



Deliverable D2.5

Report on Specifications for Project Entries, User Profiles, Use Cases and User Ranks-V2

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List of Abbreviations

ESCOs	Energy Service Companies
ESG	Environmental, Social, Governance
EU	European Union
GUI	Graphical User Interface
ICT	Information Communication Technology
IRR	Internal Rate of Return
KPIs	Key Performance Indicators
M&V	Measurement and Verification
NPV	Net Present Value
RES	Renewable Energy Sources
UC	Use Case
UUR	Updated User Requirement

Executive summary

The ENERGATE project develops an ICT platform that aims to facilitate the creation of an effective energy efficiency marketplace, bringing together building owners, implementors and sustainable finance, with the ultimate purpose of accelerating building renovation rates and facilitating stakeholders involved in energy efficiency investments.

This deliverable is the second version of a series of deliverables specifying the inputs and outputs, the workflow, the user categories, and the use cases of the ENERGATE platform.

Initially the report focuses on redefining the stakeholders of the ENERGATE platform, along with their needs. In the previous version of the deliverable, the ENERGATE pilots supported the initial identification of the platform's target groups, resulting in three user categories: Building Owners, Implementors, and Financiers. After the first definition of user categories and use cases and the development of the graphical user interface, which enabled the collection of feedback from external stakeholders, a new user category was added: the Public Bodies. The corresponding requirements have been updated, based on the input received through stakeholder consultations (surveys, bilateral and multilateral discussions, regional training workshops). Based on the initial definitions, combined with the feedback from stakeholders, the workflow demonstrating the flow of actions for users exploiting various functionalities offered by the ENERGATE platform and the use cases have been updated. The use case elicitation is of the utmost importance for forming the specificities of the ENERGATE platform regarding the project entry of the Fetch stage, the aggregation and matchmaking processes of Process stage, as well as the feedback and validation procedures of the Deliver stage. The use cases have been translated to user requirements which set the basis for functional and technical requirements of the platform. In total, 7 fully defined use cases (as well as 3 additional use cases that are still under discussion) and 56 user requirements were extracted. Finally, drawn conclusions are presented and next steps to be considered in the following versions of the report are analysed.

Since one further version of this report will be submitted by the end of the project, the use cases will continue to be updated and enriched based on the feedback that will be received through the updated stakeholder engagement process, which will be based on the actual use of the platform, after the first public roll out on September 2024.

1. Introduction

1.1. The ENERGate project

Energy efficiency is fundamental for achieving a cost-effective transition towards a decarbonised energy system. However, the energy renovation rates of buildings remain low, creating an urgent need to boost the implementation of energy efficiency measures and mobilise investments.

ENERGATE aims to address this need by creating an effective, ICT-enabled marketplace for energy efficiency investments in buildings. The ENERGate marketplace is being implemented through a user-friendly platform that connects building owners, implementors of energy renovations and financial institutions to enhance project financing and accelerate renovation rates. The platform facilitates the collection of projects, including project-specific and technical information, the aggregation of similar projects, and their matchmaking with financiers.

1.2. The objectives of this deliverable

ENERGATE needs to deploy an efficient process for collecting information on each individual project and project promoter in the most effective and user-friendly manner while also taking into account the interoperability requirements imposed by the MATRYCS architecture¹. In line with the above, a stepwise approach was employed for the development of the front-end in order for the latter to benefit from as much user-feedback as possible.

The second version of the Deliverable "Report on Specifications for Project Entries, User Profiles, Use Cases and User Ranks" revises and strengthens various elements that are critical for the design and improvement of the front-end of the platform.

The report defines the ENERGate users and the use cases developed. Stakeholders are categorised by user type, and their needs and role are defined. The use cases developed describe the various user flows that different categories of stakeholders can follow on the platform to satisfy their needs. Extensive consultation with stakeholders has taken place to ensure that user types and use cases are relevant and cover the needs of a wide range of stakeholders.

Additionally, the report presents the delivery of the prototype front-end, taking into account the feedback received from stakeholders. The prototype is designed to be as flexible as possible, in order to be able to integrate new elements and/or services as they arise to meet evolving stakeholder needs.

The analysis conducted within the present deliverable leads to a complete and concise definition of platform workflows, use cases and user requirements, that have been used to create the first public version of the platform but will also continue to be fine tuned and enriched as the project progresses. Taking stakeholders' feedback into consideration ensures that the ENERGate marketplace will be able to truly fulfil the needs of the users and achieve the expected goals. Thus, the purpose of this deliverable is to specify the ENERGate framework functionalities and services. The report is structured as follows:

¹ Pau, M., Kapsalis, P., Pan, Z., Korbakis, G., Pellegrino, D., & Monti, A. (2022). MATRYCS—A big data architecture for advanced services in the building domain. *Energies*, 15(7), 2568. <https://doi.org/10.3390/en15072568>

- In Section 2, the steps followed for defining the workflow of the ENERGATE platform are outlined.
- In Section 3, the user types and stages of the ENERGATE platform are defined.
- In Section 4, the workflow of the platform is presented with a focus on the updated uses cases, information entries and new features such as user performance and risk assessment.
- In Section 5.3.2, the feedback received from stakeholders is discussed along with the changes that it caused in the platform workflow.
- In Section 6, the updated user requirements are listed.
- In Section 7, conclusions and next steps are presented.

2. Methodological framework

The methodology followed for developing the platform is shown in Figure 1.

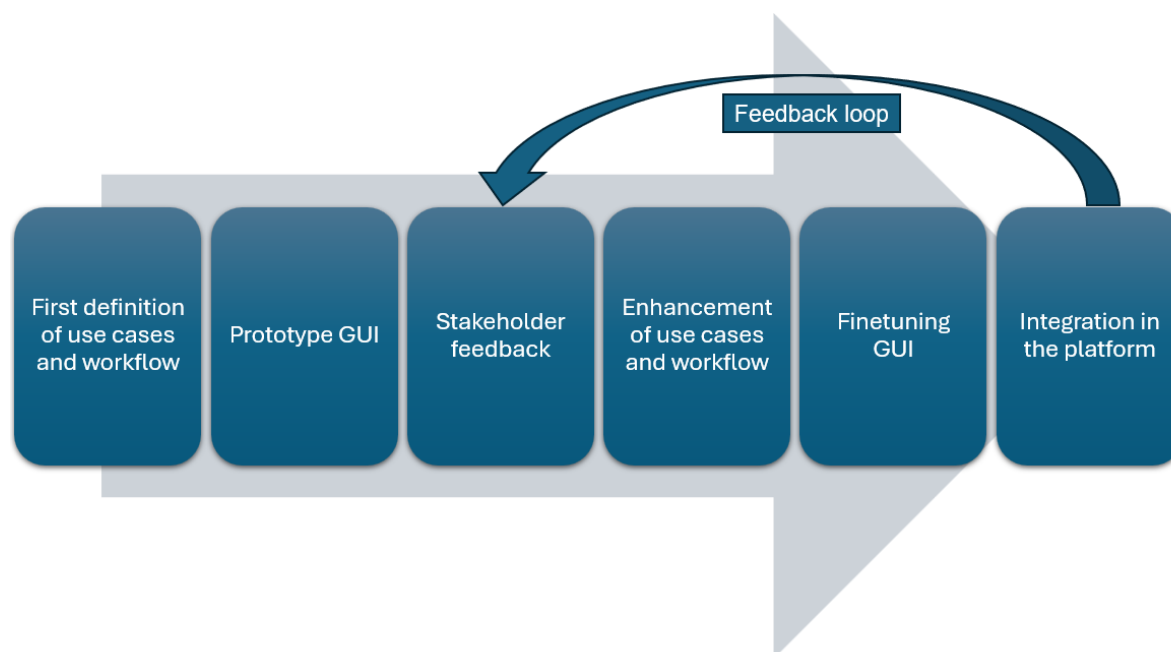


Figure 1: Methodological approach

The steps followed include:

First definition of use cases and workflow: This process was presented in the previous version of the report, [Deliverable D2.2-Report on Specifications for Project Entries, User Profiles, Use Cases and User Ranks-v1](#). The user types and user stories were defined using the input collected from the ENERGATE pilot partners. Standardised templates were used to ensure that the information was collected in a structured manner. Based on this input, the ENERGATE workflow, the first three user profiles, the first four use cases and corresponding information entries were defined.

