EUB
SuperHub

European Building Sustainability performance and energy certification Hub

D3.3 - User manual of the modules of the Hub

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EXECUTIVE SUMMARY

The **EUB SuperHub User Manual** serves as a guide for users navigating the platform's **modules, tools, and functionalities**. It provides step-by-step instructions to help stakeholders, including building owners, auditors, consultants, and policymakers, efficiently access, analyse, and manage building energy performance data.

The manual outlines the key modules of the EUB SuperHub platform, including the **E-cockpit**, a geo-referenced database for managing digital energy performance certificates (EPCs) and sustainability ratings; the **Planning and Verification Tool** (PVT), which facilitates energy simulations, scenario comparisons, and building performance verification; the **Virtual Marketplace** (VM), enabling stakeholders to connect and collaborate on building projects; and the **E-training** module, which provides educational resources on energy efficiency and sustainability.

Users will learn how to browse publicly available data, register and manage their accounts, claim and update building information, and conduct advanced energy analyses using the platform's tools. The manual also details the process of generating an E-passport, a digitally verified document summarising building performance, complete with a unique public URL and QR code for authentication.

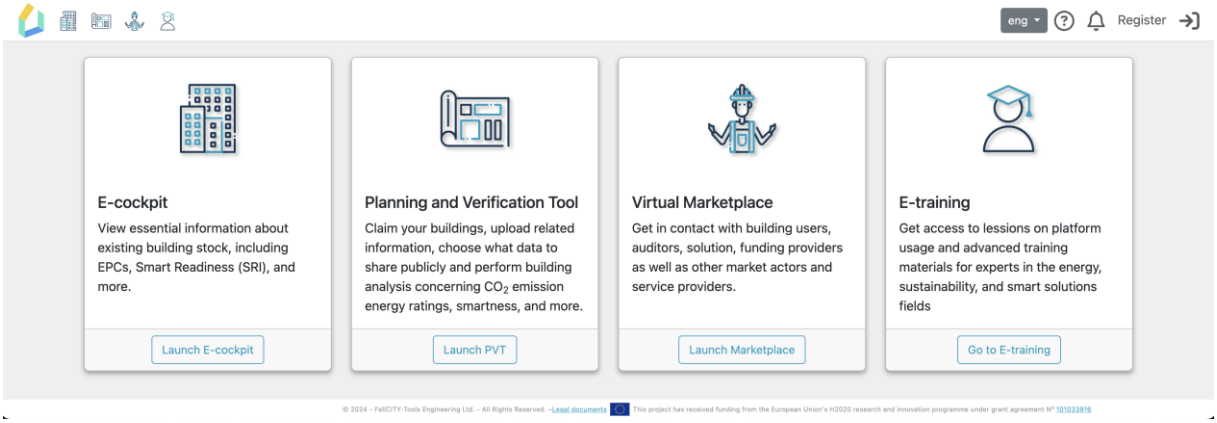

Figure 1 Welcome screen of the EUB SuperHub platform

1 Introduction

The EUB SuperHub (European Building Sustainability Performance and Energy Certification Hub) is an innovative digital platform designed to streamline the management, assessment, and certification of building sustainability and energy performance across Europe. The platform aims to support the digital transformation of Energy Performance Certificates (EPCs) and enhance the accessibility, transparency, and usability of building performance data for various stakeholders, including policymakers, building owners, auditors, and service providers.

At its core, the EUB SuperHub integrates four interconnected modules that work together to provide a comprehensive solution for building sustainability assessment. The E-passport Cockpit (E-cockpit) serves as a cloud-based, geo-referenced database that centralises digital EPCs, sustainability ratings, and smart readiness indicators, offering users a holistic view of building performance. The Planning and Verification Tool (PVT) enables building owners to manage their properties, verify energy performance, and simulate renovation scenarios for improved efficiency. Complementing these, the Virtual Marketplace (VM) acts as a matchmaking hub that connects building owners with service providers, such as auditors, consultants, and funding agencies, to facilitate building renovations and performance upgrades. Additionally, the E-training module, integrated with TRAIN4SUSTAIN, provides educational resources and training to professionals in energy efficiency, sustainability, and smart building solutions.

By integrating these modules, the EUB SuperHub promotes a harmonised, data-driven approach to building performance assessment and certification across different European countries. The platform enhances decision-making for energy efficiency investments, supports compliance with sustainability regulations, and encourages collaboration among stakeholders in the built environment sector.

1.1 Purpose of this document

This document gives a high-level, easy-to-understand overview about the user interface and available functions of the EUB SuperHub application.

1.2 References

- EUB SuperHub web application
- OpenStreetMap
- European Skills Registry
- OAuth
- OpenID Connect
- NUTS regions

2 Definitions, acronyms and abbreviations

DBL	Digital Building Logbook
EPC	Energy performance certificate
GDPR	General Data Protection Regulation
HVAC	Heating, ventilation, and air conditioning
JSON	JavaScript Object Notation
KPI	Key Performance Indicator
NUTS	Nomenclature of Territorial Units for Statistics
OAuth	Open Authorization
OIDC	OpenID Connect
OSM	OpenStreetMap
PDF	Portable Document Format
PVT	Planning and Verification Tool
SRI	Smart Readiness Indicator
URL	Uniform Resource Locator
XLSX	Office Open XML (ISO 29500-1: 2008-2016)

Table 1 Definitions and abbreviations

3 User stories

3.1 Browsing publicly available data

Unregistered visitors on the EUB SuperHub Platform can explore high-level building performance data, including Energy Performance Certificates (EPCs), sustainability ratings, and Smart Readiness Indicators (SRI). They can select individual buildings to view published information such as EPC ratings, sustainability certificates, and deviations between actual and designed energy performance. Additionally, they can browse the Virtual Marketplace to explore service providers' profiles, including auditors, consultants, and funding agencies, along with their expertise and qualifications. Visitors can also access public profiles of professionals and organisations offering energy efficiency and sustainability services. The platform provides information on national funding agencies and funding options for building renovations, along with a "Contact Us" function for support. Furthermore, visitors can review website disclaimers, legal information, and terms of use, and access the TRAIN4SUSTAIN platform, which offers training materials on energy performance assessment and sustainability.

The EUB SuperHub platform is available in all EU languages, supporting users across different regions. Translations can be easily selected through the locale dropdown menu, which is located on the right-hand side of the header. By choosing the preferred language from the list, the platform's interface will automatically update to reflect the selected locale.

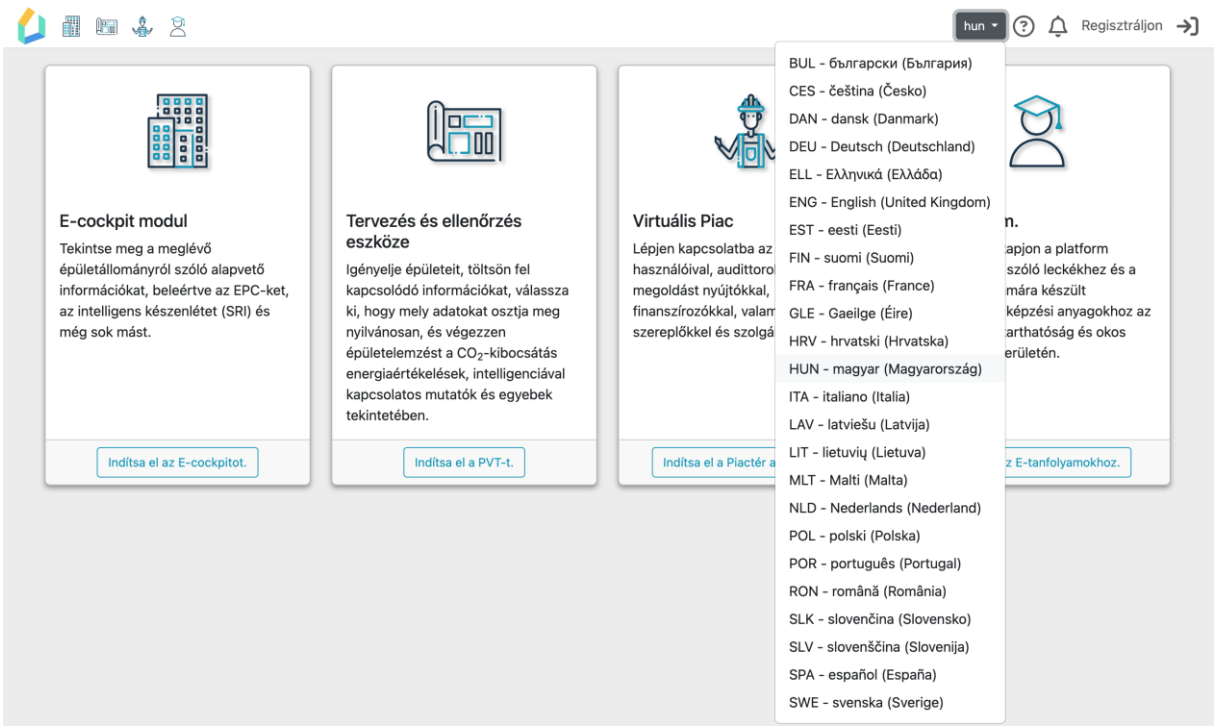

Figure 2 Available translations

3.2 Contact us

The EUB SuperHub platform provides a Contact Us form, accessible directly from the header, allowing visitors to send messages to the platform's maintainers without needing to register. To submit a message, users are required to provide only their first name, last name, and email address, ensuring a simple and efficient way to reach out for inquiries, support, or feedback.

