholders. On the basis of these real interviews, the research team create a fictional story that reflect the most common points raised by the stakeholders, the problems that they are facing in regard to the existing building stock and their needs. Afterwards, the developed stories are mapped with the features and functions of the EUB SuperHub as seen in Figure 1. This mapping of the user needs, and features is sone in similar fashion to a Pain and Gain analysis.



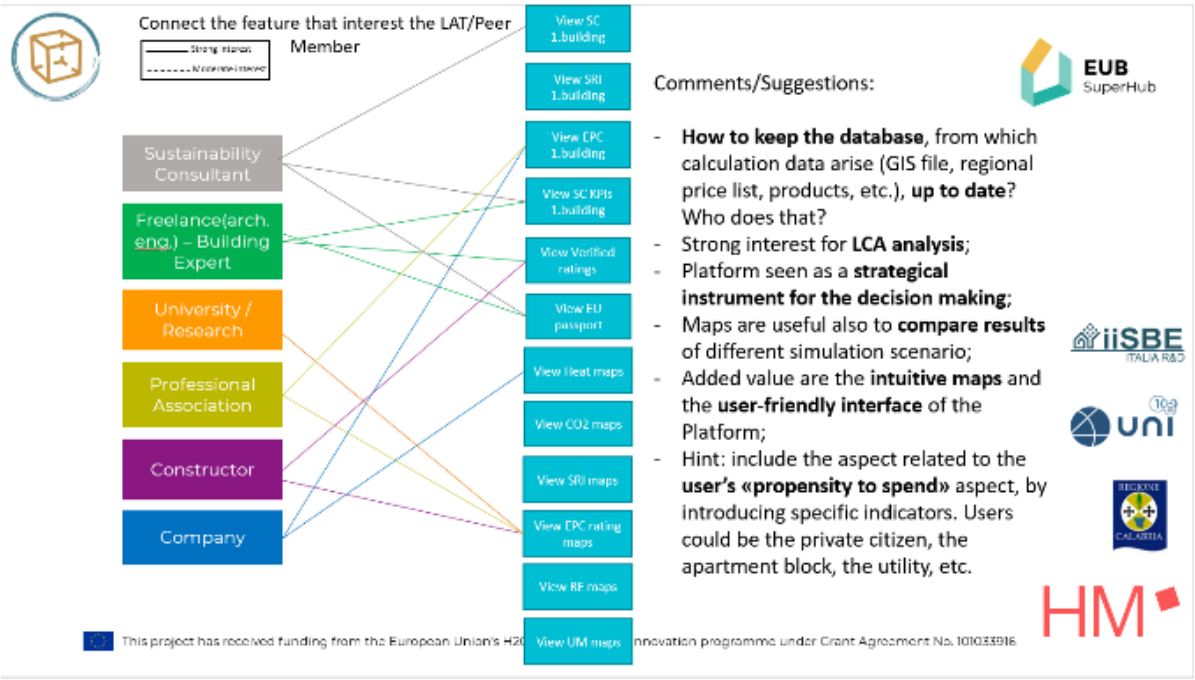


Figure 1: Example of the mapping of user needs with the EUB SuperHub features made by the project partners on the basis on the conducted interviews and LAT meetings

It is rather natural that some of the created user stories overlap in some respects and in other cases might even address topics that are beyond the scope of the EUB SuperHub project, nevertheless, they still present valuable inputs on the possible use cases of the platform and how the functionalities of the platform might be used to achieve them. The following give an example of some of the user stories developed by the research team

3.2.1.1 Users Story 1: Coli Insurance

Coli is one the main building insurance players in the EU. The constantly developing EU climate change and energy policy is putting some of their Real-estate investments at risk. To ensure the value stability of their real estate portfolio across the EU, they want:

- A harmonized indicator set that can be applied across EU that reflect and measure the building energy, smartness, and sustainability performance
- A tool that would allow evaluate and monitor the performance of the large existing building stock across the EU in 2 domains (Energy and Sustainability)
- A tool that would enable to have a quick and accurate overview of the building stock portfolio

3.2.1.2 Users Story 2: Base consultants

"Base" is a consulting firm aiming to help companies offer high-performance solutions to make buildings smarter and more energy efficient. To perform accurate simulations and optimization studies, they need to have a wealth of information about their existing buildings at their stock. As they act all

over the EU the concept of a European passport rich in shared data suits them. In particular, they would appreciate:

- A 100% digital EPC with only open and accessible input data (to verify their accuracy), easy to fill and to update.
- To reduce the gap between the buildings and their digital twin by digitizing and automating the certifications and the information exchange between different data sources.
- A tool able to perform dynamic simulations, that would allow to consider the energy behaviour of the building according to the changes that occur on it (sale, retrofit, structural changes, etc.).

3.2.1.3 Users Story 3: Immo 4D

"Immo 4D" is one of the main social landlords in Spain, managing over 250000 dwellings. For them, an EPC is created and used. For Immo 4D, EPCs are important tools to identify the need for retrofit actions and to calibrate the required investment budget. To make the best use of this tool, they need:

- To facilitate the regular updating of relevant building data, especially after modifications and renovations
- A more reliable and clearer EPC based on more easily verifiable and objective inputs and capable of giving the same result even if made by another assessor.
- A comprehensive tool capable of also taking into account comfort-related parameters such as indoor air quality
- A tool that is easier to fill out, more automatic, that doesn't take so long to be performed.

3.2.1.4 Users Story 4: MountainDorf municipality

"MountainDorf" is small town with ambitious sustainability targets. The citizens are actively engaged in the sustainability of their community. To answer to the public demand the municipality need:

- A tool that would show the sustainability performance of their existing building stock (public and private)
- A tool that enables each citizen to update the status-quo of their building.
- A tool that can communicate with the larger public the progress of the building stock performance toward meeting the sustainability goals.
- A tool that would allow to make targeted renovation and energy system installation decision on individual building and neighbourhood scale.
- A tool that can show and rank the building stock sustainability performance against a set of easy, simple and clear indicators.
- A tool that would allow to monitor the performance of the building stock over many years

3.2.1.5 Users Story 5: GLKX Utility company

"GLKX" is an electric utility company, with the mission to develop renewable and recovered energy sources and to help clients achieve energy savings and reduce CO2 emissions. As they regularly cooperate with EPC assessors to obtain relevant

buildings data, they have a real interest in improving the EPCs accuracy and reliability, for this reason they want:

- A more accurate and thorough EPC, using less “standard” and more “measured” data, useful for calibrating numerical models.
- An automized tool, which does not require requesters to provide a huge amount of data to EPC assessors.
- A tool that can give a more precise idea of the costs related to energy consumption for buildings inhabitants.
- To know what financial support is available for energy performance improvement projects.

3.2.1.6 Users Story 6: DorfiDorf town

DorfiDorf is small town with limited resources. The town hall is need of renovation. The state has lunched attractive funding scheme in case they can ensure that the renovation meets requirements of the ABCD gold sustainability standard. Therefore, the municipality need:

- A tool that would allow them to certify their planned renovation with the ABCD system
- A tool that would allow to investigate several renovation options
- A tool that can communicate with the larger public the results of the renovation

3.2.1.7 Users Story 7: Lorenz the IT engineer

Lorenz is an IT engineer that just inherited his uncle house in the blue forest. He wants to rebuild the house to the highest energy and ecological standard. The state has lunched attractive funding scheme in case he can ensure that the renovation meets the requirements of the national FKF sustainability standard. Therefore, the Lorenz need:

- A tool that would allow him to find an FKF sustainability consultant and an Auditor to help him with certifying the building and applying for the funding
- A tool that would allow to investigate several renovation options and to understand their cost as well as ecological footprint
- A tool that can inform him about the building is performance after the renovation

3.2.1.8 Users Story 8: EIZ Sustainable building certification systems

EIZ is a sustainability scheme operator for public building in Loxxstrai. Due to recent policy changes they anticipate that application of their system is going to expand and became mainstream. Moreover, their system is planned to be used across the border in neighbouring countries. All this would result in a big increase in the number of auditors, audited building, and system users across serval countries. To manage their system, they want:

- A harmonized set of indicators that can be applied across both countries and is in line with national targets in both states
- A harmonized and online based training system for the system auditors
- Possibility to qualify the auditors via easy-to-follow online training

- A platform that would allow to manage and organize the EIZ qualified auditors
- An online based platform for the certification process which allows to upload and exchange building documents.