Prototype Graphical User Interface (GUI): The initial definition of the platform's information entries, user profiles, use cases and workflow set the basis for the design of the first version of the GUI of the platform using the [Figma Tool](#). For the development of this prototype frontend, information and experiences from both the ENERGATE and the [MATRYCS project](#), as well as other relevant projects, were taken into account. In order to be able to easily demonstrate the GUI, videos were created for each user type and uploaded in the [ENERGATE YouTube channel](#).

Stakeholder feedback: The GUI videos, as well as the additional material created, such as a short description of the project, overview presentations, the [ENERGATE brochure](#), the ENERGATE [one pager](#), and the [ENERGATE user profiles](#)², enabled the collection of feedback on the platform's functionalities at an early stage, through stakeholder consultation surveys, bilateral and multilateral meetings, semi-structured interviews and events (e.g. the

² Communication material available here: <https://energate-project.eu/communication-material>

Regional Training Workshops in Madrid and Riga, the REHVA Brussels Summit, Exploreal Munich, and Buildexpo).

Enhancement of use cases and workflow: The feedback received was meticulously examined, and taken into consideration to inform the use cases, information entries, user requirements and workflow. As a result, a new user profile was created and three additional use cases were defined.

Finetuning the Graphical User Interface: Proposed improvements to the platform from stakeholders was incorporated at the GUI as a first step. This enabled further internal discussions and fine tuning before integrating major changes in the actual ENERGATE platform, since such modifications often require significant changes in the platform's structure and architecture.

Integration in the platform: The platform was developed (back and front end) with the aim of implementing what is presented in the GUI, so that the platform's design is aligned with user requirements, as defined during the stakeholder consultation processes.

Feedback loop: Stakeholder engagement and consultation are continuous processes, since the priority of ENERGATE is to develop a platform that is properly aligned to the needs of the market and the financing community. Therefore, the material and methods used for stakeholder engagement are constantly updated, and tailored for each stage of the project. Recently, the first public version of the platform was launched, so this is now an important tool for engaging stakeholders. Stakeholders can become users, test the platform and its services and provide feedback. To this end, all recent capacity building and training materials include interactive tools like infographics and videos that train stakeholders in using the platform. The platform will continue to be enhanced, considering stakeholders' feedback, until the end of the project.

3. Platform User Types and stages

An integral part of the process for the development of the ENERGATE front-end is the definition of the platform users and their activities. In the [previous version of the report](#), three user types were defined: Building Owners, Implementors and Financiers. After consultations with stakeholders involved in the renovation of public buildings (i.e. municipalities and ministries in Greece and Latvia), it was concluded that the “Building Owner” category is not sufficient to represent both private and public building stakeholders in the platform. More specifically, in order to Implement energy efficiency measures in public buildings, specific public procurement procedures and tendering processes need to be followed. Additionally, EU funding is often the source of financing for such projects (particularly in Latvia and Greece). Therefore, an additional user type was defined, the “Public Body”. More details about the feedback received are provided in Section 5.

3.1. User types

3.1.1. Building Owner

A “Building Owner” is a user that either owns or manages a private building and is interested in pursuing its energy renovation. The Building Owner has access to technical, commercial, and/or risk-related data for the building, and can enter such data in the platform, so as to compare the building with other buildings that have been renovated in the past, search for technical experts that can implement energy efficiency interventions, and explore possible finance solutions for the project. Stakeholders identified within this group include:

- Private building owners
- Asset managers
- Property/building managers
- Real estate developers/managers

3.1.2. Implementor

An “Implementor” is a user that can provide technical support and implement energy renovation projects. A wide range of implementors exist and their role is defined according to their type. Often, they are the enabler of a funded solution, working with building owners and financiers to facilitate the implementation of funded projects. Typically, they collect and process information on buildings, undertake techno-economic analysis of different energy efficiency measures for selected buildings, define projects and offer their services and technical expertise for the implementation of energy renovation projects. An implementor can also create attractive investment opportunities through the aggregation process, and explore finance solutions to implement these projects. Stakeholders identified within this group include:

- Energy Service Companies (ESCOs)
- Project Developers
- Engineering Companies
- Architect & Design Companies

- Energy Consultants
- Installers

3.1.3. Financier

A “Financier” is a user that typically provides funding for projects. Through the ENERGATE platform, financiers can explore various investment opportunities specifically related to energy renovation projects in buildings. The platform enables them to access and analyse project data, helping them assess whether they wish to finance these initiatives and decide on the financing method, such as loans, green finance instruments, framework agreements. Key stakeholders in this group are:

- Financial institutions such as commercial banks and development banks that offer loans or green finance products to support energy renovation projects.
- Private investors: High-net-worth individuals or private equity investors interested in funding sustainable energy initiatives with potential long-term returns.
- Investment Funds: Funds focused on climate action, such as energy efficiency funds, renewable energy funds, and infrastructure investment funds that support both private and public sector clients. Examples include green bond funds, sustainability-focused venture capital funds, and climate impact funds.

3.1.4. Public Body

A “Public Body” is an additional user role in the ENERGATE platform. This type of user aims to renovate one or multiple public buildings. The Public Body can use the ENERGATE platform to insert data relevant to the building, according to the predefined information entries, so as to compare their building with other buildings that have been renovated in the past, and explore available EU funding schemes and mechanisms that could finance/fund energy efficiency interventions in public buildings project. Currently, additional features for this user type are being explored (e.g. the aggregation of similar energy efficiency renovation projects to create project bundles, so that public authorities can apply for funding under different financial mechanisms, like ELENA). Stakeholders identified within this group include:

- Municipalities/cities/communities
- Regions and national authorities
- Other public entities

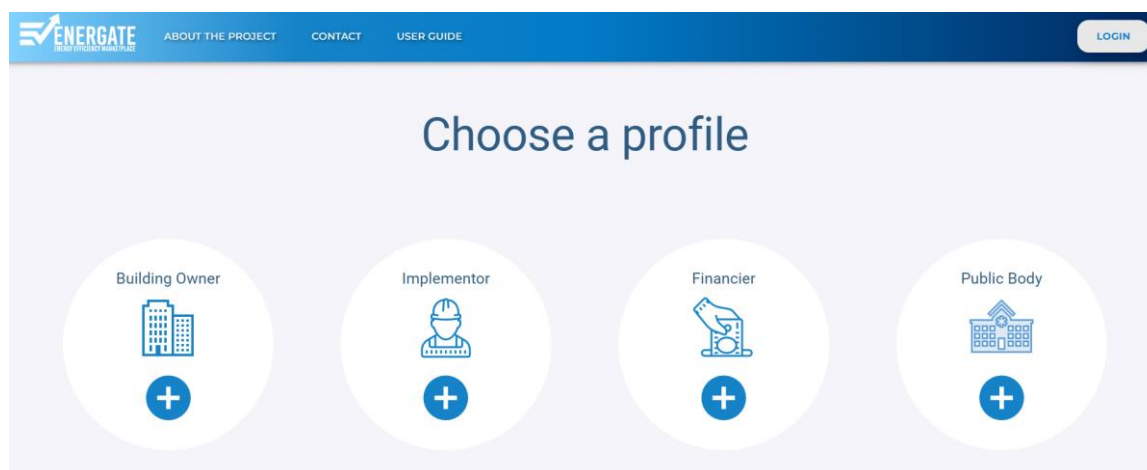


Figure 2: Profile Selection

3.2. Platform stages

The platform stages are described below and shown in Figure 3. These have been slightly modified to accommodate stakeholders' suggestions, primarily the addition of Public Bodies as users.