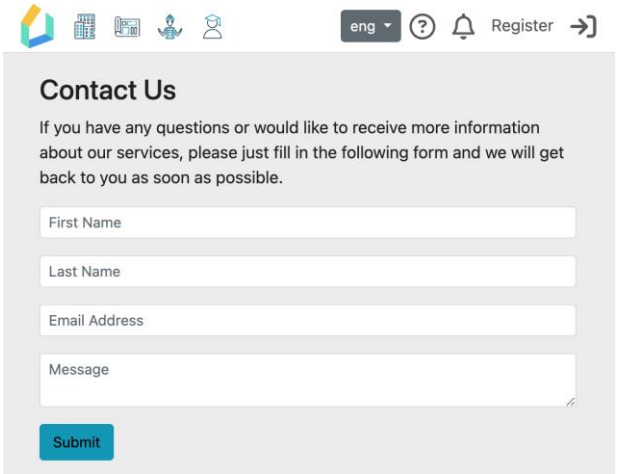

Figure 3 Contact Us form

3.3 Registration

The EUB SuperHub platform offers a flexible authentication system that allows users to register either through a local account or via external identity providers that support OAuth or OpenID Connect (OIDC) protocols. This ensures secure and convenient access to the platform while catering to different user preferences.

For users who prefer to create a local account, the registration process requires them to provide a valid email address, a password, as well as their first and last name. After submitting the registration form, the system performs an email verification to confirm the user's identity. A verification email is sent to the provided email address, and the user must follow the instructions within the email to activate their account. Once the email is successfully verified, the user can log in using their credentials and access the platform's features.

Alternatively, users have the option to sign in using an existing account from one of the supported external identity providers. The EUB SuperHub platform integrates authentication with FeliCity Account, EUB SuperHub Cloud, LinkedIn, and Google, allowing users to bypass the need for separate registration. To log in using one of these providers, users simply need to select their preferred authentication method from the login page. They are then redirected to the chosen provider's authentication portal, where they must enter their credentials and grant the necessary permissions. If it is their first time signing in with an external provider, the system may request additional confirmation before linking their account to EUB SuperHub. Upon successful authentication, users are automatically redirected back to the platform and logged in without the need for further action.

By supporting both local and external authentication options, the EUB SuperHub platform ensures a secure, seamless, and user-friendly login experience. Whether users prefer to manage their credentials within the platform or leverage their existing accounts from trusted providers, the system accommodates various access preferences while maintaining strong security measures.

3.4 User account

After registration, a user account is created on the EUB SuperHub platform, which becomes accessible after authentication. Within their account, users can manage profile details, update their email address, and change their password for security and personalisation.

For those who registered using an external identity provider (such as Google, LinkedIn, or FeliCity Account), no initial password is set. However, if a user specifies a password later, they can log in either through their external service or the local authentication method, providing greater flexibility.

The user account also serves as the place where users can define their role in the Virtual Marketplace (VM) and provide additional personal or professional details. This allows users to showcase their expertise, connect with potential clients or partners, and participate effectively in the marketplace ecosystem.

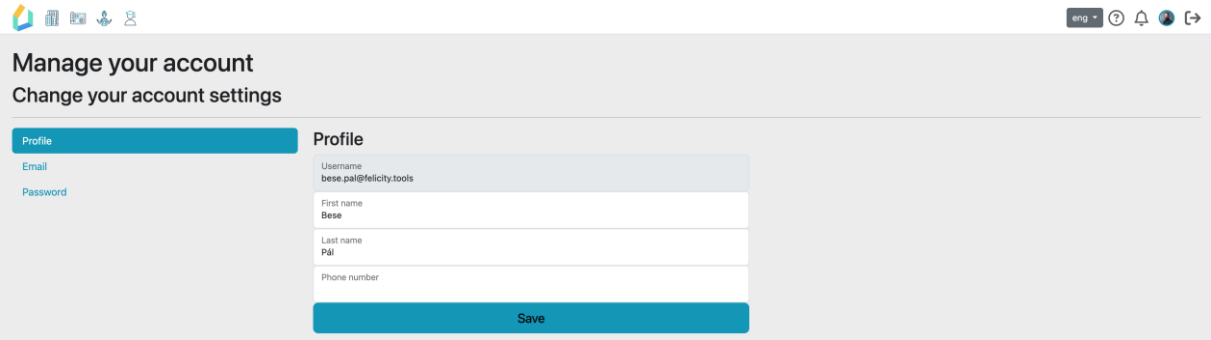

Figure 4 Profile settings

4 Modules

The EUB SuperHub platform is built around a set of interconnected modules, each designed to support different aspects of building sustainability assessment, performance verification, and stakeholder collaboration. These modules work together to provide a comprehensive digital ecosystem for managing, analysing, and improving building energy performance across the EU.

The platform consists of four main modules: the E-passport Cockpit (E-cockpit), which serves as a centralised repository for building-related performance data and certificates; the Planning and Verification Tool (PVT), which enables building owners to assess, verify, and optimise their buildings' energy efficiency; the Virtual Marketplace (VM), which connects building owners with service providers such as auditors, consultants, and funding agencies; and the E-training module, which provides educational resources for professionals seeking to enhance their expertise in energy performance and sustainability.

Each of these modules plays a crucial role in enabling data-driven decision-making, facilitating collaboration between stakeholders, and promoting the digital transformation of energy performance certification. The following sections provide detailed descriptions of each module, outlining their key functionalities and how users can interact with them to achieve their objectives.

4.1 E-cockpit

The E-cockpit is a cloud-based, geo-referenced interactive database that enables full digitalisation of Energy Performance Certificates (EPCs) and sustainability ratings. It serves as an open-access data hub where users – such as policymakers, investors, and building owners – can view key building information and assess sustainability, smart readiness, and energy performance.