3.2.2 User Point of View

The results of the Persona stories provided the research team with valuable input about the platform users' needs and expectation. These are then translated by the research team into list of users' point of view (POV) statements. The POV is composed of simple statement that can be formulated as: User (X) Want (Y), because (Z). For example, a building owner wants to update the EPC in preparation to sell the house. For the creation of the EUB SuperHub POV, the research team first carefully studied the results of the interviews and LAT meeting and grouped that statement given by the interviewee into the most appropriate EUB SuperHub model that can full the end-user POV. These are then filtered out to remove duplication and the provided statements grouped by the type of user such as project planner, owner, utility company, etc. It is rather expected that the same interviewee can fulfil several functions within the same module such as being the project architect and the project manager at the same time. Moreover, it is also possible that two distinct group of users share the same needs and requirements.

3.2.2.1 POV Statements related to the PVT module

Role of the LAT member / interviewee	Need to / want to	Because
Planner Sustainability Consultant	Simulate what if scenarios and get first sustainability results	It saves time and help guide the decisions making
Planner Sustainability Consultant	To have access to the Digital Logbook and to preform what-if scenario on GIS enabled platform.	To be able to see the building information easily and to perform sustainable analysis and to make very rapidly an Energy Performance Certificate and simulate possible renovation scenario
Planner (Architect)	Have easier and clear organized structure of relevant building files	It saves time and make the organization of the building project easier and allow to have integrated planning as the results can be communicated with several experts
Planner (Architect)	to check information about EPC results of the buildings and building data in PVT Module. Needs to have an easy access to the buildings EPCs georeferenced.	to perform comparative studies about EPC results to verify any

		discrepancies and their reliability
Certification system operator	An online based platform for the certification process which allow to upload and exchange building documents	To ease the creation of sustainability certificates and to create building material passports
Large real-estate owner / Public	To have a standardized and harmonized rating system for a large building portfolio	To compare the performance of various building types and
Large real-estate owner/ Public	To track the performance of large building	To ensure that the building performance targets are reached
Large real-estate owner/ Public	To have a standardized building data collection the cover aspects beyond energy	To ease the building data collection and create building material passports
Certification system operator	A harmonized set of indicators that can be applied across countries and is in line with national targets	The system is to be used in more than one region / EU MS
Researcher (Visitor/ Owner)	possibility to check information about buildings through the Digital Logbook. It is considered very useful because it ensures to have all the information about the building in a single repository. Anyway, it's important to give the possibility to the user to customise all the variants for the what-if simulation scenario	
Solution provider	Professional association representer has interest in this module in relation to the simulation of what-if scenario at different spatial scale. This is an opportunity to evaluate (quickly) benefits coming from energy efficiency strategies and consequently make planning decisions.	open new markets
Solution provider (Constructor)	Constructor appreciates to get easily the information concerning the buildings and the possibility to simulate what-if scenario on them (renovation scenario above all). unified repository to have access to buildings information. Constructor says that is important the use of GIS system	Logbook is seen as a simplifying data collection of the buildings data
Solution provider (Company)	Stakeholder from company appreciates the possibility to simulate thermal insulation scenario on building(s). This module would help in promoting energy efficiency through thermal Insulation companies, checking building energy	promoting energy efficiency through thermal Insulation companies / to promote/recommend a specific product and

	performance. Companies take advantage of the possibility to simulate a renovation scenario to promote/recommend a specific product and consequently, to get the expected result	consequently, to get the expected result
National policy maker / Public authority / Financial institution	simulate what-if scenarios on multiple scales (building, neighbourhood, and city scale) / run analysis	· To make a decision · To assess the benefits of performance optimisation (economic, environmental, energy) on multiple scales
National policy maker / Public authority / Financial institution	access to building related data / information from digital building logbook	· To better understand the existing building stock and based on that to implement effective renovation programs
Solution Provider (Financial institution)	share links to available financing options for renovation projects (e.g., green loans, incentives ...)	· To foster building renovations · to create new, skilled green jobs
Solution Provider (Real estate agency)	collect all the necessary building related data	· To form real estate price - to set a price based on the facts - make a more informed decision related to the real estate price · to simplify data collection during a property sale · to sell building/apartment faster and for more money
Solution Provider (Real estate agency)	share links to available financing options for renovation projects (e.g., green loans, incentives ...)	· To foster building renovations · to create new, skilled green jobs
Planner (Energy assessor)	collect all building data required for issuing an EPC (if already available)	· To issue an EPC quickly and easily
Planner (Energy assessor)	store building related data gathered mainly by on-site visits (e.g., buildings construction information: envelope, technical building system - TBS, building energy performance: EPC and audit general information)	· Provide building related data that building owner due to lack of knowledge cannot collect · to support setting up a logbook
Planner (Sustainability assessor)	collect all building data required for issuing a sustainability certificate	· To issue a sustainability certificate
Owner	view their building	interested

Owner	simulate what-if scenarios on the building scale adopt energy efficient solutions in his/her building	· To assess the benefits of performance optimisation (economic, environmental, energy) · to see savings in the energy bill
Owner	get a first assessment of the building performance in three domains (energy, sustainability, and smartness)	· To get clear and easily understandable information about the current state of building condition
Owner	see all building related data supplied from professionals (e.g., energy assessor) monitor and compare energy consumption monitor energy generation from renewable energy sources get automatic notifications in case of unusual consumption patterns get alerts and guidance concerning maintenance aspects	interested
Owner	see thermal images of buildings	to detect energy losses of buildings · to indicate (quickly and easily) insulation problems of buildings
Owner	store information and specific data about building throughout time (general and administrative data related to the building, occupants' behaviour and preferences, relevant documentation, and evidence of performed actions in the building)	· To update digital building logbook
Owner	to store energy production data on-site (e.g., energy generation from RES)	to be able to monitor the reduction in energy consumption due to on-site energy generation · to monitor reduction of energy costs
Owner	store information and specific data about building over time (general and administrative data related to the building, occupants' behaviour and preferences, relevant documentation, and evidence of performed actions in the building)	· To update digital building logbook
Solution provider	access to building related data information from digital building logbook	· To give advice to the building owner · to be able to suggest better decision making in implementing

		measures · to estimate exact renovation costs
Solution Provider (Construction company)	collect all the necessary building related data	benefit from having this data available
Solution Provider (Construction company)	give existing construction solutions to renovate buildings encourage and support end-users in decision making	to contribute the possible future building renovation
Solution provider (Energy company/Utility company)	to store real time energy/water consumption dana/energy bills (automated data from smart meters or monitoring devices)	· To contribute the possible future building renovation. · It is their obligation
Investor (Visitor)	simulate what-if scenarios	· Make a decision
Owner	Simulate the impact of retrofit solutions on the building stock	· To plan the future investments and retrofit actions specially to follow regulatory changes
Public decision-maker	Estimate the situation of my property stock as its energy performance level	To determine and calibrate the budget to provide for renovation actions
Solution Provider	Define the objectives and specification for simulations - Know what financial support I can get - Have a decision-making tool	To make feasibility assessment - I would like To Have a reliable idea of the "GO" or "NO GO" decision for renovation