Zero Stage

At zero stage, users insert basic personal data and information about their organisation (the term "organisation" has replaced the term "company", to make the terminology suitable for both private and public sector). In line with the feedback received from stakeholders, in the future, the Zero Stage will also include some additional requirements (e.g. an official document) to enable the verification of the company and ensure that the platform user is indeed an authorised representative of the company. The specific documents and verification process that will be implemented are currently under discussion.

Fetch Stage

During this stage, users (Building Owners, Public Bodies and Implementors) insert information on buildings. Private and public buildings have different profiles, so information entries differ. Similar buildings incorporated within the ENERGate database are identified to help Building Owners and Public Bodies learn from best practices.

Process Stage

The aggregation and matchmaking process is the core part of this stage, where Implementors are matched with buildings, projects are formulated, project offers are finalised by Implementors, and Financiers are matched with projects according to their profile and preferences in terms of performance indicators. The Process Stage has been improved for private buildings so as to support users in calculating the performance indicators of their projects. Unlike private buildings, public buildings cannot be matched with Implementors through ENERGate, since the public sector needs to follow strict public procurement processes. Thus, through the platform Public Bodies will be able to inform Implementors interested in renovating public buildings about upcoming projects. Public Bodies will also be able to explore available EU funding mechanisms that might be suitable for their projects.

Deliver Stage

During this stage, users will have access to statistics and visualisations in order to better understand the impact of the renovation projects they are considering.

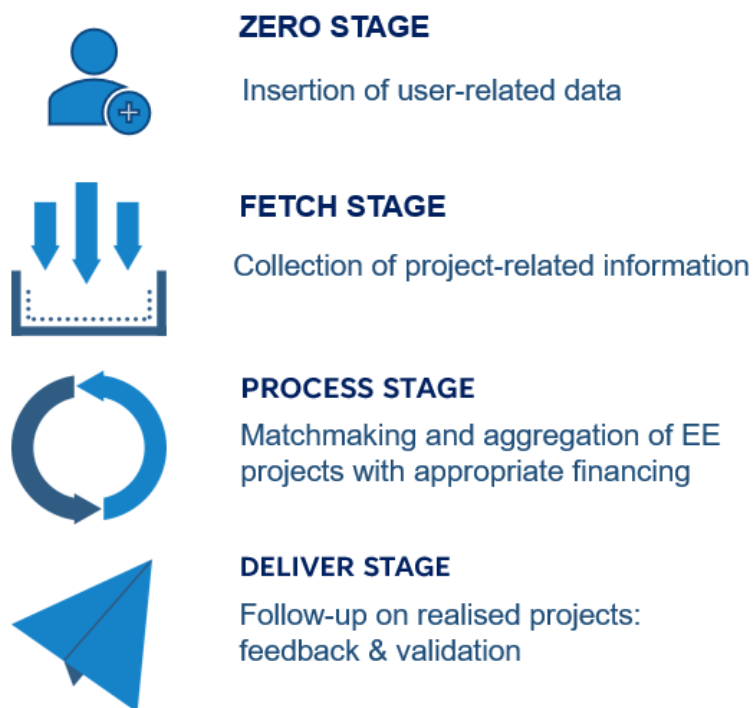


Figure 3: ENERGATE platform stages: overview

4. Platform workflow

The ENERGATE platform has been defined in a way that ensures that the needs of the market are met. This has been achieved through extensive discussions within the consortium and with external stakeholders. In this section, the nine use cases developed are described. These define what each of the four users can do within the platform. Furthermore, information entries and the flow of information within the platform is presented, using appropriate workflows.

4.1. Use Cases

In order to ensure flexibility and a wider uptake of the ENERGATE platform, different use cases have been developed for different users. These use cases define user activity within the platform. Recommendations from previous projects and initiatives, the experience and expertise of project partners and the feedback and suggestions received from external stakeholders have been paramount in the design of these use cases. An overview of the use cases is presented in Table 1.

Table 1: Overview of the ENERGATE use cases

Use Case ID	Description
UC1	A Building Owner searches for technical and financial support to execute a renovation project (thus, the Building Owner searches for both an Implementor and a Financier).
UC2	An Implementor searches for financial support to renovate a building it manages or that of an external client (thus, the Implementor searches for a Financier and does not interact with Building Owners in the platform).
UC3	A Building Owner searches for financial support to execute a project (thus, the Building Owner searches for a Financier and does not interact with an Implementor in the platform).
UC4	An Implementor searches for financial support to renovate a building it manages or that of an external client (thus, the Implementor searches for a Financier and does not interact with Building Owners in the platform).
UC5	A Public Body explores EU level funding options through ENERGATE's repository of funding sources.
UC6	A Public Body that needs technical support makes the information about an energy efficiency project available to Implementors, in compliance with public procurement processes.
UC7	A Public Body that needs technical and financial support makes the information about an energy efficiency project available to Implementors and Financiers. Interested implementors are matched with relevant Financiers to prepare a funded solution.
UC8	A Public Body searches for financial support to execute a project (thus, the Public Body searches for a Financier and does not interact with an Implementor in the platform).
UC9	A Financier can add specific financing tools/banking products and receive notifications when projects matching the criteria set are available in the platform.

In the following tables and diagrams, the currently defined use cases are presented, along with respective goals, triggering events, preconditions and postconditions. Moreover, figures summarising each use case are shown. Use cases 1 to 4 were initially defined in the [previous version of the report](#), while use cases 5 to 9 are defined in this deliverable for the first time. Finally, under each use case, updates in the design of the use cases are described, which are clearly linked in most cases with feedback received from stakeholder consultation (and there is a reference on the specific feedback received according to Table 41 – Suggestions are defined from S1 to S35).

Table 2: Use Case 1 summary

USE CASE 1		
ID		UC1
Name		Building owner searching for technical support and finance
Goal(s)		A private Building Owner wants to find a financed solution for the energy renovation of a building.
Actors		Building Owner, Implementor, Financier
Trigger events		The Building Owner wants to renovate a building and does not have the funds and a technical team in house.
Preconditions		The user managing the building profile should either be the owner of the asset or have authorization to engage in such activities, so as to register the building in the platform and fill in the information requested.
Basic Flow	Description	A Building Owner wants to renovate a building and seeks an Implementor that can execute the project and find finance. The owner registers the building in the platform to identify an Implementor. The Implementor formulates an initial offer for the energy renovation of the building and presents this to the Building Owner. Once this is accepted the Implementor prepares a final offer. Specific information of the finalised offer will be shown to the Building Owner and also all the information in the offer will be available to the Financier to finance the project. The Implementor might aggregate the project with other similar projects to facilitate the financing of the project.
	Postconditions	• Offers from Implementors that could implement the project, including final offers to Building Owners and Financiers, which include proposed actions, expected impacts (e.g. energy savings) and the project's financial performance when relevant (i.e. offers for Financiers). • A term sheet from a Financier interested in investing in the project. • The final project financing and implementation is subject to due diligence and the establishment of an agreement between the parties involved.