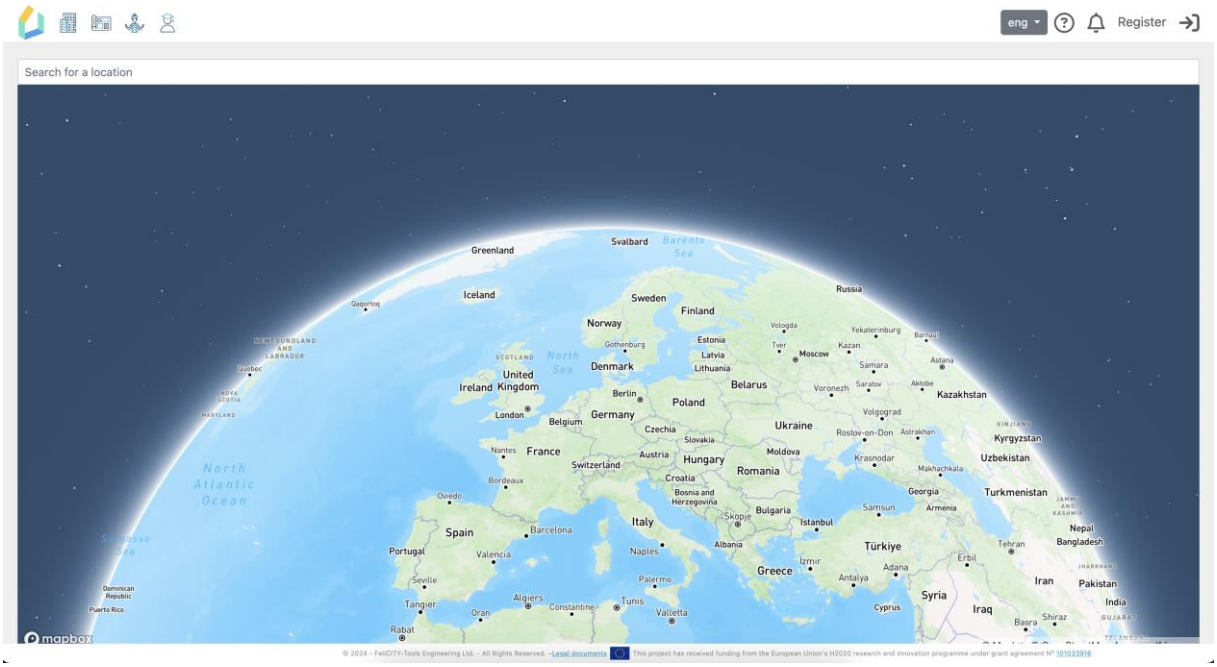

Figure 5 E-cockpit opening screen

4.1.1 Searching for a location

As a geo-referenced database, the E-cockpit provides an interactive map interface, allowing users to efficiently explore and locate buildings. To enhance navigation, the platform features an autocomplete-enabled geolocation search bar, powered by Google Places as the search engine. Users can quickly find specific locations by entering an address or place name, with real-time suggestions improving search accuracy.

To ensure privacy and data security, the EUB SuperHub platform does not directly communicate with external services, including Google Places. Instead, all requests are first processed through the platform's backend, preventing any traceability or leakage of personal details. This approach safeguards user information while maintaining a seamless and efficient search experience.

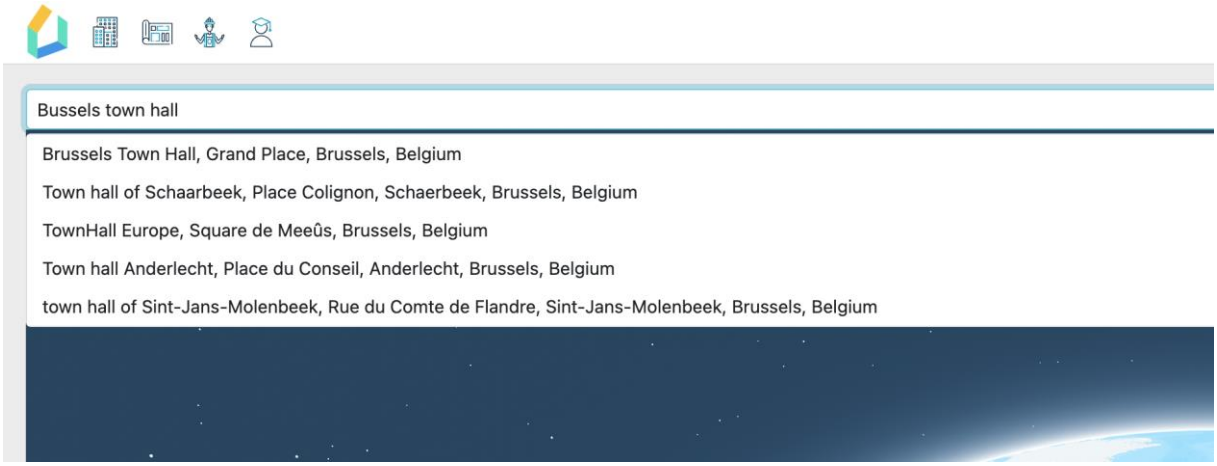

Figure 6 Autocomplete-enabled geolocation search bar

4.1.2 Claiming a building

Claiming a building in the EUB SuperHub platform grants the user managerial control over that building. Any registered user can claim a building, provided it has never been claimed before. Once a building is claimed, a new entry is created in the Digital Building Logbook (DBL), and the claiming user is assigned as its manager. This allows the user to update building details, manage its data, and access relevant features within the platform.

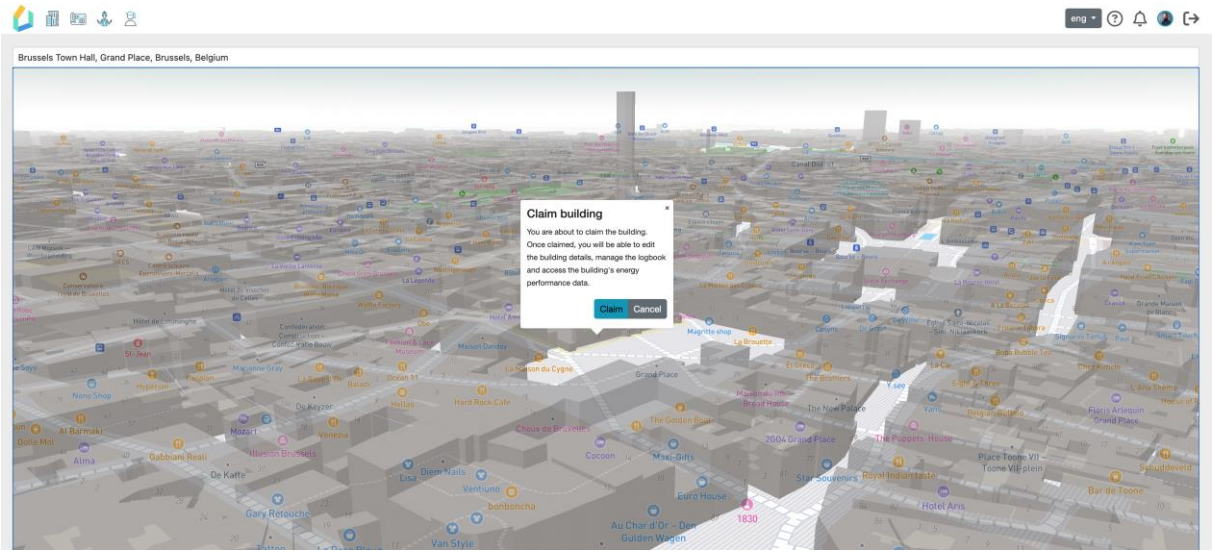

Figure 7 Claiming a building

4.1.3 Details in the Digital Building Logbook

The Digital Building Logbook (DBL) is a central repository within the EUB SuperHub platform that stores and manages comprehensive building-related data throughout its lifecycle. It includes key information such as administrative details, energy performance, sustainability ratings, renovation history, and smart readiness indicators. The DBL ensures that all relevant building data is digitally organised, easily accessible, and updatable, supporting informed decision-making, regulatory compliance, and long-term energy efficiency planning. By integrating multiple data sources, it provides a holistic view of a building's performance and enables efficient collaboration among stakeholders.

When a user clicks on a building in the E-cockpit' map, a popup window appears displaying details about the building as stored in the DBL.

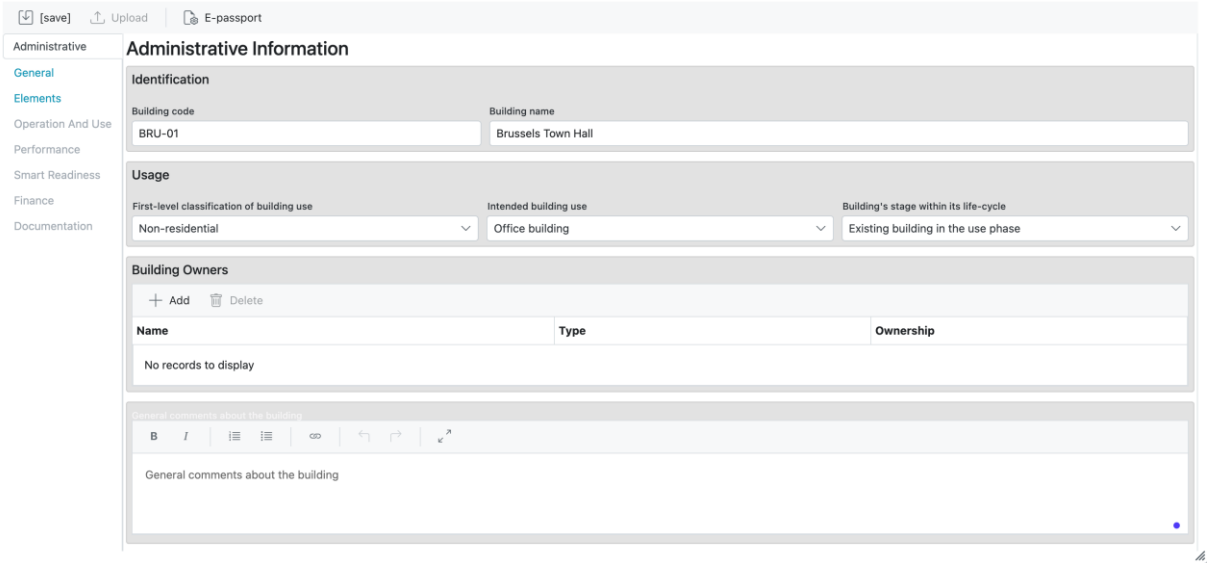

Figure 8 Digital building logbook

4.1.4 E-passport

The E-passport is a digitally generated document that provides a comprehensive overview of a building's performance, based on the data stored in the Digital Building Logbook (DBL). Created automatically by the EUB SuperHub platform, the E-passport consolidates key information such as energy performance, sustainability ratings, smart readiness indicators, and renovation history into a structured and accessible format.