3.2.2.2 POV Statements related to the E-COCKPIT module

Role of the LAT member / interviewee	Need to / want to	Because
Planner	Get first overview about the district performance	assess how the building preforms within its district and find possible synergies
Certification system operator	Communicate building sustainability and energy results to a larger audience	Raise awareness
Large real-estate owner / Public	Communicate building sustainability and energy results to a larger audience	Improve image / Transparency with public
Planner	visualise indicators results to be used in the building E-Passport and the energy simulation results	to suggest retrofitting scenarios and raise awareness about the topic

Planner (Sustainability Consultant)	to get an overall impression concerning sustainability aspects of a group of buildings and not only referred to a single building	easy way to communicate outcomes and they are very useful also to compare results of different simulation scenario
Researcher (Visitor)	visualise aggregated data of buildings	to find any possible synergies with other buildings
Solution provider	visualisation of the energy efficiency performance and EPC results / get specific information about a specific cluster of buildings	transparency and accessibility
Solution provider	see the status of the buildings. This section helps in making useful reasoning about renovation of the building	strategical instrument for the decision making
Solution provider	visualise heat maps related to a cluster of buildings	promote energy renovation solutions
Public policymaker	To have access and visualize all the buildings data	To adapt the public policy
Solution provider (energy company)	To know the potential of energy use and retrofit actions	To identify the improvements to be made
Real estate manager (Owner)	To have access and update all the buildings data	For the management of my assets and prioritize retrofit actions
National policy maker / Public authority	see aggregated data on multiple scales (building, neighbourhood, and city scale)	· To gain more detailed information on the existing building stock and its performance - the effective monitoring of buildings' energy performance · to better understand the existing building stock and based on that to implement effective renovation programmes
National policy maker / Public authority	see the status quo of the existing building stock	· To perform an analysis of the status quo of the existing building stock related to energy and water consumption, buildings envelope and technical building system · to be able to give solutions (heating cooling solutions, ...) · to identify which

		buildings in portfolio to target for improvement or recognition
National policy maker / Public authority	analyse the heating appliances stock (number of heating units installed, thermal capacity installed, yearly energy consumption, age of the heating units)	· To be able to suggest more efficient alternatives · to motivate building owners to plan the replacement of their old and inefficient heating appliances
National policy maker / Public authority	generate different types of maps (heat maps, renovation maps, urban mining maps, smartness maps, ...) display and analyse the results of the building performance via a 3D-GIS map - data visualisation - run map analysis visualise energy consumption and generation (building, neighbourhood, and city scale)	· To get spatial data · make a decision · to see impact of energy efficient building policies over time · to see distribution of energy consumption and generation
National policy maker / Public authority	access to BRP	· To monitor the impact of policies · to identify the measures that provide the greatest value for money · to issue incentives to promote the adoption of energy efficiency measures
Solution provider (Financial institution)	display and analyse the results of the building performance via a 3D-GIS map - data visualisation - run map analysis visualise energy consumption and generation (building, neighbourhood, and city scale)	to gain more detailed information on the existing building stock and its performance · to detect the worst-performing buildings
Solution provider (Financial institution)	develop new and improved financial products and services that meet customer need based on aggregated data on retrofit trends contained within BRP	to support building retrofit projects · to support the owner · to ensure a minimum average energy efficiency performance
Real estate agency	view published information	· To indicate and compare the energy class of buildings helping to regulate property transaction prices and rents

Real estate agency	give property valuation based upon data within BRP advise customers about the potential impact of energy efficiency on the speed and price of a property sale	to improve property value when BRP outputs have negative impact on the value of a property · to work with customers to identify and support retrofit measures
Planner (Energy assessor / Sustainability assessor)	view KPIs and BRP	Interested
Building manager / Building owner	to benchmark his/her building see EPC of his/her building	Interested
Solution provider (Insurance company)	Access to Building Renovation Passport	· To get all relevant building data before issuing insurance policy for a building · to get all relevant data when the building owner makes an insurance claim for repairs - to see how a building is maintained
Solution provider	view buildings / find a customer	· To identify which buildings in portfolio to target for improvement or recognition · to find a potential customer - to get work
Solution provider (Energy or utility company)	display and analyse the results of energy and water consumption via a 3D-GIS map - run map analysis	· See spatial distribution of different types of energy on multiple scales (building, neighbourhood, and city scale)
Investor	view buildings and find new investment	make a decision

3.2.2.3 POV Statements related to the VM module

Role of the LAT member / interviewee	Need to / want to	Because
Planner (Sustainability Consultant)	Get first overview about the district performance	assess how the building preform within its district and find possible synergies

Planner (Sustainability Consultant)	Reach more clients easily	A lot of time and effort is spent in acquiring new project and to better understand the exact market needs
Planner (Architect/Sustainability Consultant)	Find sustainability consultants / solution providers for their design project	It is not easy to find the right persons for the right job
Auditor (Certification system operator)	manage and organize the qualified auditors	They don't have the capacity to organize their auditors
Planner (PROFESSIONAL ASSOCIATION)	Generate interaction / matchmaking among professionals	It is not easy to find the right persons for the right job
Solution Provider	finding sustainability consultants and solution providers	To identify available funding and consequently get work in that field
Solution Provider	to reach proper companies, solution provider and clients with specific skills easily	connection between demand, supply, and product
Social landlord	To benchmark the solutions providers	To reach new partners and to launch new markets
Dwelling owners	To find providers adapted to my needs	To adapt the maintenance renovation to my building needs
Dwelling owners	To find consultants and solution providers	To get a first impression about the work and services provided
Auditor (Energy / Sustainability assessor)	find a customer who needs a sustainability certificate	To expand the work
Building manager / Building owner	access to information and advice get an overview of the most efficient alternatives available on the market find a solution provider connect with suppliers and service providers	to make informed decisions · to make renovation simpler · to renovate building and thus reduce energy consumption/cost, improve the quality of life through better comfort and improved safety
Solution provider	sell a product (e.g., windows, thermal insulation, heat pumps, pellet boilers, solar collectors, ...)	To expand work

3.2.2.4 POV Statements related to the E learning module

Role of the LAT member / interviewee	Need to / want to	Because
Certification system operator	A harmonized and online based training system for the system auditors	To ensure that the training is of the same quality across several states
Certification system operator	Possibility to qualify the auditors via easy-to-follow online training	Attract more auditors
Users (lot of profiles)	learn how to use PV module, E-cockpit and VM module	to use the platform

3.2.3 Conclusion

Based on the results of the LAT meeting, interviews, and brainstorming sessions it became rather apparent that the platform as whole generated a sizable interest from a wide spectrum of stakeholders that are involved in the construction sector in general and building certification in particular. However, each the interest in the platform features and modules is not shared equally by all stakeholders. It is safe to say that the vast majority of showed interest in the platform features that are provided by PVT, E cockpit and VM modules and to less degree in the e learning platform. The lack of interest in the e learning platform is attributed to the fact that such platforms already exist, and they are already widely established in the market. Hence, the development of another platform seemed to be to most of the attendees redundant. However, it was also agreed that a sort of formal training is needed for the stakeholder to be able to use the platform correctly and to exploit its one-stop shop nature. This need was reflected by many LAT members as seen in the POV statements. As a result, the project research team decided to focus its resources on the development of the most needed and rather unique models and features of the platform, namely the PVT, the E-cockpit and VM module and to exploit the use of already existing or in development E-learning platform that are also developed within the H2020 framework. In this regard it was decided to adopt the E-INVENTORY module that is developed by the H2020 funded project TRAIN4SUSTAIN for the use and publishing E learning materials that are developed within the EUB SuperHub. This selection is also justified given the fact that both the EUB SuperHub and the TRAIN4SUSTAIN are coordinated by Geonardo Environmental Technologies Ltd and cover almost the same geographical area. The E-INVENTORY that is developed within TRAIN4SUSTAIN for project offers to a great extent the same functions and features that are needed within the EUB SuperHub project as it offers a convergence of e-learning and help desk, as well as a database storing information on training courses and training material content. It will allow professionals (customized according to profession) to access available training materials and related qualification courses in the field of sustainable energy skills from across the EU. Therefore, it was decided to adopt and adjust the TRAIN4SUSTAIN use cases and access rights within the E learning module so that it best reflects the needs of the EUB SuperHub project as will be elaborated in the next chapter.