Figure 4: Use Case 1 overview

Updates compared to the initial case: The most important changes are that the Implementor provides an offer to Building Owners in two stages (in line with S5), and the aggregation process is added as an extra step (in line with the stakeholder suggestion S7 – Table 41).

Table 3: Use Case 2 summary

USE CASE 2		
ID	UC2	
Name	Implementor searching for financing	
Goal(s)	An Implementor wants to find financing for a project	
Actors	Implementor, Financier	
Trigger events	An Implementor wants to access finances for the energy renovation of a building they own or of a client's building or a real estate developer with a technical team in-house wants to communicate directly with financiers through the platform.	
Preconditions	The user (Implementor) must have an agreement with the client (Building Owner), which mandates the user to implement an energy efficiency renovation project, subject to access to finance. The user can therefore fill in the information required by the ENERGATE platform. Alternatively, the user (Implementor) can own or manage a building or be a or a real estate developer and implement an energy efficiency project.	
Basic Flow	Description	An Implementor aims to implement energy efficiency measures at a building or group of buildings. For the implementation of the identified measures, the Implementor registers at the platform the required inputs for the building, along with information about energy efficiency measures and the financial performance

USE CASE 2		
		of the project to seek for relevant funding opportunities. Upon receiving a term sheet from a Financier, the Implementor can review it and accept or reject it.
	Postconditions	• A final offer from an Implementor with details about the project, including proposed actions, expected impacts (e.g. energy savings) and the project's financial performance. • A term sheet from a Financier interested in investing in the project. • The financing of the project is subject to due diligence and the establishment of an agreement between the two parties involved.



Figure 5: Use Case 2 overview

Use case 2 assumes that the implementor has a technical team in house, which allows the user to aggregate projects.

Table 4: Revised Use Case 3 summary

USE CASE 3	
ID	UC3
Name	Building Owner searching for finance
Goal(s)	Find finance to be able to proceed with energy efficiency interventions

USE CASE 3		
Actors		Building Owner & sub-categories, Financier & sub-categories
Trigger events		The Building Owner (without a technical team in – house) needs to access finance for a project that will be implemented in their building and wants to communicate directly with financiers in the platform, without having an external Implementor as an intermediate.
Preconditions		It is assumed that the Financier is not very interested in the details of the project, instead the decision on whether or not they will provide finance will be based on the financial checks they will perform on the Building Owner. The Building Owner needs to have an estimation of the investment cost to apply the interventions, so as to know how much money they need to borrow from the Financier.
Basic Flow	Description	A Building Owner aims to apply renovation measures to a building. They will cooperate with an Implementor that does not follow the ESCo model, therefore the Implementor will not be responsible to find finance for the project. To find finance, the Building Owner will provide the amount that they need to proceed with the implementation of the energy efficiency project, as well as other important criteria for the Financier (to be defined). The Financiers in the platform that might be a good match will receive notifications and will request any additional information they need in order to decide whether or not they will proceed to provide finance to the Building Owner.
	Postconditions	A preliminary agreement between the Building Owner and the Financier.

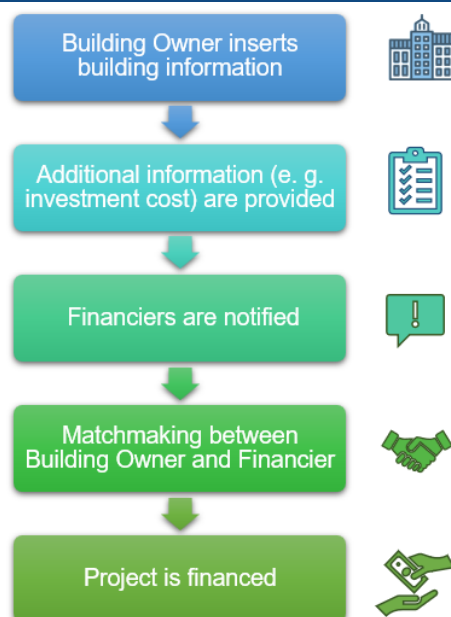


Figure 6: Revised Use Case 3 overview

Updates compared to the initial case: The revised version of Use Case 3, in line with S8, takes into account the fact that a direct connection between the Building Owner and the Financier is needed in many cases (particularly for the Greek and Spanish markets according to stakeholder consultation). Previously, the direct connection between the Building Owner and Financier was achieved through UC3, but the assumption was that the Building Owner has a technical team in – house and therefore can act as an Implementor for their own buildings. However, stakeholder consultation showed that particularly in the case of banks, it is not always a precondition for the Building Owner to have a technical team in – house to start the negotiations. On the other hand, for an Investment Fund the energy efficiency project

needs to be fully defined. The revision of the use case is still under discussion and has not been implemented in the platform yet.

Table 5: Use Case 4 summary

USE CASE 4		
ID		UC4
Name		Building owner searching for technical support
Goal(s)		A Building Owner wants to: Renovate his/her building and seek a renovation roadmap Find an Implementor that will undergo the required energy efficiency actions
Actors		Building owner & sub-categories, Implementor & sub-categories
Trigger events		The building owner wants to have a renovation roadmap and access to an Implementor to execute the project.
Preconditions		The user entering the building information should either have ownership of the asset or authorization to engage in such initiatives, so as to fill in the information requested on the ENERGATE platform. The Building Owner has either not access, or the understanding of potential measures that must be applied to his/her property.
Basic Flow	Description	A Building Owner wants to renovate their building and seeks a renovation roadmap and an Implementor that can execute the renovation actions. The owner registers the building within the ENERGATE platform to receive offers from Implementors that will undergo the required energy efficiency actions.
	Postconditions	Offers from Implementors that could undertake the project A finalised offer with proposed actions and estimated energy savings Project implementation



Figure 7: Use Case 4 overview

The high – level description of Use Case 4 has not undergone significant changes, apart from the division of the offer in two stages (“initial” and “finalised”).

Table 6: Use Case 5 summary

USE CASE 5		
ID	UC5	
Name	Public Body searching for funding sources	
Goal(s)	A Public Body wants to explore available EU funding mechanisms that might be suitable for their energy efficiency project.	
Actors	Public Body & sub-categories.	
Trigger events	The Public Body needs to renovate one or multiple buildings.	
Preconditions	The user (Public Body) managing the building profile should have authorisation to provide information requested on the ENERGate platform.	
Basic Flow	Description	A Public Body aims to apply renovation measures to a building or group of buildings. The Public Body registers the required inputs to seek the relevant funding opportunities. The platform will provide the list of EU funding mechanisms, with a summary of each mechanism and key information (scope, requirements for application, relevant links etc.)
	Postconditions	A list of EU funding mechanisms and relevant information.

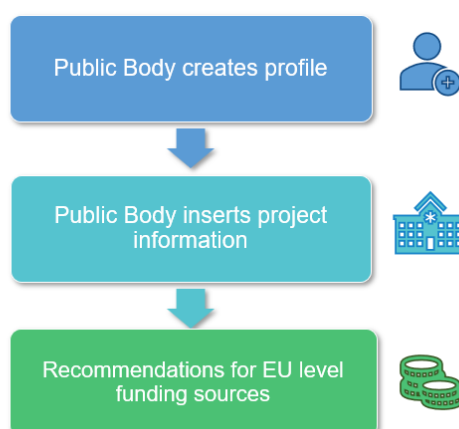


Figure 8: Use Case 5 overview

Unlike the use cases 1 to 4 presented above, Use Case 5 is defined for the first time in the present deliverable, since it introduces the new user role “Public Body” (defined in Section 3.1.4). This use case is linked to the stakeholder suggestion S15.