Each E-passport is a unique PDF document assigned a public URL, allowing stakeholders to easily share and access verified building data. By offering a standardised and transparent representation of a building's characteristics, the E-passport supports decision-making, compliance with regulations, and investment planning, making it a valuable tool for building owners, policymakers, and energy professionals.

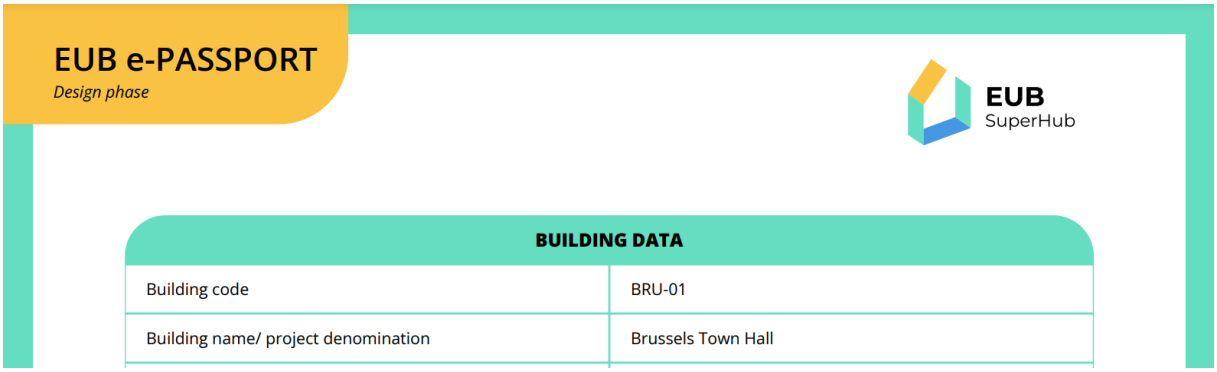

Figure 9 E-passport header

To ensure authenticity and ease of access, this URL is embedded in the document as a QR code. By scanning the QR code, readers can instantly verify the validity of the document, ensuring that the information presented is accurate, up-to-date, and securely linked to the official platform. This feature enhances trust, transparency, and reliability for building owners, auditors, policymakers, and potential investors.

Figure 10 QR code referring to the E-passport

4.2 Planning and Verification Tool

The Planning and Verification Tool (PVT) is a key module of the EUB SuperHub platform, designed to assist users in evaluating, simulating, and optimising building energy performance. It enables building owners, auditors, and planners to assess current energy efficiency, explore possible retrofitting options, and verify building performance metrics using real data and simulation models.

The PVT module is a private extension of the E-cockpit that allows building owners to manage their properties on the platform. It enables users to input building performance data, conduct "what-if" simulations for renovation and energy efficiency improvements and validate these assessments with accredited auditors.

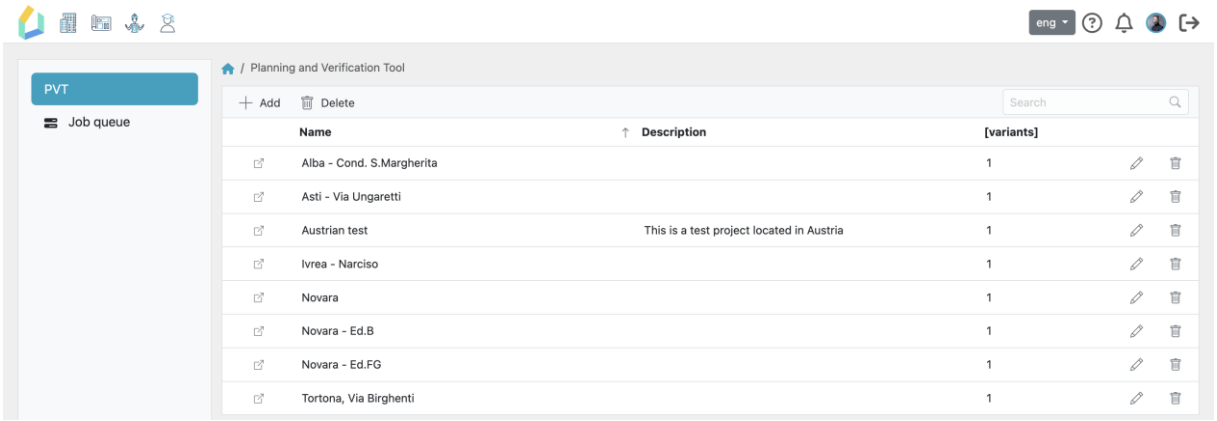

Figure 11 Planning and Verification Tool: List of projects

4.2.1 Projects

At the core of the PVT module is a structured approach to organising city models into projects and variants. A project serves as a container for multiple variants, defining the regional context of the buildings included in the simulation. Each project allows users to set up an energy analysis tailored to a specific geographical and regulatory environment. Within a project, variants provide different simulation setups, enabling users to create multiple scenarios for the same problem. This allows for a comparative analysis of energy performance, renovation strategies, and potential improvements, supporting informed decision-making.

By offering an intuitive scenario-based simulation environment, the PVT module empowers users to explore different energy efficiency strategies before implementing them. The ability to model and verify building performance within a defined regional and regulatory framework makes this tool an essential component of the EUB SuperHub platform, fostering data-driven planning and policy alignment for energy-efficient building management.

4.2.1.1 Creating a project

To create a new project, users need to provide a project name and may optionally include a description to further define its purpose.

A crucial step in project creation is selecting a geographical location, which determines the regional context of the project in the form of a NUTS region. Users specify a location by entering it into the georeferencing search box, which allows for quick and accurate identification of the desired area. Once a location is entered, the system automatically determines the NUTS region that contains it and assigns the appropriate classification to the project.

After completing these steps, the user can proceed with defining variants, adding buildings, and performing simulations within the selected regional framework.