4 User Roles and Access Rights

The outcomes of LAT meetings showed that the EUB SuperHub platform functions and modules address a large number of stakeholder groups each having different interest in the features offered by the platform and have a different motivation to use them. For example, policy makers are interested mainly in having reliable information about the energy and environmental performance about the existing building stock, a service provider is more interested in getting information about the market needs and trends, an Auditor is more likely to use the platform to streamline and harmonize the building auditing process and find new projects, etc. Therefore, the EUB SuperHub platform modules need to be on the one hand consistent so that the three modules (PVT, E-Cockpit and VM) can work as interlocking system and on the other hand, flexible enough to handle varying interests of the large number of users.

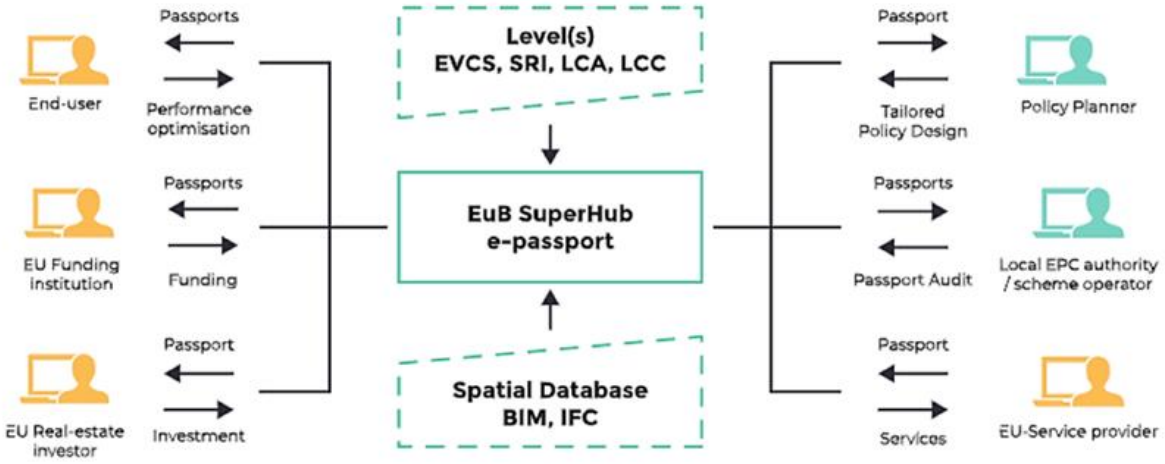


Figure 2: A schematic showing the interest of various stakeholder group in the EUB SuperHub E-passport which is part of the E-cockpit module.

To balance these somewhat conflicting objectives, the EUB SuperHub takes advantage of the concept of user roles. User Roles are permission sets that control access to areas and features of the platform. Hence, all involved stakeholders that are using the three modules of the platform (PVT, E-Cockpit and VM) are assigned to a limited number of user roles, each having a specific set of access rights to the features offered by the platform. Using this approach, it is possible to bring the unpredictable number and type of stakeholders and their specific interactions with the platform back to a manageable amount of abstract user roles.

4.1 User roles and access rights used in the PVT, E-cockpit and VM modules

For the PVT, E-cockpit and VM modules the 7 user roles have been defined in the following hierarchy, this means that in general each role will have at least the same access rights as the preceding role. So, a Solution provider will have at least the

same rights as a user. And a user will have at least the same rights as the visitor, etc. Some exception to this rule is illustrated in the table 1 below:

1. Administrator
2. Owner
3. Auditor
4. Planner
5. Solution Provider
6. User
7. Visitor

The following table provide a description of the user roles used across the platform PVT, E-Cockpit and VM modules.

Table 1: An overview of the user roles used in the EUB SuperHub PVT, E-Cockpit and VM modules

User Role	Main Characteristics
Administrator	Administrator role combines all activities which are needed to set up and run the EUB SuperHub platform. This include setting up and maintain the process and the necessary software environment to be used by the other project roles. They have access to all the platform features are responsible for managing the backend part of the platform such as setting up database, linking the building information databases to GIS information, assigning correct project roles to each user, running the simulation, etc.
Owner or Owner representative	An Owner or an Owner representative is a platform user that have registered account on the Platform and have successfully claimed ownership of a building or a group of buildings on the platform. For each successfully claimed building on the platform. The owner has ownership rights to the building logbook and building model and can assign access, view and publish rights to chosen user(s) of the platform to each part of the building model and its logbook. They can run what-if simulations in PVT module and share the result with other platform users. An Owner can set up a profile and use the Match-making Hub's internal communication panel but can't get listed in VM as solution provider in VM. The Owner can publish building performance certificates relating to their buildings in E-Cockpit but cannot verify them.
Auditor	An Auditor is a user with registered account on the Platform. They can set up a profile and use the Match-making Hub's internal communication panel can get listed to the VM as Auditor when successfully recognized as such by the platform Administrator. An Auditor can view, edit one or more building model and logbook in the platform and run-what if simulations in the PVT module. Results can be shared with the owner or with other users pending owner permission but not be published to the E-Cockpit. Moreover, an Auditor can develop and verify building certificates but can't share it on the E-Cockpit

Planner	A planner is a user with registered account on the Platform, they can set up a profile and use the Match-making Hub's internal communication panel and can get listed in the VM as planner when successfully recognized as such by the platform Administrator. A planner can view, edit to one or more building model and logbook in the platform and run what-if simulations in the PVT. Moreover, a planner can develop a beta certification relating to the building in the PVT module but cannot verify building certificates and can't share it on the E-Cockpit. Results can be shared with the owner or with other users if the owner permits
Solution provider	A solution provider is a user with registered account on the Platform. They can set up a profile and use the VM Match-making Hub's internal communication panel can get listed to the VM as solution provider when successfully recognized as such by the platform Administrator. A solution provider can view, edit one or more building models and logbooks, and run-what if simulations in the PVT module. Results can be shared with the owner or with other users pending owner permission but not be published to the E-Cockpit.
User	A user has a registered account on the Platform, they can set up a profile and view the VM Match-making Hub's panel and published information on the E-cockpit. A user can run-what if simulations to a building or group of building in PVT but cannot publish or share the results.
Visitor	A visitor does not have registered account on the Platform, they can view the VM Match-making Hub's panel and published information on the E-cockpit.

4.1.1 Breakdown of Access rights per platform feature and user role

The following provide a draft list of functions provided by the platform with an indication to the user role access right to each of them.