Table 7: Revised Use Case 5 summary

REVISED USE CASE 5		
ID	UC5	
Name	Public Body searching for funding sources	
Goal(s)	A Public Body wants to explore and evaluate available funding mechanisms that might be suitable for their energy efficiency project. A Financier (public financing body/ fund manager) wants to communicate a funding opportunity through the platform.	
Actors	Public Bodies & sub-categories, Financiers & sub-categories	
Trigger events	The Public Body needs to renovate one or multiple buildings and needs assistance in selecting a funding source.	

REVISED USE CASE 5		
Preconditions		The Public Body managing the building profile should have authorisation to provide information requested on the ENERGATE platform.
Basic Flow	Description	A Public Body aims to apply renovation measures to a building or group of buildings. The Public Body registers the required inputs to seek the relevant funding opportunities. The platform will provide the list of EU funding mechanisms, with a summary of each mechanism and key information (scope, requirements for application, relevant links etc.). The platform will also add to the list any funding sources that have been added by Financiers and are applicable for the specific energy efficiency project. Finally, the platform will use the input provide by the Public Body to evaluate the suitability of the funding sources for the energy efficiency project.
	Postconditions	A list of funding sources and relevant information, and an evaluation of the funding sources.

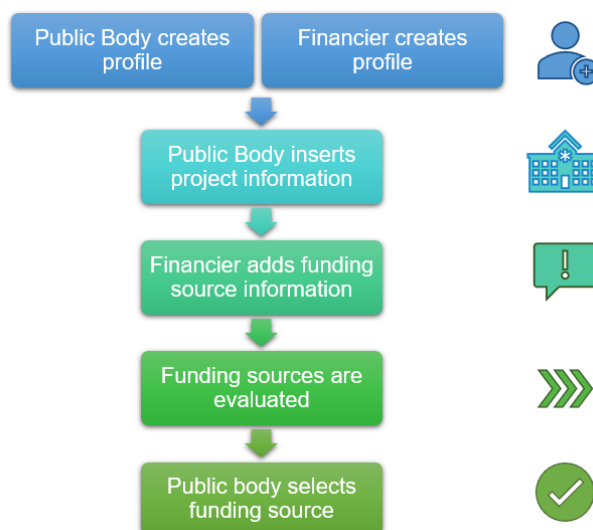


Figure 9: Revised Use Case 5 overview

An extension of the use case could be linked to S16 and S17, since the list of funding mechanisms could be updated through the involvement of public financing institutions/ fund managers, using the platform as a communication channel. However, more consultations with stakeholders that manage funding mechanisms for public buildings need to be done, to ensure that this use case should in fact be designed and will actually help them, since so far it seems that most stakeholders that would belong in this category (e.g. ministries) would be hesitant to use the platform in this context, because they have already established standardised processes and communication channels. Furthermore, an appropriate methodology could be created to evaluate whether the project fits the funding sources' requirements, so as to pre-assess the chances of the project succeeding to receive the grant (or subsidy etc.).

Table 8: Use Case 6.A summary

USE CASE 6.A	
ID	UC6.A

USE CASE 6.A		
Name		Public Body looking for an Implementor – project above tender threshold
Goal(s)		A Public Body wants to inform Implementors in the platform about a current or upcoming project, giving them the opportunity to prepare better offers for the public procurement.
Actors		Public Body & sub-categories, Implementor & sub-categories
Trigger events		A public building needs renovation and technical support is required.
Preconditions		The user (Public Body) managing the building profile should have authorization to provide information requested on the ENERGATE platform. A public procurement for the project is active or will be active soon.
Basic Flow	Description	A Public Body aims to apply renovation measures to a building or group of buildings. The Public Body registers the required inputs. The user (Public Body) may add the link to the relevant website (e.g. announcement of the energy efficiency project's public procurement, official website for applications to participate in the procurement etc.). The Implementors in the platform can see the list of projects in Public Buildings that fit their criteria. They can access the information provided by the Public Body.
	Postconditions	Enhanced proposals from Implementors for the public procurement of the energy efficiency projects.

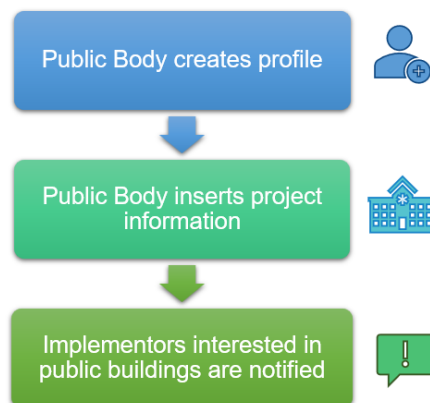


Figure 10: Use Case 6.A overview

Table 9: Use Case 6.B summary

USE CASE 6.B	
ID	UC6.B
Name	Public Body looking for an Implementor – project below tender threshold
Goal(s)	A Public Body wants to inform Implementors in the platform about an energy efficiency project, which is below the tender threshold and therefore there is no need for public procurement. This use case could also include other services provided by Implementors, that are below the tender threshold, such as technical studies for energy efficiency projects.
Actors	Public Body & sub-categories, Implementor & sub-categories
Trigger events	A public building needs renovation and technical support is required.

USE CASE 6.B		
Preconditions		The user (Public Body) managing the building profile should have authorization to provide information requested on the ENERGATE platform. The CAPEX of the project should not exceed the national tender threshold.
Basic Flow	Description	A Public Body aims to apply renovation measures to a building or group of buildings. The Public Body registers the required inputs. The Implementors in the platform can see the list of projects in Public Buildings that fit their criteria. They can access the information provided by the Public Body. They can be matched with the project.
	Postconditions	Cooperation between the Public Body and Implementor to execute the energy efficiency project (below tender threshold).

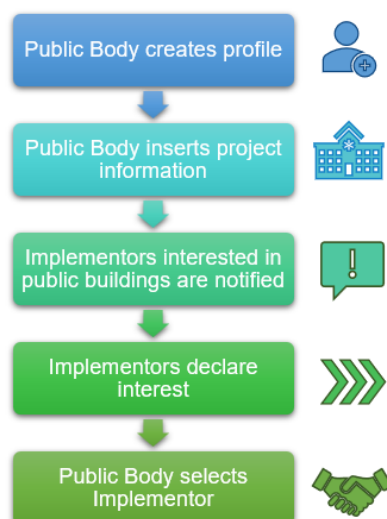


Figure 11: Use Case 6.B overview

The 6th use case, in line with S6, is divided in subsections as follows:

- UC6.A: Above tender threshold (Table 7 and Figure 10)
- UC6.B: Below tender threshold (Table 9 and Figure 11)

This division ensures that there are no conflicts regarding the matchmaking process of the platform and the regulations of the public sector. According to the regulation, if the investment cost of the project exceeds a certain amount (depending on the country) an official public procurement process must take place and Implementors must provide competitive offers, so that the Implementor that will undertake the project can be selected. If the investment does not exceed the established threshold, then the project can be assigned to an Implementor through direct award.

Currently, all public projects looking for technical support that are added to the platform follow the workflow of UC6.A, since the investment cost is not taken into account. The incorporation of both UC.A and UC.B will be done at a later stage.