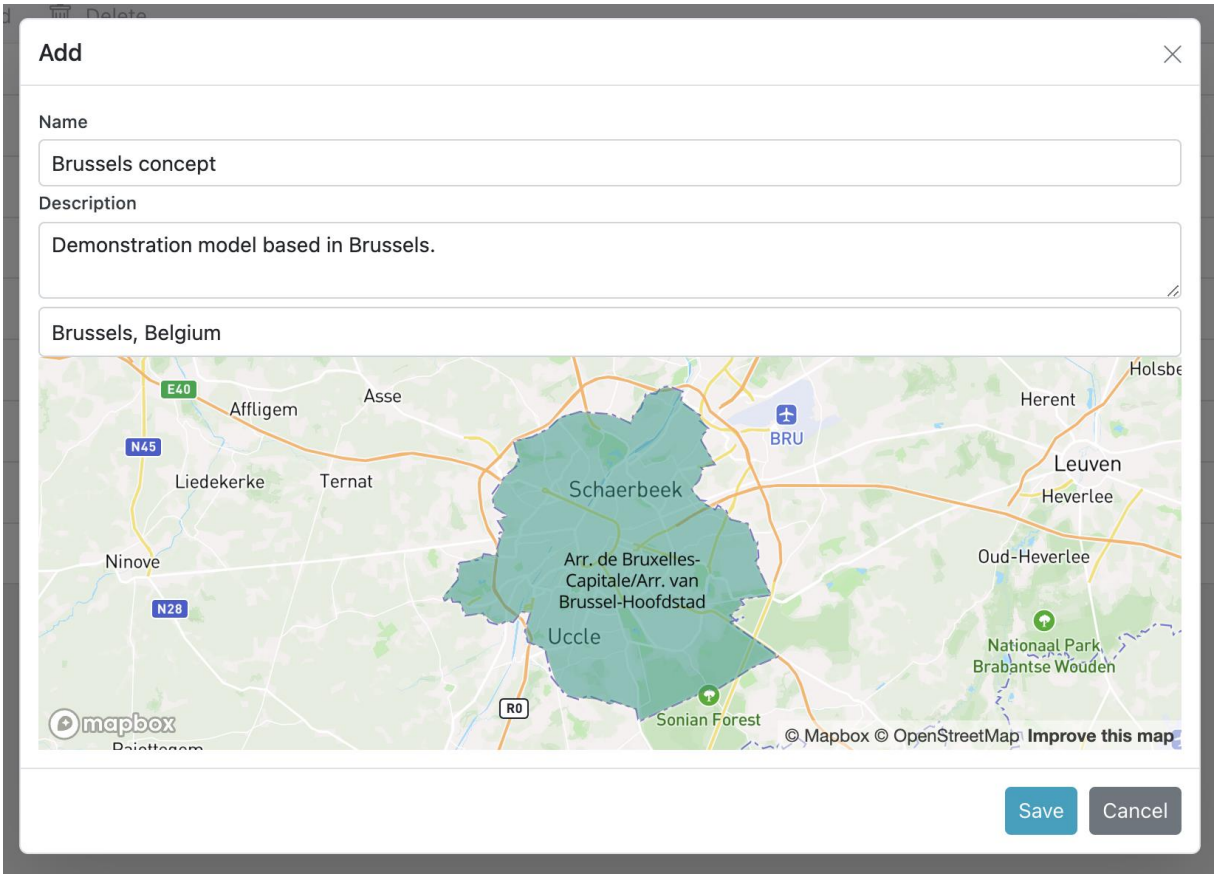

Figure 12 Add new project dialog

4.2.2 Variants

Variants represent different scenarios within a project, allowing users to compare alternative building configurations, renovations, or energy strategies. This enables informed decision-making for optimising building performance.

4.2.2.1 Creating a variant

When creating a variant in the PVT, users must provide a variant name and specify a geolocation within the project's defined area. This location serves as the default centre point for the variant's map, ensuring that all relevant spatial data is properly aligned.

Additionally, users have the option to select a base variant, which allows them to duplicate all existing information from a previously created variant. This feature simplifies the process of exploring different scenarios by providing a structured starting point, reducing the need for manual data entry. Once created, the variant can be further customised to test alternative configurations, interventions, or energy strategies.

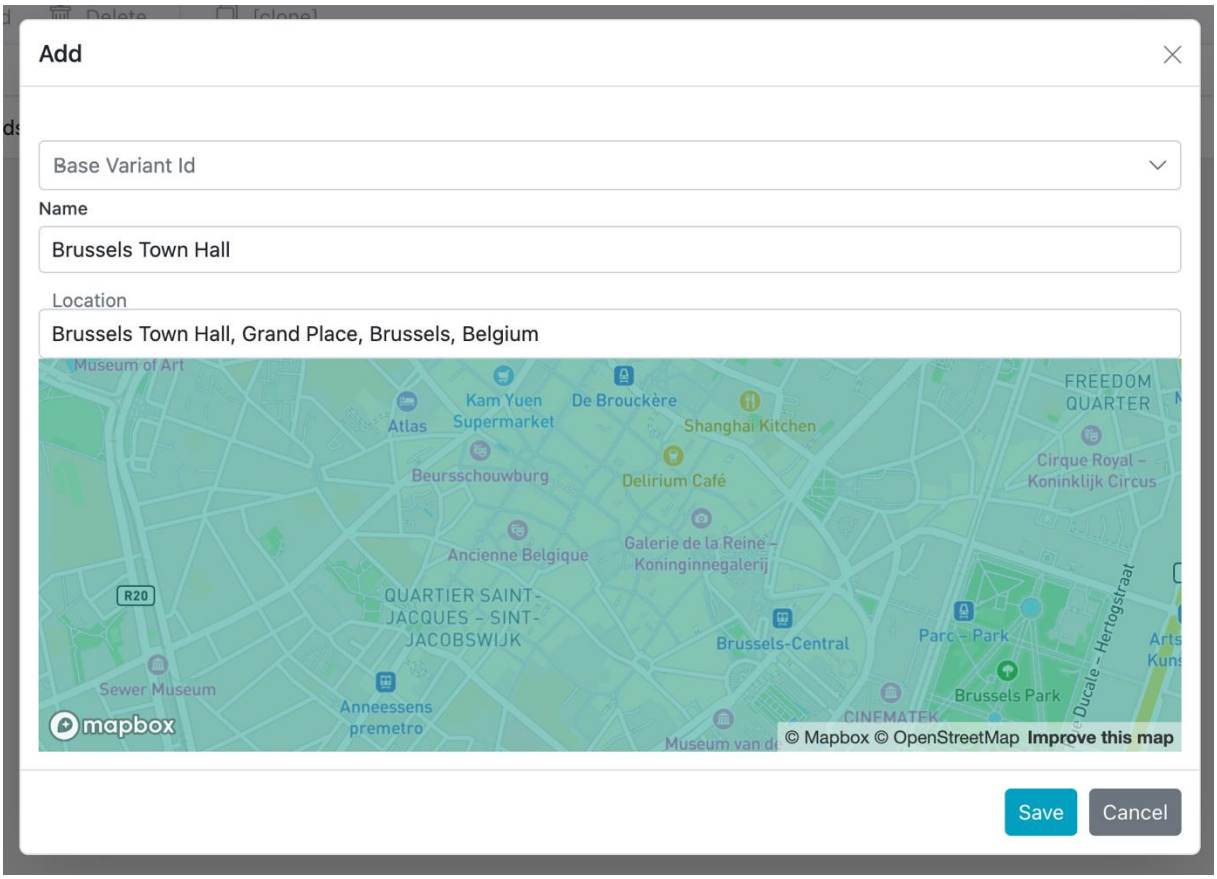

Figure 13 Add new variant dialog

4.2.2.2 Variant list

All variants created under a project are listed in the variant list, where users can view and manage them. Each variant can be edited, allowing changes to its name or location, or it can be deleted if no longer needed.

Selecting a variant from the list navigates the user to the variant screen, where the city model can be analysed. This screen serves as the workspace for assessing building performance, exploring energy efficiency measures, and comparing different scenarios within the project.

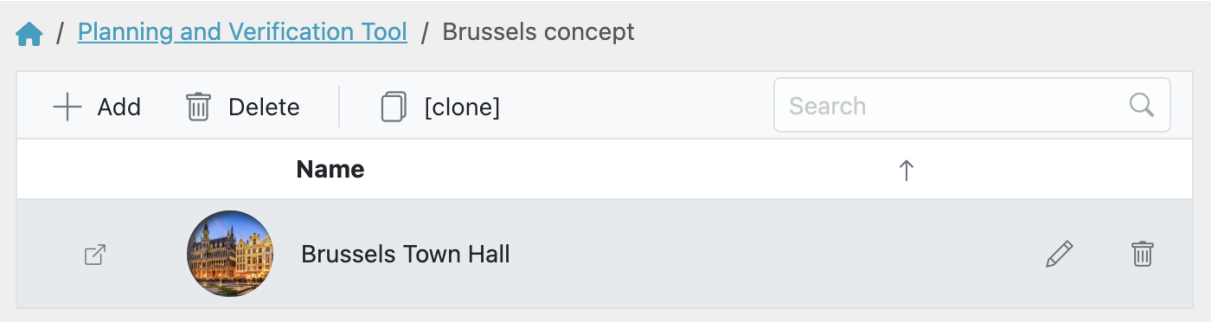

Figure 14 List of variants under the scope of a project

4.2.2.3 Opening a variant

When a variant is opened, the Building List and Variant Map are displayed, providing a detailed overview of the buildings registered under the variant. The Building List includes key details such as building usage, year of construction, and postal address, offering a structured view of the variant's building stock.