Table 2

Module	**Feature/ Function**	**Access right (Yes=1 / No=0)**						
		Admin	Owner	Auditor	Planner	Solution-provider	User	Visitor
PVT	Claim a building	0	1	0	0	0	1	0
	Assign a claimed building to user	1	0	0	0	0	0	0
	Create a building logbook	1	1	0	0	0	0	0

View Logbook	0	1	1	1	1	0	0
Use Match making between Building and VM	1	1	1	1	1	0	0
Publish building results to the E-cockpit	0	1	0	0	0	0	0
Add files to claimed building logbook	1	1	1	1	1	0	0
Edit claimed Building Attributes	1	1	1	1	1	0	0
Create EPC /SC/SRI EU building Passport	1	1	1	1	1	0	0
Simulate what if to one or more buildings	1	1	1	1	1	1	0
Verify EPC /SC/SRI and EU building Passport	0	0	1	0	0	0	0
Save local	1	1	1	1	1	1	0
Assign user role	1	0	0	0	0	0	0
Assign Access rights	0	1	0	0	0	0	0
Clone a building into a variant	1	1	1	1	1	1	0

	Flag a building for review	0	1	1	1	1	0	0
	Run analysis for Building Portfolio and view results	1	1	1	1	1	1	0
	Export results	1	1	1	1	1	0	0
E-Cockpit	View SRI Verified/ unverified for one or more building	1	1	1	1	1	1	1
	View SC Verified/ unverified for one or more building	1	1	1	1	1	1	1
	View EPC Verified/ unverified for one or more building	1	1	1	1	1	1	1
	View own Published Buildings	0	1	0	0	0	0	0
	View EU passport	1	1	1	1	1	1	1
	View Heat maps	1	1	1	1	1	1	1
	View renewable energy maps	1	1	1	1	1	1	1
	View urban mining maps	1	1	1	1	1	1	1

	View SC/SRI/ EPC rating maps	1	1	1	1	1	1	1
	View SC/SRI/ EPC maps	1	1	1	1	1	1	1
	Export results	1	1	1	1	1	1	0
VM	Find funding	1	1	1	1	0	0	0
	Find an Auditor	1	1	1	1	1	1	0
	Find A Planner	1	1	1	1	1	1	0
	Find A Solution Provider	1	1	1	1	1	1	0
	Send a massage	1	1	1	1	1	0	0
	Prepare a quotation	0	0	1	1	1	0	0
	Add profile description	1	1	1	1	1	0	0
	Filter and browse VM profiles	1	1	1	1	1	1	0
	Get listed in the VM	0	0	1	1	1	0	0

4.2 User roles and access rights used in E-learning module

For the E-learning module, the EUB SuperHub will largely adopted the same user roles used by the E-INVENTORY module of the TRAIN4SUSTAIN project. Which are:

Table 3: Adopted user roles in the E-learning platform from the TRAIN4SUSTAIN project

User Role	Main Characteristics
Administrator	Those that are managing the application are the administrators. They have access to all features that the application.

Assistants	Assistants are allowed to manage the core databases (e.g., core database dimensions, thematic fields, learning outcomes, etc., as well as their translations) but don't have access to the user database
Scheme operators	Scheme operators are special users who can access the Scheme Evaluation Tool and add new qualification scheme to the registry
User	Users have registered account on the Platform, can set up a profile and use the Match-making Hub's internal communication panel and get enlisted to the offered training and course
Visitor	Visitors are those users who don't have accounts yet or haven't logged in. They can only access publicly available content

5 Use Cases for the PVT, E-cockpit and VM modules

A use case (UC) is a written description of how a group of users will perform a certain task on the platform to achieve a desired result. The UC outlines, how the system should behave and which user requests it should fulfil. The methodology used in the development of the UC is outlined in chapter 3 of this document. The use case definition will support the specification of the methodological, sociological, technical, scientific, and other requirements of the platform functions. Using scenario-based development in each identified use scenario, the actors will be involved, and their roles will be defined. The task results will feed into the development of Task 3.1. It must be noted that the provided UCs are subject to change and further expansion due to evolving nature of any software development process. The final list of UCs is to be defined in T3.1

5.1 The PVT Use cases

the PVT is multi scale cloud-based building information and simulation space. The PVT objective is to allow building owners and planner to evaluate the actual performance of their building based on actual building information that is stored in the building logbook or by means of what-if simulations to evaluate possible technology neutral interventions and retrofitting options. Moreover, thanks to the wealth of information stored in the PVT database, the PVT user can conduct a multi building analysis in which a group of building can be selected and analysed in terms of CO2 emissions, energy performance rating, smartness, possible synergies, or other benchmarks. This will facilitate providing holistic suggestions for performance improvements that target more than one building at a time. Based on the feedback received from the LAT meeting and summarized in the POV in chapter 3.2.2 the following use cases has been developed:

Table 4: List of Use Cases Developed for the PVT module

#	Use case Name	Use case description	User role (lowest access right possible)	Comments
1	Launch PVT	the user launches the PVT module	User	
2	Chose a city / address to start	After completing the registration, the user can chose/ type in which city / address they would like to lunch the program	User	
3	Search for building by address	the user can type the address of the building to search for the building required	User	
4	Activate a building	the user can activate a building for editing by clicking on it	User	
5	Choose an already existing project / activated buildings	the user is able to open a version of the PVT where a building has already been edited and activated	User	
6	Claim a building	claim activated building as an owner	User	
7	Validation of building claim	the building claim is to be validated via a 2-step verification (automated and manual) in order assign a building to user as claimed	Admin	a building and logbook will be assigned to a user, the user access rights will be elevated to an Owner of the building
7	Open building Logbook file management and assign access rights	A user opens the building file management system in the logbook and can	Owner	

		assign which user (s) is/ are able to open it		
8	Upload file (document, jpg, pdf, ...) to one of the logbook predefined folders	A file is selected by the user and is uploaded to the building logbook The User enters the document management part of the logbook on the PVT and can upload any file from the local pc to the PV module in one of the predefined folders. The file will be stored after uploading. Alternatively a reference to an external file can also be entered.	solution Provider	Permission by Owner must be granted
9	Assign access rights to the building configurator	The user can assign the list of users that can edit the building data in the building data entry wizard configurator	Owner	
10	Assign access rights to the logbook folder	The user can open a folder/file and decide which folders / files in the logbook are accessible to other to open	Owner	
11	Configure the building basic information	The user is to Configure the building basic information name, address, ownership, etc and can choose the building year of construction, number of stories	User (for unclaimed buildings) / Planner (when granted access rights by the owner) / Owner	

		and usage, heating, and cooling system, etc. This will allow the system to map and populate the building data fields from existing database		
12	Save the building spatial data	The user is to click on save after configuring the building spatial data	User	
13	Overwrite spatial data in building logbook	An Owner can choose to overwrite the data in the logbook with the new ones, an Email notification will be sent to all logbook access right holder	Solution Provider (when granted access rights by the owner)	
14	Save as a new variant	the user can choose to save the new information as part of new variant for what if simulation	Solution Provider	
15	Configure / edit the building spatial data	The PVT displays the building footprint and height, the user can edit the build footprint and height to reflect the real building information. This cannot be done to already claimed Buildings. for Claimed Building only the owner can assign such rights to a planner	User (for unclaimed buildings) / Planner (when granted access rights by the owner) / Owner	