Table 10: Use Case 7 summary

USE CASE 7		
ID		UC7
Name		Public Body looking for financed solution
Goal(s)		A Public Body wants to inform both Implementors and Financiers in the platform about a current or upcoming project, giving them the opportunity to cooperate and prepare better offers.
Actors		Public Body & sub-categories, Implementor & sub-categories
Trigger events		A public building needs renovation and a complete solution including both technical and financial support is required.
Preconditions		The user (Public Body) managing the building profile should have authorisation to provide information requested on the ENERGATE platform. The Public Body must be actively seeking a financed solution for the project.
Basic Flow	Description	A Public Body aims to apply renovation measures to a building or group of buildings. The Public Body registers the required inputs. The Implementors and Financiers in the platform can see the list of projects in Public Buildings that fit their criteria. They can access the information provided by the Public Body. If they are interested in the same project, the Implementor and Financier will be matched through the platform.
	Postconditions	Cooperation between Implementor and Financier to prepare a financed solution as a proposal for the energy efficiency project.

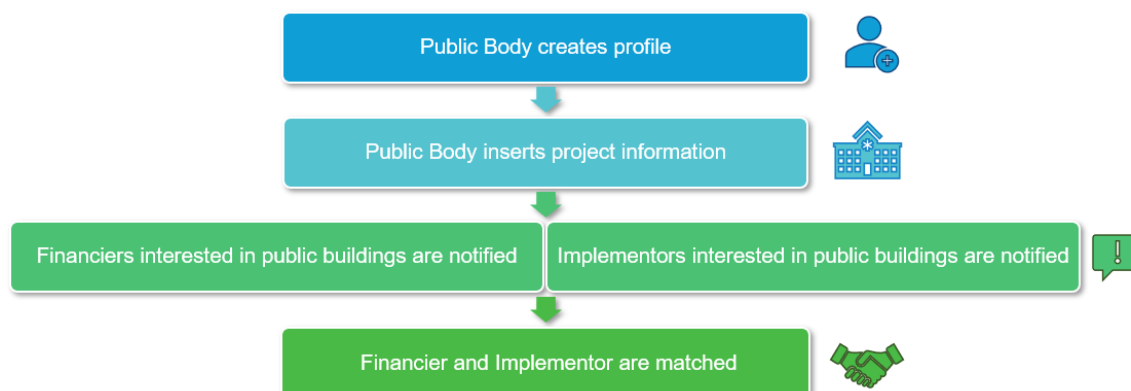


Figure 12: Use Case 7 overview

Use Case 7 has been designed but is currently not fully developed to be integrated in the platform. Specifically, both Implementors (UC6) and Financiers can access the list of public energy efficiency projects that fit their criteria, but they do not have the option to declare their interest for a project through the platform yet, and therefore no matchmaking between the Implementor and the Financier can occur for public buildings at this stage.

The aim of the addition of this use case is the mobilisation of Financiers that normally focus on private buildings to participate in investments in the public sector, since they are more likely to do this if they connect with an Implementor that they can trust. Furthermore, the use case aims to encourage Public Bodies (municipalities) to seek private financing for their energy efficiency projects. It must not be neglected that stakeholders in the public sector appear sceptical when it comes to this use case, therefore the use of the platform will show whether

this use case is actually applicable for the pilot countries of ENERGATE (mainly Greece and Latvia), or if the market is not mature enough for it yet.

Besides the updates and additions in existing use cases, new use cases can also be defined to address the feedback received from stakeholders and to make sure that the ENERGATE platform meets the needs of the market. When it comes to Public Bodies, the following use case could be considered:

Table 11: Use Case 8 summary

USE CASE 8		
ID	UC8	
Name	Public Body looking for a Financier	
Goal(s)	A Public Body wants to use the platform to connect with Financiers.	
Actors	Public Body & sub-categories, Implementor & sub-categories, Financier & sub-categories	
Trigger events	Financing is needed for an energy efficiency project in a public building.	
Preconditions	The Public Body managing the building profile should have authorisation to provide information requested on the ENERGATE platform. The energy efficiency project must already be assigned to an Implementor (through direct award or public procurement).	
Basic Flow	Description	A Public Body aims to apply renovation measures to a building or group of buildings. The Implementor that will execute the projects has been found. The Financiers in the platform will be able to see information about the project to be able to evaluate it and decide whether they will invest in it.
	Postconditions	Financing of the energy efficiency project.

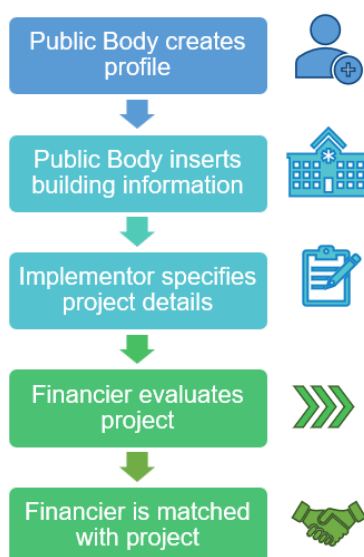


Figure 13: Use Case 8 overview

As explained, currently the Financiers in the platform can engage with the public sector through this use case. However, there are doubts and concerns from the side of public institutions that have participated in the consultation process regarding the applicability of this

use case. Thus, another use case could be proposed to motivate private financing in energy efficiency projects in the public sector. In UC8 (Table 11 and Figure 13), the Financier evaluates the project after the Implementor has been found and the project is fully defined. This might be important to certain Financiers, especially those that will determine their decision primarily based on the quality of the services that the Implementor that has undertaken the project is expected to provide. Nonetheless, it must not be neglected that this use case should be discussed with stakeholders involved in the public sector to understand its potential applicability and possible barriers.

Other additional use cases could be targeted to the integration of banks in the platform. The existing workflow of Financiers is useful for banks, but additional services could motivate these major stakeholders to use the ENERGATE platform.

Table 12: Use Case 9 summary

USE CASE 9		
ID		UC9
Name		Financier adding banking products
Goal(s)		Increase the visibility of banking products for building renovation
Actors		Building Owner & sub-categories, Financier & sub-categories
Trigger events		The Financier (bank) has available financing tools that can be used for energy efficiency projects.
Preconditions		The bank must create a profile in the platform as a Financier. The Building Owner must be able to add key information about the energy efficiency project. The Building Owner must be eligible to receive financing from the bank.
Basic Flow	Description	A Building Owner aims to apply renovation measures to a building. They will cooperate with an Implementor that does not follow the ESCo model, therefore the Implementor will not be responsible to find finance for the project. To find finance, the Building Owner will provide the amount that he needs to proceed with the implementation of the energy efficiency project, as well as other important criteria (to be defined). The Financier (bank) will add banking products in the platform through specific information entries (to be defined). If the energy efficiency project of the Building Owner is a good match for the banking product, the Financier will be notified and request additional information.
	Postconditions	A match between a banking product and an energy efficiency project.

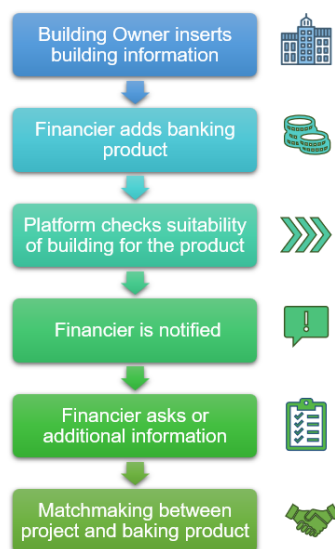


Figure 14: Use Case 9 overview

In line with S18 and S19, Use Case 9 would enable a more specific approach for banks, that would allow them to find projects that fit already existing financing tools/ products that the bank provides. This would also enable them to receive notifications from users, instead of actively looking for clients in the platform, which is more suitable for the usual workflow that banks follow in real life. Such a use case could also help the Building Owners easily access the information on existing financing tools, instead of waiting for a Financier to declare interest in their project. The specific KPIs and information entries for this use case will be defined at a later stage.