The Variant Map presents a 3D representation of the variant's area, visually highlighting the buildings within the project. The Building List and Variant Map are linked, allowing users to seamlessly navigate the model. Selecting a building from the list automatically centers the map on the chosen building, enabling quick access to its spatial and performance data.

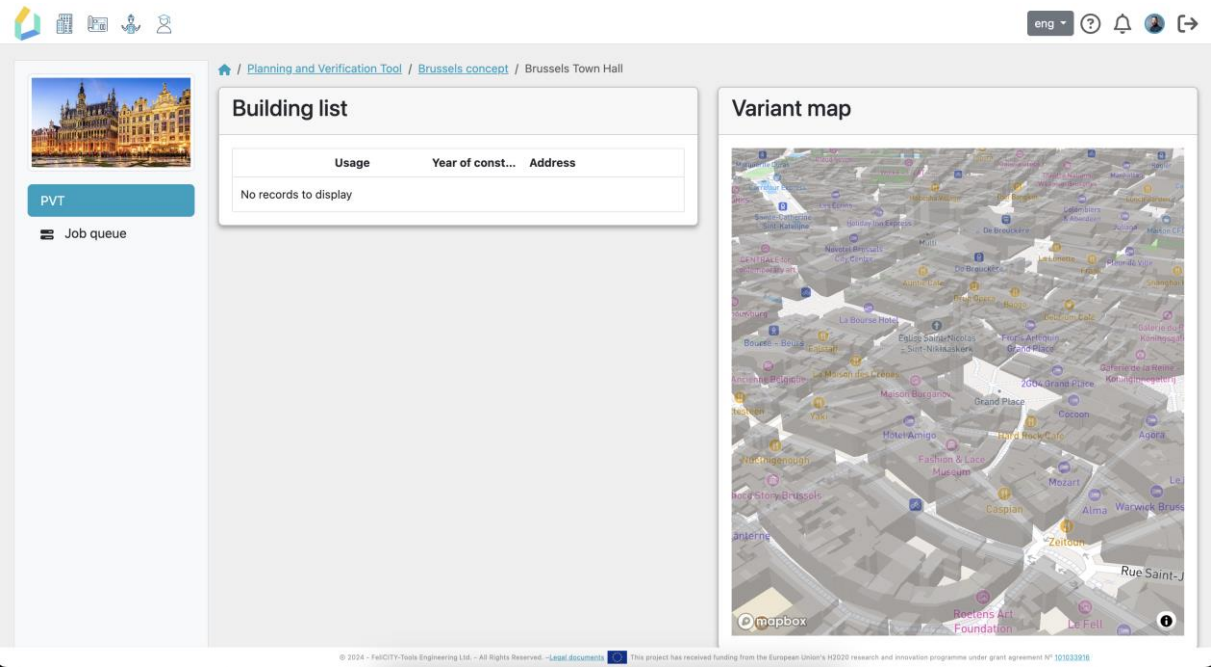

Figure 15 Screenshot of an empty variant

4.2.3 Building activation

The first step in analysing a variant is building activation, which integrates a selected building into the city model for further analysis. By default, a variant does not contain any buildings, and activation is required to associate buildings with the variant.

The PVT streamlines this process with a simplified building activation method. Users only need to provide the year of construction and building usage, while all

other attributes are automatically derived from predefined *building archetypes*. This ensures a quick and efficient setup, allowing users to start their analysis without the need for extensive manual data entry.

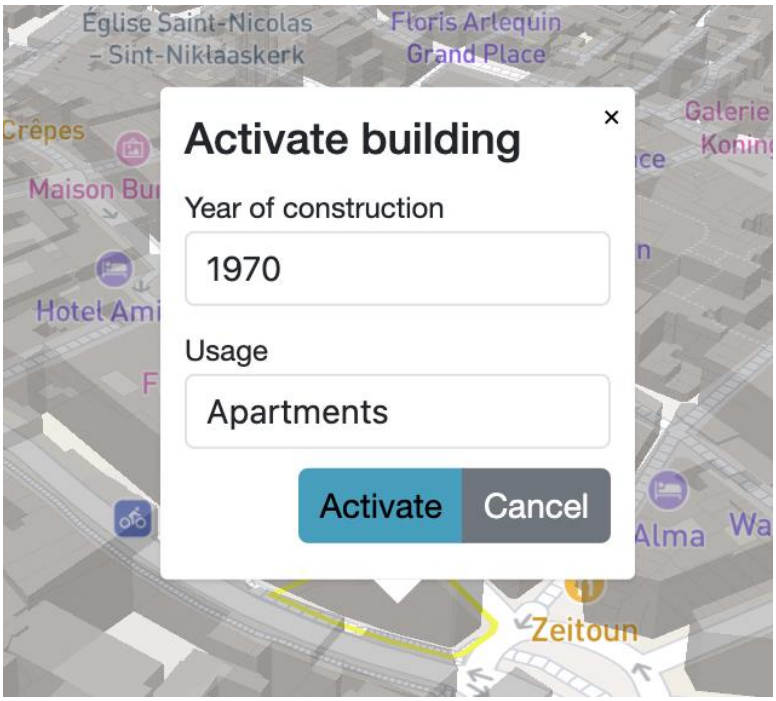

Figure 16 Simplified building activation popup

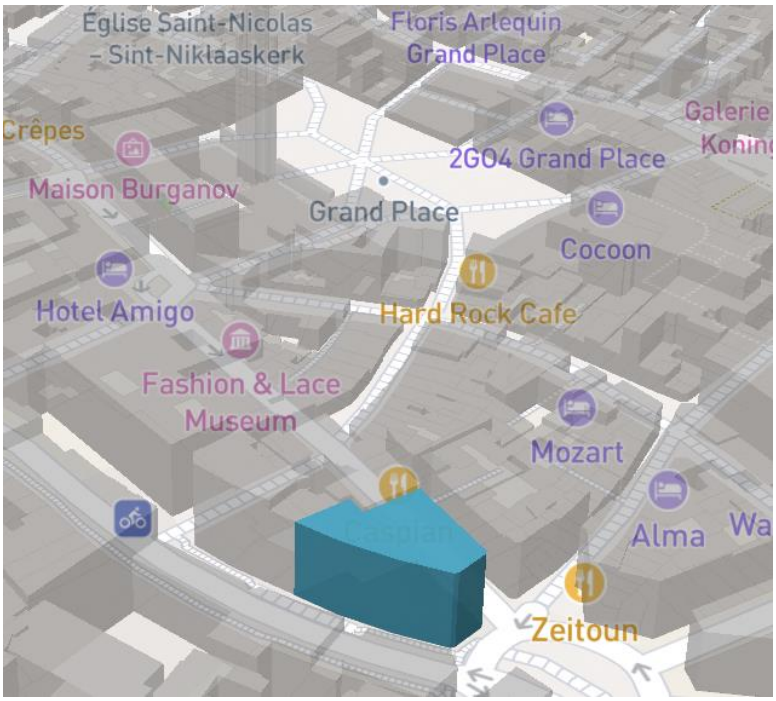

Figure 17 Activated building

4.2.4 Building archetypes

To enhance efficiency and accuracy, the PVT relies on building archetypes, which serve as standardised reference models for energy simulations. Archetypes group

buildings based on construction period, usage type, geometry, thermal envelope properties, and HVAC systems, enabling quick and scalable energy performance assessments. This approach ensures that energy evaluations remain computationally efficient and widely applicable, even when detailed building data is unavailable.

The use of building archetypes significantly reduces the complexity of energy simulations. Instead of requiring extensive manual data entry, the PVT applies predefined values for energy consumption, thermal characteristics, and system efficiencies, derived from Energy Performance Certificates (EPCs), national building typologies, and regulatory frameworks. This makes the tool especially useful for policy development, renovation planning, and regional energy efficiency assessments.

Through its integrated scenario-based approach and reliance on standardised archetypes, the PVT module provides a powerful tool for analysing, optimising, and verifying building energy performance at various scales, from individual structures to large urban areas.

4.2.5 Data analysis

The PVT is designed for conducting energy simulations under different scenarios and comparing their results. These simulations help users evaluate building performance, energy efficiency measures, and renovation strategies within a structured framework.

There are two primary ways to access the results of these simulations. The first method is through the City Object Summary, where key performance indicators (KPIs) are displayed directly within the PVT interface.

The second method is through data export, which allows users to download the simulation results for further analysis.