16	Save the building basic information	The user is to click on save after configuring the building basic data, this will overwrite old data	User	
17	Overwrite building basic information in building logbook	A user can choose to overwrite the data in the logbook with the new ones, an Email notification will be sent to all logbook access right holder	Planner (when granted access rights by the owner)	
18	Save as a new variant	the entered data can be saved as a new variant, old data won't be replaced	User	
19	Configure the building data for EPC, sustainability assessment and SRI	User opens the PVT and Activates a claimed building of interest. The PVT displays fields and/or drop-down menus for variables / properties that need to be defined in order to configure the building for energy simulation and/or sustainability assessment and/or SRI assessment (data not known to the user can be derived from database).	User	
20	Save building for assessment	The user is to click on save after configuring the building data for energy and sustainability assessment, this	User	

		will overwrite the old, saved data		
21	Overwrite building assessment information in building logbook	The user can choose to overwrite the assessment data in the logbook with the new ones, an Email notification will be sent to all logbook access right holder	Planner (when granted access rights by the owner)	
22	Run building Simulation / calculation	the user can run the simulation/ calculation based on entered data	User	
23	Run Simulation / calculation for assessment	The user can run the EPC simulation/ SC calculation based on entered data	User	
24	Flag out missing data for energy simulation	The PVT will flag out fields / attributes that are derived from data base or need to be filled out by the user to run the simulation. This can also be done manually by an Auditor or planner	Admin/ Planner	
25	Flag out unrealistic EPC data	The PVT is to compare the entered values with the ones available in the database for similar building and issue a warning if one or more information appears to be unrealistic for example building height is 1000 M, or windows U value is 0.01, etc. This can also be	Admin/ Planner	

		done manually by an Auditor or planner		
26	Flag out missing data for sustainability assessment	The PVT will flag out missing fields / attributes that need to fill out by the user to run the simulation. This can also be done manually by an Auditor or planner	Admin/ Planner	
27	Flag out SC unrealistic data	The PVT is to compare the entered values with the ones available in the database for similar building and issue a warning if one or more information appears to be unrealistic for example building indoor CO2 concentration 200 PPM. This can also be done manually by an Auditor or planner	Admin/ Planner	
28	Flag out missing data for SRI assessment	The PVT will flag out missing fields / attributes that need to be filled out by the user in order to run the simulation. This can also be done manually by an Auditor or planner	Planner	
29	Display simulation results	The PVT is to display the simulation results of an activated building and breakdown of	User	

		energy gains and losses		
30	Display a BETA EPC / SC / SRI	A beta EPC/ SC/ SRI is displayed for the user with the results a breakdown of over and underperforming KPIs	User	
31	Save BETA EPC / SC / SRI results	the BETA EPC is saved and associated to the building	User	
32	Flag result for verification	The user can flag the result for a verification by an auditor. The planner or owner can assign to whom the flag is to be sent	Planner	
33	Download results to local PC	The user downloads the results to a local EPC	Planner	
34	Download building configuration local PC	The user downloads the file containing all the entered data in the building model	User	
35	Resolve flagged results	a planner or Auditor can view and edit building based on beta assessment result	Planner	
36	Issue verified EPC / SC / SRI results (certificate)	An Auditor can issue verified assessment result. an Email notification will be sent to all logbook access right holder	Auditor	
37	Flag result for resolving	An Auditor or planner can flag assessment result to be resolved by a planner or owner. The	Planner	

		planner or Auditor can assign to whom the flag is to be sent		
38	Save issued EPC / SC / SRI results to the logbook	the issued beta EPC / SC / SRI results will be saved to the logbook	Planner	
39	Save verified EPC / SC / SRI results to the to the logbook	the issued and verified assessment (certificate) is to be save in the logbook and associated to the building	Planner (when granted access rights)	
40	Download building logbook files to local PC	The user can download all the files saved in the building logbook	Planner (when granted access rights)	
41	publish EPC / SC / SRI results to E-cockpit	An owner can choose to publish EPC and/or SC and/or SRI result to E-cockpit. Verified vales will appear with a symbol indicating that they have been verified by Auditor	Owner	
42	Overwrite published results	An owner can choose to overwrite published EPC and/or SC and/or SRI result to E-cockpit	Owner	
43	Publish building data to the E-cockpit	An owner can choose to which building data can be published / displayed in E-cockpit. Verified values will appear with a symbol showing that they have been	Owner	

		verified by Auditor		
44	Configure analysis results and scope	In the results analysis section, the user can configure the parameter on each analysis (EPC, SRI, SC)	User	
45	Configure the unit price of each intervention	The unit price and currency of each intervention can be adjusted by the user	User	
46	Configure the KPIs benchmarks	The user can adjust the numerical Benchmarks of the KPIs or use the default ones.	User	
47	Analysis of the KPIs	the analysis will show the deviation between the achieved KPI and the desired KPI results	User	
48	Configure the KPIs description and results	The user can manually enter or can automatically derive (From T2.2) the list of SC/SRI KPIs description	Admin/ User	
49	Configure the EPC rating and score	the user can configure the EPC rating thresholds	User	
50	manually input the EPC values of existing EPC	the user opens the configurator and manually enter the EPC values of existing EPC	Solution provider (when granted access rights permission by owner)	
51	manually input the SC values of existing SC	the user opens the configurator and manually enter the EPC values of existing SC	Solution provider (when granted access rights permission by owner)	

52	manually input the SRI values of existing SRI	the user opens the configurator and manually enter the EPC values of existing SC	Solution provider (when granted access rights permission by owner)	
53	Configure the time duration of each intervention	for each intervention the user can enter the expected time for it	User	
54	manually input metered data	for each metered data (water, heating, Electricity, energy generation) the user can enter the metered data for the last 5 years and for each year it can be also entered by month	Solution provider (when granted access rights permission by owner)	
55	manually input metered data price and unit	for each metered data (water, heating, Electricity, energy generation) the user can enter the unit cost i.e €/kWH or €/liter	Solution provider (when granted access rights permission by owner)	
56	Automatic meter reading (AMR)	the user can connect the metered data to the PVT to Automatically read meter data	Solution provider (when granted access rights permission by owner)	
57	Display timeseries data of heating and electricity	the PVT is to show timeseries data of Energy consumption and production	User	
58	Configure timeseries data	the user can choose the time and date range of a timeseries data	User	
59	Configure and edit the primary energy factor	for each energy source the user can correct and edit the primary energy factor	User	

60	Configure the building heated area as per EPC	the user can enter the building heated (conditioned area) as per the national EPC requirement	User	
61	Display timeseries CO2 / GWP emissions of the building	the PVT will show the CO2 emissions of the building per CO2-eq/yr. the user can chose the time and date range of a timeseries data	User	
62	Configure the building energy and mechanical systems	the user can configure the heating cooling and mechanical systems used in the building in terms or rated power, share, type and the systems year of installation	User	
63	Configure the condition of energy and mechanical systems	the user can configure the condition of heating cooling and mechanical systems used in the building i	User	
64	Configure the condition of building envelope components	the user can configure the condition of building envelope components	User	
65	Inspection of Heating Systems	The user can set the Inspection of interval for each Heating Systems	Solution provider (when granted access rights permission by owner)	
66	Inspection of cooling Systems	The user can set the Inspection of interval for each cooling system	Solution provider (when granted access rights permission by owner)	

67	Flag building systems for inspection	The user can flag the building systems that require inspection by Auditor	Solution provider (when granted access rights permission by owner)	
68	issue verified inspection report	An Auditor can issue verified inspection report. an Email notification will be sent to all logbook access right holder	Auditor	
69	Save systems inspections results in the logbook	the inspection report can be saved an uploaded to the logbook	Solution provider (when granted access rights permission by owner)	
70	Display expected end of life for building systems	the system can display based on a database and user information the expected end of life of each building system such as 20 Years for PV panel	User	
71	Configure the end of life for each building system	The user can configure the end of life of each building system	Solution provider (when granted access rights permission by owner)	
72	Verify end of life of each building system	planner of solution provider can verify the end of life of each building system	Solution provider (when granted access rights permission by owner)	
73	Flag building systems nearing end of useful life	The system would flag buildings that are near the end of their useful life	Admin	
74	Resolve flagged systems	The user can indicate flagged system as resolved	User	
75	View building status quo	The user can view the status quo of the building systems and	Solution provider (when granted access rights	