4.2. Information Entries

The previous section provides an overview of the use cases through a high-level definition. In this section, specific information entries of the general platform workflow are provided. The information entries are categorised by platform stage and user profile. Furthermore, to boost the user – friendliness of the platform, explanations have been added for the information fields, which have also been classified as mandatory and optional. The information presented in this Section is based only on the fully developed use cases.

4.2.1. Zero Stage

During this stage, preliminary information is provided by all platform users, so that they can register in the platform.

Table 13: Zero Stage: Building Owner information

Information entries	Details	Explanation	Classification
I am a...	dropdown menu: • Building owner • Property Manager • Real Estate Developer • Development Manager • Asset Manager	"Building Owner" refers to the user that inserts the information of a building needing renovation in the platform. Here, you can define your specific user role.	Mandatory

	Other		
Looking for...	Tick the box: - Implementor - Financing	An Implementor = technical expert that can undertake the execution of the renovation. Financing = looking for a financial institution or body that is capable of investing in the renovation project.	Optional

Table 14: Zero Stage: Implementor information

Information entries	Details	Explanation	Classification
I am a...	dropdown menu: - ESCo/ Project developer - Engineering company - Architect and design company - Energy company/ audit/ consultant - Installer - Maintenance company - Other	"Implementor" refers to the user that can provide technical support for buildings needing renovation and can execute the renovation. Here, you can define your specific role.	Mandatory
Looking to...	Tick the box: - Finance your pipeline - Execute projects	Finance your pipeline = means that you have one or more projects underway and you're seeking financing through ENERGATE. Note that the investment should meet a certain threshold (of ...) to be eligible for financing through ENERGATE. Execute projects = you want to use the platform to find projects that need Implementors to undertake them, and possibly find finance for them through the platform.	Optional
Technology Covered	Tick the box(es) See Table 16	-	Mandatory
Years of market experience	Text field Number (years)	-	Mandatory
Years of technical experience	Text field Number (years)	-	Mandatory
Geography Covered	Tick the box(es) - Greece - Italy - Spain - Latvia - France - Austria - Hungary	-	Mandatory

Table 15: List of energy efficiency measures

Categories	Energy efficiency Measures
Building envelope	○ Insulation ▪ Thermal insulation of outer walls and thermal bridges ▪ Thermal insulation of walls ▪ Thermal insulation of floor ▪ Thermal insulation of roof ○ Windows ▪ Replacement of existing windows with energy efficient windows ▪ Installation of low-emissivity glazing or replacement of existing glazing with low-emissivity glazing ○ Doors ▪ Replacement of new doors with energy efficient doors
Lighting	○ Light replacement ▪ Replacement of existing light bulbs with inefficient light sources by new advanced bulbs of better light-technical characteristics and more efficient light sources ▪ Application of manual dimmers ○ Control/ automation ▪ Application of light management systems, with the integrated ability to adjust to daylight (daylight sensor integrated) ▪ Application of presence detectors
Automation	○ Supervision/ management/ control ▪ Energy Management System (meters, network) ▪ Installation of monitoring and visualisation systems for energy and water consumption ▪ Installation of supervision, management and control systems for individual control ▪ Installation of systems for supervision, management and regulation of peak loads
HVAC	○ Heating systems ▪ Installation of thermostatic radiator valves ▪ Installation of electronic wireless thermo-regulation radiator valves with controllers or programmable thermostatic heads ▪ Installation of manual balance or overflow valve ▪ Thermal insulation of uninsulated pipes and valves ○ Domestic hot water (DHW) ▪ Installation of equipment for water heating ▪ Replacement of equipment for water heating ▪ Installation of flow regulators ▪ Installation of DHW storage ▪ Utilization of waste hot water energy ○ Cooling systems ▪ Installation of air conditioning systems ▪ Replacement of existing equipment with devices with higher efficiency ▪ Installation of systems with higher efficiency (air-conditioning chambers) ▪ Night cooling ○ Ventilation ▪ Regulation of the system operation according to the required number of air exchanges ▪ Installation of recovery ventilation ○ Regulation systems ▪ Installation of regulation systems depending on outdoor temperature ▪ Installation of regulation systems depending on indoor temperature (thermostat)
Renewable systems	○ Application of heat pump systems ▪ Low temperature heating system • Water/water • Ground sources – horizontal loops • Ground sources – vertical loops • Air/water • Air/air ▪ High temperature cooling systems • Water/water

Categories	Energy efficiency Measures
	• Ground sources – horizontal loops • Ground sources – vertical loops • Air/water ○ Biomass ▪ Utilization of agricultural biomass in heating plants ▪ Utilization of forest biomass in heating plants ○ Photovoltaic collectors ▪ Installation of photovoltaic collectors ○ Microwind generation ▪ Installation of microwind generation system

Table 16: Zero Stage: Financier information

Information entries	Details	Explanation	Classification
I am a...	dropdown menu: • Private Financing Body • Public Financing Body • Fund Manager • Investment Consultant • Private Investor • Other	"Financier" refers to the user that will use the platform to find energy efficiency projects to finance. Here, you can define your specific user role.	Mandatory
Looking to...	Tick the box: • Finance Energy Efficiency Projects	-	Optional

Table 17: Zero Stage: Public Body information

Information entries	Details	Explanation	Classification
I am a...	dropdown menu: • Municipality • City • Region • Commune • Other	"Public Body" refers to the user that inserts the information of a public building needing renovation in the platform. Here, you can define your specific user role.	Mandatory
Looking for...	Tick the box: • Implementors • Financing	An Implementor = technical expert that can undertake the execution of the renovation. Financing = looking for a financial institution or body that is capable of investing in the renovation project.	Optional

Table 18: Zero Stage: Information for all users

Information entries	Details	Classification
First name	Text field	Mandatory
Last name	Text field	Mandatory
Username	Text field	Mandatory

Email address	Text field	Mandatory
Password	Text field	Mandatory
Repeat password	Text field	Mandatory
Organisation name	Text field	Mandatory
Organisation address	Text field	Mandatory
Country	Text field	Mandatory
Corporate registration number	Text field	Optional
VAT number	Text field	Mandatory
Position in organisation	Text field	Mandatory

1

Choose your preferences

2

Basic Account Info

I am a...

User Role

Municipality
City
Region
Public Procurement Body
Commune
Other

Looking for:

☐ Implementors
☐ Financing

NEXT

Figure 15: Zero Stage user interface



2

Choose your preferences
Basic Account Info

First Name *

Last Name *

Username *

Email Address *

Password *

Repeat Password *

☐ I accept the [Terms and Conditions](#) *

Organisation Name

Organisation Address

Country

Corporate Registration Number

VAT Number

Position In Organisation

BACK

NEXT

Figure 16: Zero Stage user interface

4.2.2. Fetch Stage

During this stage, the users add the Building information (Building Owner for UC1 and UC4, Implementor for UC2 and UC3, Public Body for UC5, UC6 and UC7).