4.2.5.1 City object summary

A quick summary of selected building details is displayed on the buildings' popup window that can be opened by clicking on the building.

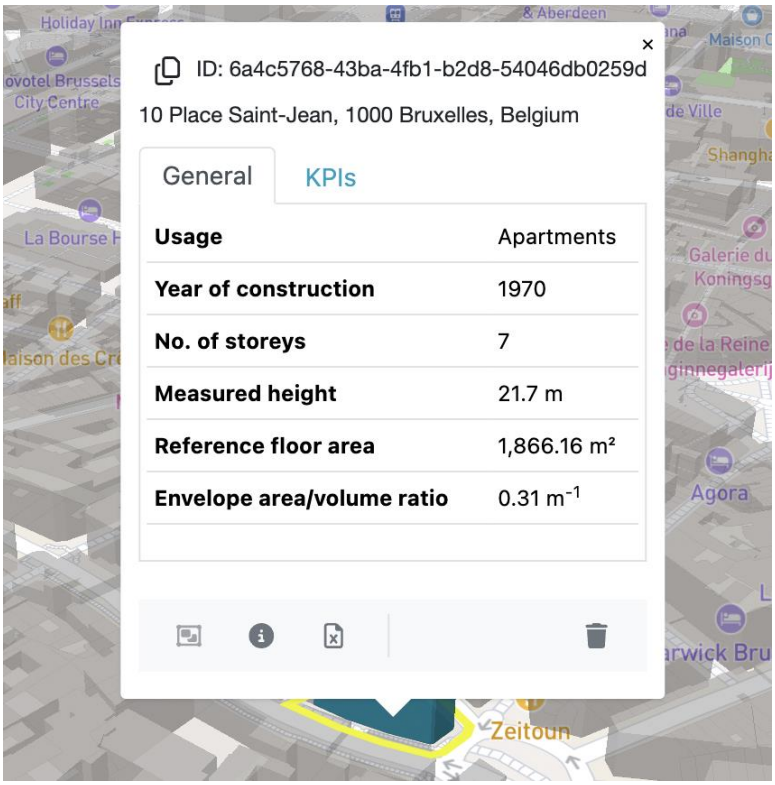

Figure 18 City object summary

On the building summary popup's toolbar there are four actions:

- *Select building*: opens the Selection Helper and adds a criteria that includes the building to the selection,
- *Details*: opens the *City Object Details* dialog using the selected building,
- *Export*: generates an XLSX spreadsheet with the details about the selected building,
- *Demolish*: gives to option to choose between removing the building from the current variant or from all variants.

On the summary popup's *KPIs* tab, a table is available giving an overview of the energetic performance of the selected building.

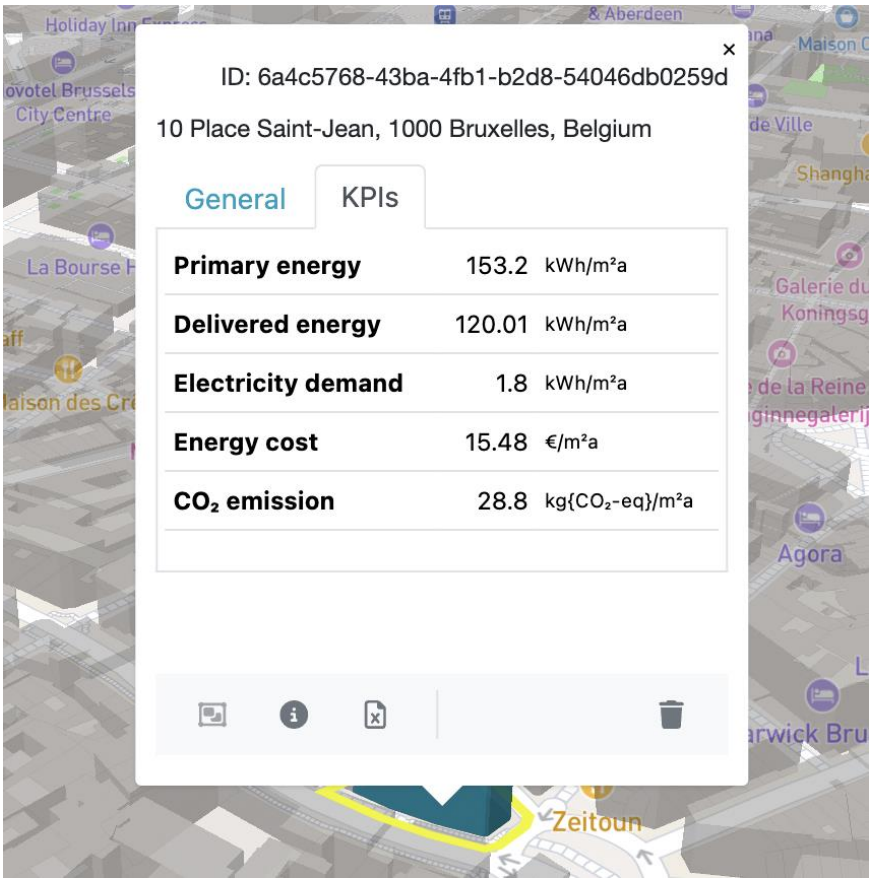

Figure 19 Building KPIs

4.2.5.2 Data export

The PVT provides users with the ability to export building data used in energy simulations conducted by the FeliCity Simulation API. These simulations run asynchronously in the cloud, ensuring that complex calculations do not interfere with the user experience. Once the simulations are completed, the results are made available for download, allowing users to further analyse and utilise the data as needed.

The exported data file contains a comprehensive summary of the building. It includes details such as the postal address, along with the entered building attributes that define its structural and operational characteristics. Additionally, it provides heat source information, specifying the energy supply system used in the building. The file also incorporates geometric data, which is derived by combining the building's footprint with its relevant attributes, ensuring an accurate representation of its physical structure.

Beyond structural information, the export includes simulated annual energy performance metrics, offering insights into the building's energy efficiency. Furthermore, it provides hourly energy production and consumption data, giving a detailed breakdown of energy usage patterns throughout the year. This exported dataset serves as a valuable resource for users, enabling them to analyse, compare, and document building performance, supporting data-driven decision-making in energy efficiency planning and optimisation.

	A	B	C
1	**Address**	10 Place Saint-Jean, 1000 Bruxelles, Belgium	
2	**Variant ID**	70a24b2c-3b69-452d-9b4d-b0650a1ff8f7	
3	**City Object ID**	6a4c5768-43ba-4fb1-b2d8-54046db0259d	
4			
5	**Attribute**	**Value**	**Unit**
6	Usage	Apartments	
7	YearOfConstruction	1970	
8	NumberOfOccupants	3	
9	UsageHours	17	
10	FloorHeight	3.1	m
11	MeasuredHeight	21.7	m
12	BaseHeight	0	m
13	NumberOfHeatedBasementFloors	1	
14	NumberOfStoreys	7	
15	PercentageOfSkyLight	0.05	%
16	RoofInclination	35	°
17	RoofType	Gabled	
18	HeatedRoof	TRUE	
19	WindowPercentageN	0.25	%
20	WindowPercentageS	0.15	%
21	WindowPercentageE	0.25	%
22	WindowPercentageW	0.25	%
23	ActualUValueDoor	3.5	W/m²K
24	ActualUValueFloor	0.8	W/m²K
25	ActualUValueRoof	0.5	W/m²K
26	ActualUValueWall	0.8	W/m²K
27	ActualUValueWindow	3.5	W/m²K

Figure 20 Building data

	A	B	C
1	**Attribute**	**Value**	**Unit**
2	BottomFloorArea	650.4672212	m²
3	TotalWallSurfaceArea	342.395209	m²
4	TotalRoofArea	794.0738545	m²
5	SkylightWindowArea	39.70369272	m²
6	DoorArea	14.26646685	m²
7	TotalEnvelopeArea	2140.744663	m²
8	WindowAreaN	22.90386102	m²
9	WindowAreaS	16.69327249	
10	WindowAreaE	21.56742157	m²
11	WindowAreaW	13.30539883	m²
12	ReferenceFloorArea	1866.157163	m²
13	HeatedVolume	6998.089362	m³
14	AverageWindowPercentage	0.19	%
15	CenterLat	50.84486209	°
16	Azimuth	148.0709959	°
17	NetRoofArea	754.3701617	m²
18	TotalWindowArea	74.46995391	m²
19	NetWallSurfaceArea	253.6587882	m²
20	EnvelopeAreaVolumeRatio	0.305904162	m-1

Figure 21 Building geometry

4.2.5.3 City object details

The City Object Details dialog serves as the main entry point for building analysis within the EUB SuperHub platform. This interface provides detailed information about a selected building, allows users to override attributes, and grants access to specific analysis tools. Users can update building attributes in multiple ways: by selecting from reference lists, manually entering quantitative data, or applying predefined interventions that modify the building's characteristics.