		consumption values	permission by owner)	
76	track changes	the user can track the changes in the building performance over defined time frame	Solution provider (when granted access rights permission by owner)	
77	cumulated KPIs and performance	the system shows the avg. KPI score of the building over a time frame	Admin	
78	Update of static information within DBL at some trigger points	necessary updating of DBL at some trigger points (sale, building undergoes renovation, change of tenants)	Admin	
79	Update of dynamic information within DBL	Dynamic data stored in the DBL should be automatically generated and updated (monitoring of energy consumption and renewable energy generation)	Admin	
80	user guide section	Define a user guide section	Admin	
81	Run multi building analysis	the user can choose more than one building and activate this option to conduct a multi building analysis	User	
82	Chose a group of building for analysis	the user can choose to add a group of building into a building portfolio for further analysis. The group of buildings can be chosen in a similar fashion to	User	

		the filter view building function		
83	Chose type of multi building analysis	the user can choose to add the type of multi-building analysis they plan to conduct. Such as running a CO2 analysis, Rating analysis, user or RE analysis, etc. to be defined further	User	
84	View results	View the results of the multi building analysis	User	
85	Export results to xlsx or csv	the user can export the results to other formats	User	
86	Compare the results of the building against a predefined benchmarks	the user can compare the results of the analysis against a set of predefined KPIs. The tool will show the buildings that are over or under preform via a list. The function will show how far each building is from the reaching the benchmark. An average aggregated score will also be displayed	User	
87	Configure KPIs and Benchmarks for multi building analysis	the user can select the KPIs and their benchmarks for analysis	User	
88	Clone an owned building	the user can clone the parameter of their Claimed building an assigned it to an unpublished or	Planner (when granted access rights permission by owner)	

		unowned building. The user can choose which parameter they plan to clone such as physical characteristics, and or building systems, U values, and or EPC rating, etc		
89	Clone an unowned building	the user can clone parameters of an unclaimed or claimed building and assign it to another building. The user can choose which parameter they plan to clone such as physical characteristics, and or building systems, U values, and or EPC rating, etc	User	
90	add building to portfolio	the user can add a building to for multi building analysis		
91	Edit an unowned building	the user can activate unowned published buildings to edit their parameters		
92	Save building portfolio	the user saves the created portfolio of buildings with a unique identifier that the user can chose / define	User	
93	Save a variant	The user can save the edited buildings or created group in special variant	User	

94	open a stored variant	the user can open a pre saved variant	User	
95	clone an existing variant	the user can create a new variant based on an existing one	User	

5.2 The E-Cockpit Use cases

The E-Cockpit objective is to provide policy makers and public users with reliable "intelligence" about the state of the building stock. The E-Cockpit will achieve this objective by creating a cloud based digital twin that contain key information about the existing building stock and related certificates (EPC, SRI, etc). Based on the feedback received from the LAT meeting and summarized in the POV in chapter 3.2.2 the following use cases has been developed:

Table 5: List of Use Cases developed for the E-Cockpit module

#	Use case Name	Use case description	User role (lowest access right possible)	Comments
1	Launch E-cockpit	the user launches the E-cockpit module	Visitor	
2	track changes	the E-cockpit will show buildings which have newly published information add to them or are recently added to the E-cockpit	User	
3	chose a time frame to track changes	the user can choose the date for which the changes that happened in the E-cockpit can be	User	
4	run analysis of changes	The user can choose a start and finish date and run the track changes function for a single building or a group of buildings. The function will show which building parameters have	User	

		changed during this time		
5	Compare the results of the building changes against a predefined benchmark, KPIs	The user can see how the building performance have improved or worsened during a defined time frame against a set of benchmarks	User	
6	View published buildings	the user can view the buildings that are published in the E-cockpit	Visitor	
7	view RE synergy potential	The user can see based on the published data where energy syringes can be exploited. The program is to list the best matching buildings based on the degree of load and RE production overlap	Visitor	
8	View Renovation potential	The user can see based on the published data which buildings require renovation based on their EPC score and impact on the whole portfolio. The program is to list the buildings from worst to best based on their overall EPC rating, per m^2 final energy use and per m^2 primary energy use	Visitor	
9	Go to city - go to exact address of a	the user types the exact address of a	Visitor	

	building and select a building	building or chooses a building on a map by mouse click		
10	View EPC of a building	the user views EPC of a building	Visitor	Need to be published from the PVT by the Owner
11	View KPIs of a building	the user views KPIs of a building	Visitor	Need to be published from the PVT by the Owner
12	View SRI	the user views SRI of a building	Visitor	Need to be published from the PVT by the Owner
13	View BRP (Building Renovation Passport)	the user views BRP	Visitor	
15	Benchmark a building	the user compares his/her building to similar buildings (e.g., the user monitors a building's energy consumption and carbon pollution over time and compares them to similar buildings)	Visitor	
16	Select a group of buildings on multiple scales (buildings, neighbourhood, city scale, state scale)	the user chooses a group of buildings by simple typing all addresses or by mouse clicking on a map, or the user selects the whole neighbourhood or the entire city	Visitor	
17	Visualize RE maps	The user can visualize the RE maps of the	Visitor	

		selected buildings		
18	Visualize UM (urban mining) maps	The user can visualize the UM maps	Visitor	
19	visualize buildings per specific features	The user can decide to visualize buildings with specific characteristics	Visitor	
20	Export view results	The user can export the visualized results	User	
21	Save project	The user can save a certain analysis	User	

5.3 The VM Use cases

The VM objective is to facilitate the match making connection between the building users, auditors, solution providers, funding providers as well as other market actors and service providers. Based on the feedback received from the LAT meeting and summarized in the POV in chapter 3.2.2 the following use cases has been developed:

Table 6 : List of Use Cases developed for the VM module

#	Use case Name	Use case description	User role (lowest access right possible)	Comments
1	Launch VM	the user launches the Virtual Market place	Visitor	
2	Add general profile description	A user adds his/her general profile description based on their assigned user role	User	
3	Publish general profile description - get listed in the VM place	the solution provider publishes his/her profile description	Solution provider	The User roles Owner and Admin cannot get listed in VM as solution provider
4	Provide and publish description of services to the VM	Provide and publish (upload) general characteristics of products or services to the VM		

5	Browse/filter solution providers	A user browses/filters solution providers published on the VM platform	User	The User roles Owner and Admin profiles cannot be browsed in the VM
6	Choose suitable solution providers	the user can choose acceptable solution providers (funding institution, energy assessor, sustainability assessor, planner, contractor, construction company, ...) and mark them in a list	Solution provider	
7	Connect with the chosen solution providers - share part of the DBL with the chosen solution providers	the user connects with the solution providers asking for a product or a solution sharing with solution providers part of the DBL	Planner	Must be granted Owner permission to share DBL with other users
8	View shared DBL	the solution provider views shared part of DBL	solution Provider	Permission by Owner must be granted
9	Contact for additional information	the user can contact another user for additional information	Solution provider	
10	Create an offer (quotation) for a product or a solution selling according to predefined template	based on the information collected from the shared part of DBL the solution provider creates an offer for a product or a solution selling according to predefined template	Solution Provider	
11	Send prepared offer to the owner	the solution providers send	Solution Provider	

		prepared offer to a building manager/owner		
12	Collect offers from the solution providers, compare characteristics and check prices for the best deals	the owner collects offer from solution providers, compares characteristics and checks prices for the best deals	Owner	
13	Find funding (funding institution)	the owner searches for the funding to be able to conduct energy efficiency improvements	Owner	
14	Share received offers with funding institution to get funding	the owner shares received offers with funding institutions to get funding	Owner	
15	Adjust offer	the solution provider adjusts offer	Solution provider	
16	Confirm and accept offer	An Owner confirms and accepts offer	Owner	
17	Accept one offer, all other offers automatically decline	the owner accepts one offer, all other offers are automatically declined	Admin	
18	Filter solution provider by area expertise	the user can filter the solution provider based on the declared area of expertise (insulation, heating systems, renewable energies, etc)	User	
19	Filter solution provider by location	the user can filter the solution provider based on their location	User	
20	Browse VM registered service providers	the user can Browse registered consultants	User	