Once changes are saved, the system automatically triggers energy simulations via the FeliCity API. When the simulations are completed, the Key Performance

Indicator (KPI) values are updated in the City Object Summary, reflecting the new results. These updated performance metrics can also be downloaded, enabling further analysis and reporting.

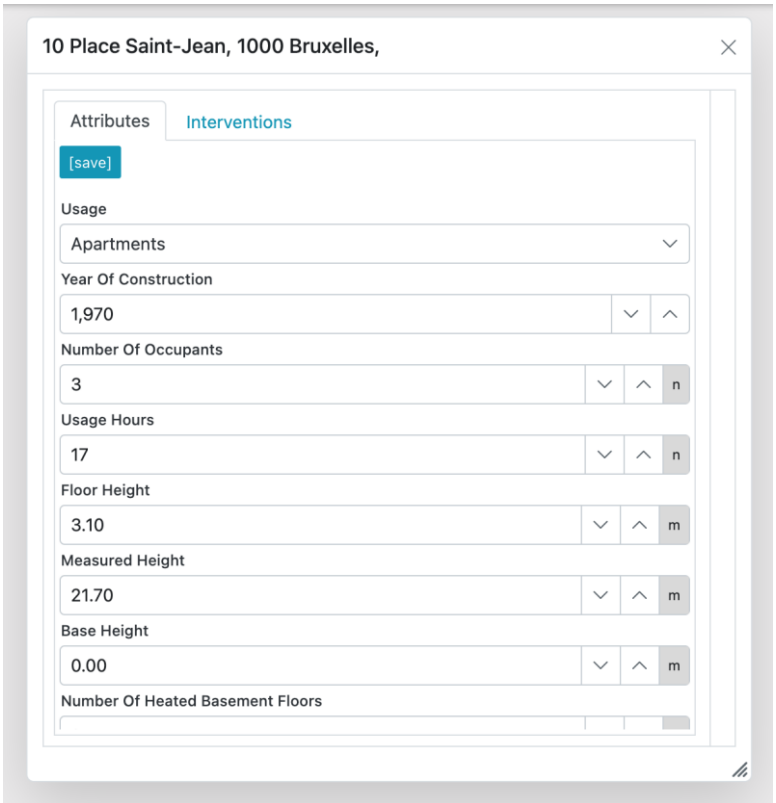

Figure 22 City object details

4.3 Virtual Marketplace

The Virtual Marketplace is a matchmaking platform that connects building owners with service providers, including auditors, consultants, and funding organisations. Users can search for qualified professionals and share building-related data in a GDPR-compliant environment. It facilitates access to expertise in energy performance assessment, retrofitting, and funding options.

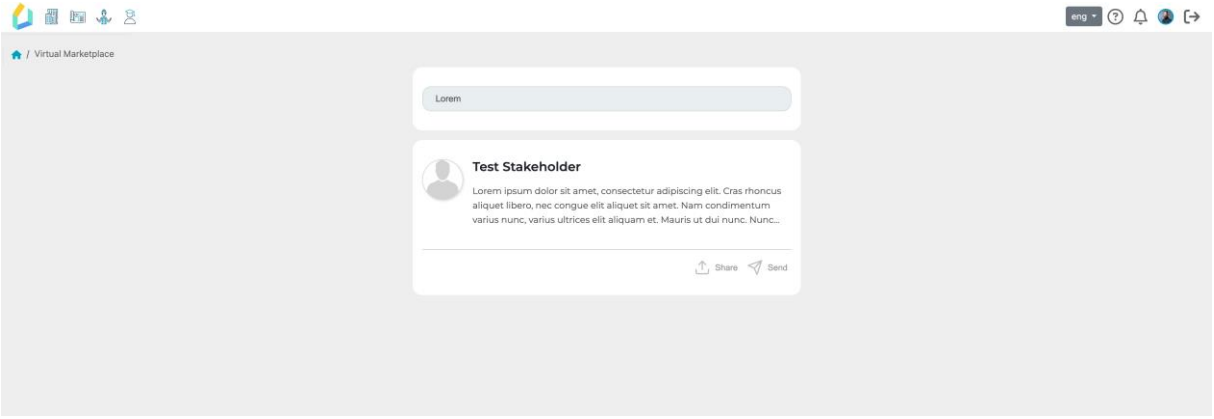

Figure 23 Searching for stakeholders

In the VM, users can search for relevant stakeholders, such as auditors, consultants, and service providers, based on their expertise and qualifications. Once a search returns a list of suitable professionals or organisations, users have the option to contact them directly and invite them to collaborate on a building's case. This feature facilitates matchmaking, enabling building owners and professionals to form partnerships and work together on energy assessments, renovation planning, and certification processes within the EUB SuperHub platform.

4.4 E-training

The E-training module integrates with the European Skills Registry, a platform developed under the TRAIN4SUSTAIN project. It provides educational resources, including e-learning materials, video tutorials, and webinars, aimed at training experts in energy efficiency, sustainability, and smart building solutions.

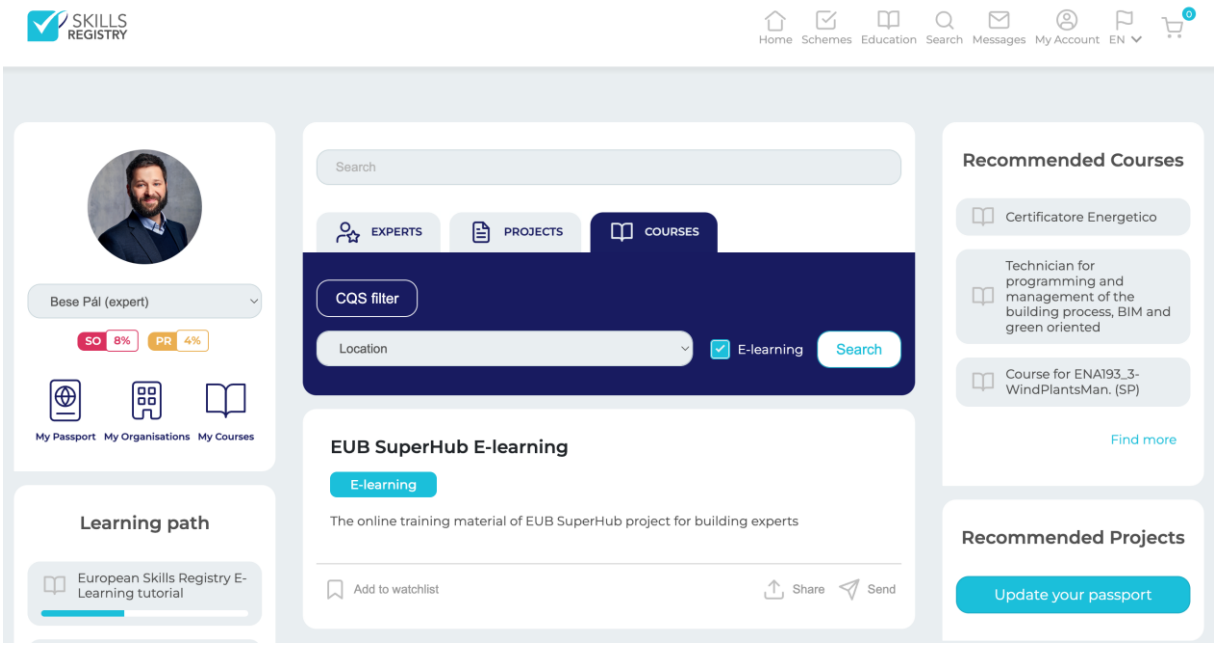

Figure 24 EUB SuperHub E-training on the European Skills Registry

The EUB SuperHub project e-learning material is based on the in-person training content produced by the Hochschule München. The content of the training is a direct result of the EU project outcomes related to building Key Performance Indicators (KPIs), assessment and certification methodology and on the concept of the Digital Building Logbook developed by the EIHP from Croatia.