21	Filter service providers by area expertise	the user can filter the consultants based on the declared area of expertise (sustainability assessment, energy planning, building physics, etc)	User	
22	Filter service providers by location	the user can filter the service providers based on their location	User	
23	Filter consultants/ solution provider by rating score	the user can filter the service providers based on their rating score	User	
24	Filter consultants based on training badges	the user can filter the consultants based on their earned badges	User	
25	link profile to the training module	the user (solution provider/ consultant/ Auditor) can link their profile e to the training module and import the earned badges from the training	Solution provider	
26	link profile to website	the user (solution provider/ consultant/ Auditor) can link their profile to an external website	Solution provider	
27	Rating the solution provide/ consultants	the user can give a rating to the solution provide/ consultants	Owner	
28	Filter consultants/ solution provider by PVT KPI	The user can search for the consultant or solution provider that can improve the result of one or more KPIs	Planner	

29	link profile to KPIs	the user (solution provider/ consultant/ Auditor) can choose KPIs that best represent their profile expertise	Solution Provider	
30	Validation of the registered user	the profile is to be validated via a 2 step verification (automated (VAT number and manual) in order to get listed in the VM	Admin	
31	Number of executed Projects	Provide a count on the number of successful projects made by the consultant via the VM and list it the user profile	Solution Provider	
32	Upload photos to profile	The user can upload a photo to the profile	Solution Provider	
33	Mark a solution	Mark a solution provider/ consultant to favoured so they can be easily found	User	
34	update profile	the user can edit an update the profile.	Solution Provider/ Owner	
35	Validate a DBL	an Auditor can validate the DBL information flagged for validation	Auditor	
36	Find specific product	the user is able to find a specific product belonging to a solution provider by search	User	
37	Visualise the list of the professionals registered and their	The user is able to see the "catalogue" of the professionals, auditors, solution	Owner	

	"presentation card"	providers, funding providers registered		

6 Annex 1

6.1 LAT meeting Austria

#	LAT Member / Peer Meeting institution	LAT Member / Peer Meeting function/ occupation	Expertise
1	Spektrum Gmbh	Managing Director	Building physics and sustainability auditor
2	Bernhard Weithas engineering office	Managing Director	Building physics and sustainability auditor
3	Gemeindeverband Vorarlberg	Sustainable procurement	sustainability auditor
4	State of Vorarlberg	State EPC registry	EPC audit
5	Baubook	Product research	Sustainable material researcher
6	City of Feldkirch	Environment Manager	

6.2 LAT meeting Croatia

#	LAT Member / Peer Meeting institution	LAT Member / Peer Meeting function/ occupation	Expertise/ Profile
1	Ministry of Physical Planning, Construction and State Assets	National policy maker	civil engineer
2	Ministry of Physical Planning, Construction and State Assets	National policy maker	architect
3	Croatian Government Real Estate Agency	Public authority	master of Physics-Geophysics, assistant director at Department for systematic energy management
4	Environmental Protection and	Financial institution	architect, head of Department for energy efficiency and renewable energy sources

	Energy Efficiency Fund		
5	Opereta	Real estate agency	ecology engineer, general manager at Opereta
6	Monel	Building manager	graduate economist, director at Monel
7	Klimaproing	Energy assessor	mechanical engineer
8	STUDIO M2 j.d.o.o.	Energy assessor	architect
9	Zamolo M d.o.o	Sustainability assessor, expert witness	civil engineer
10	Energy institute Hrvoje Požar	Energy assessor	architect
11	Energy institute Hrvoje Požar	Energy assessor	electrical engineer
12	-	Private building owner	Ph.D., food science and technology
13		Private building owner	master of economics
14		Private building owner	expert in quality management and safety at workplace

6.3 LAT meeting Germany

#	LAT Member / Peer Meeting institution	LAT Member / Peer Meeting function/ occupation	Expertise
1	City of Munich , Department for Education and sport	Climate protection manager	DGNB Auditor / sustainability rating researcher
2	Architekturbüro Lindner	Architect/ Energy advisor	Architect/ Energy advisor / LCA specialist
3	v3sta	Managing partner / Sustainability Consultant	Sustainability and energy consultant
4	Deutsche Bahn	Project manager	Building construction / Civil engineer

6.4 LAT meeting France

#	LAT Member / Peer Meeting institution	LAT Member / Peer Meeting function/ occupation	Expertise
1	"Ace with you"	Founder of the consulting firm/energy efficiency and sustainability consultant,	Project management assistance for the sustainable building- Smart building expert
2	"Dalkia"	Technical expert/energy efficiency and sustainability consultant	Energy services to building- Buildings energy efficiency and sustainability expert
3	"Immobilier 3F"	Technical referent for a social housing landlord, in charge of EPCs	Energy performance diagnosis divison Monitoring the energy performance of the building stock and managing retrofit solutions
4	"CSTB"	Research and consulting engineer	Expert in national thermal regulation/Thermal physics researcher and development of calculation tools for buildings energetical evaluations

6.5 LAT meeting Hungary

#	LAT Member / Peer Meeting institution	LAT Member / Peer Meeting function/ occupation	Expertise

1	ÉMI Non-Profit Limited Liability Company for Quality Control and Innovation in Building	Consultant	Civil engineer/ quality of materials
2	LCA Center (Hungary)	Consultant	Architect/LCA expert/building energy engineer
3	Independent energy auditor	Independent energy auditor	Architect/building energy expert

6.6 LAT meeting Italy

#	LAT Member / Peer Meeting institution	LAT Member / Peer Meeting function/ occupation	Expertise
1	ANIT (National Association Thermal Insulation)	President of ANIT	Engineer / Representatives of the companies producing thermal insulation material
2	ANIT (National Association Thermal Insulation)	Collaborator in ANIT	Engineer

3	University of Architecture	Polytechnic of Milan	Freelance Architect / Researcher
4	University of Architecture	Polytechnic of Milan	Researcher
5	Engineer	Energy efficiency engineer	Freelance Engineer / Expert in Protocollo ITACA
6	ANCE Turin (National Association for Construction Builders)	Officer for ANCE Turin	Architect
7	ANCE National (National Association for Construction Builders)	Officer for ANCE National	Engineer
8	Engineer's Association of Cosenza (Calabria Region)	Councilor at Engineer's Association of Cosenza	Councilor / Freelance Engineer
9	Architect's Association of Turin	Referent for the energy sector and sustainability at the Architect's Association of Turin	Architect expert in sustainable construction material

6.7 LAT meeting Ireland

#	LAT Member / Peer Meeting institution	LAT Member / Peer Meeting function/ occupation	Expertise

1	Tipperary Energy Agency (TEA)	Director of Industry Engagement at Technological University of the Shannon: Midlands Midwest (TUS Midwest) Chair of Board of Directors, TEA Secretary General of FEDARENE	Energy management; Sustainable energy project development
2	Kane Architects	Architect	Residential, education, and commercial, including passive house
3	SE Systems	BER assessor and energy officer	Energy efficiency retrofits, BER assessor, EPC expert (Ireland)
4	TUS Midwest	Senior Project Assistant, Sustainability and Energy consultant	Energy Management, Sustainable Construction, Water Treatment, Nearly Zero Energy Building (nZEB)
5	Irish Green Building Council Ireland	Project manager and architect	Circularity, Sustainability, Built Environment
6	University College Cork	Energy & Utilities Manager	Procurement, managing service providers, increasing load etc.