Table 19: Building profile (private buildings)

Information entries	Details	Explanation	Classification
BUILDING DETAILS			
Building name	Text field	Add a name for your building. The name will be visible to users that match with it.	Mandatory
Building description	Text field	Add a brief description of your building. Click on the field to see an example.	Mandatory
Country	Dropdown menu - Greece - Italy - Spain - France - Austria - Latvia - Hungary	-	Mandatory
Province/region	Text field	-	Mandatory

Information entries	Details	Explanation	Classification
Climate zone	Text field	The climate zone depends on the location of the building.	Optional
I am the...	Tick the box • Owner • Renter	-	Mandatory
BUILDING TYPOLOGY			
Building type	Dropdown menu • Commercial building • Industrial building • Factory/manufacturing • Office space • Residential • Shared space • Accommodation/hotel/spa resort • Education facility • Healthcare facility • Sport facility • Other	Select the building typology that better describes your building.	Mandatory
TECHNICAL INFO			
Past interventions	Tick the box(es) See Table 15	Click on any measures that you have implemented in the past so that the Implementor can understand what your building might need.	Optional
Year of construction	Text field Number	-	Mandatory
Building size	Text field Number in m ²	-	Mandatory
Number of levels	Text field Number	-	Mandatory
Days of usage	Text field Number	Add the average days of usage per year.	Mandatory
Hours of usage	Text field Number	Add the average hours of usage per year.	Mandatory
Occupancy level	Text field Number	The occupancy rate is the ratio of used or rented space to the total amount of available space.	Mandatory
Current EPC level	Dropdown menu • A • B • C • D • E • F • G	EPC = Energy Performance Certificate, which is indicative of the current energy performance of your building.	Mandatory
Energy Performance Certificate	Upload		Optional

Information entries	Details	Explanation	Classification
ENERGY EFFICIENCY STATUS			
Type of heating (year installed – model)	Text field	Insert the type of heating system and the year it was installed	Mandatory
Type of cooling (year installed – model)	Text field	Insert the type of cooling system and the year it was installed	Mandatory
Electricity consumption	Text field Number in kWh/year	-	Mandatory
Heating consumption	Text field Number in kWh/year	-	Mandatory
Cooling consumption	Text field Number in kWh/year	Cooling consumption is often included in electricity.	Mandatory
PROJECT FINANCING			
Type of financing	Dropdown menu - No finance needed - Financed solution	No finance needed = You have your own financial resources to cover the costs of the project. You do not need a Financier. Financed solution: See Table 20.	Mandatory
ENERGY EFFICIENCY MEASURES PREFERRED			
See Table 15.			

Table 20: Financing options

Information entries	Explanation
As a Service	Business model where services are provided on a subscription or pay-per-use basis.
Energy Performance Contract (EPC)	Agreement where an energy service company implements energy-saving measures in client facilities, recouping the investments through savings.
On-Bill	A financing mechanism where energy efficiency upgrades or renewable energy projects are funded by a utility or energy provider, with repayment made through the customer's utility bill based on energy savings.
Bank Loan	Borrowed funds from a financial institution, typically repaid with interest over time, used for various purposes such as business investments, personal expenses, or project financing.
Operating Lease	Lease where the lessee uses an asset for a period, with the lessor retaining ownership and responsibility for maintenance.
Applying for subsidies	A subsidy in financing refers to financial assistance or support provided by the government, organisations, or institutions to help reduce the cost of goods, services, or projects. This assistance can take various forms, such as direct cash payments, tax reductions, low-interest loans, or grants, and is often aimed at encouraging certain activities, investments, or sectors that serve public or economic interests.

At this stage, the Building Owner will select the energy efficiency measures preferred.

If the building was added by an Implementor (UC2 and UC3), then the Fetch Stage has been completed and the workflow moves on to the Process Stage.

If the building was added by a Building Owner (UC1 and UC4), the Building Owner will wait for an Implementor to make an initial offer. The initial offer contains the information presented in Table 21.

Table 21: Initial offer

Information entries	Details	Explanation	Classification
Offer for a walkthrough	Text field	Click on the field to see an example.	Mandatory
Other details	Text field	Click on the field to see an example.	Optional
Similar projects in your portfolio	Upload	Describe the type of building, the renovation measures, the energy savings achieved and the return on investment.	Mandatory
Technology/ type of measure	Dropdown menu See Table 15	-	Mandatory

If the initial offer is rejected by the Building Owner, the building will be able to continue to receive initial offers. If it is accepted, the workflow moves on to Process Stage (UC1, UC4).

Table 22: Building profile (public buildings)

Information entries	Details	Explanation	Classification
BUILDING DETAILS			
Building name	Text field	Add a name for your building. The name will be visible to users that match with it.	Mandatory
Building description	Text field	Add a brief description of your building. Click on the field to see an example.	Mandatory
Project link	Text field	Add the link to your project so that users can access more information about it.	Mandatory
Country	Dropdown menu - Greece - Italy - Spain - France - Austria - Latvia - Hungary	-	Mandatory
Province/region	Text field	-	Mandatory
Climate zone	Text field	The climate zone depends on the location of the building.	Optional
BUILDING TYPOLOGY			
Building type	Dropdown menu Municipal building	Select the building typology that better describes your building.	Mandatory

Information entries	Details	Explanation	Classification
	- Office space - Social housing - Shared space - Education facility - Healthcare facility - Sports facility - Other		
TECHNICAL INFO			
Past interventions	Tick the box(es) See Table 15	Click on any measures that you have implemented in the past so that the Implementor can understand what your building might need.	Optional
Year of construction	Text field Number	-	Mandatory
Building size	Text field Number in m ²	-	Mandatory
Number of levels	Text field Number	-	Mandatory
Days of usage	Text field Number	Add the average days of usage per year.	Mandatory
Hours of usage	Text field Number	Add the average hours of usage per year.	Mandatory
Occupancy level	Text field Number	The occupancy rate is the ratio of used or rented space to the total amount of available space.	Mandatory
Current EPC level	Dropdown menu - A - B - C - D - E - F - G	EPC = Energy Performance Certificate, which is indicative of the current energy performance of your building.	Mandatory
Energy Performance Certificate	Upload		Optional
ENERGY EFFICIENCY STATUS			
Type of heating (year installed – model)	Text field	Insert the type of heating system and the year it was installed	Mandatory
Type of cooling (year installed – model)	Text field	Insert the type of cooling system and the year it was installed	Mandatory
Electricity consumption	Text field Number in kWh/year	-	Mandatory
Heating consumption	Text field Number in kWh/year	-	Mandatory
Cooling consumption	Text field Number in kWh/year	Cooling consumption is often included in electricity.	Mandatory
PROJECT FINANCING			

Information entries	Details	Explanation	Classification
Type of financing	Dropdown menu - No finance needed - Need financing - EU funding	No finance needed = You have your own financial resources to cover the costs of the project. <u>You do not need a Financier.</u>	Mandatory
		EU funding: See Table 23.	
PREFERRED MEASURES			
See Table 15.			

Table 23: EU Funding options

EU Funding
European Regional Development Fund (ERDF) ³
European Social Fund Plus (ESF+) ⁴
European Agricultural Fund for Rural Development (EAFRD) ⁵
Public sector Loan Facility under Just Transition Fund (PSLF) ⁶
Connecting Europe Facility (CEF) ⁷
EU renewable energy financing mechanism ⁸
European Energy Efficiency Fund (EEEF) ⁹
European Local ENergy Assistance (ELENA) ¹⁰
Recovery and Resilience Facility (RRF) ¹¹
Cohesion Fund (CF) ¹²

³ https://commission.europa.eu/funding-tenders/find-funding/eu-funding-programmes/european-regional-development-fund-erdf_en

⁴ <https://www.fi-compass.eu/funds/esfplus>

⁵ https://commission.europa.eu/funding-tenders/find-funding/eu-funding-programmes/european-agricultural-fund-rural-development-eafrd_en

⁶ <https://eur-lex.europa.eu/eli/reg/2021/1056/oj>

⁷ https://cinea.ec.europa.eu/programmes/connecting-europe-facility_en

⁸ https://cinea.ec.europa.eu/programmes/renewable-energy-financing-mechanism_en

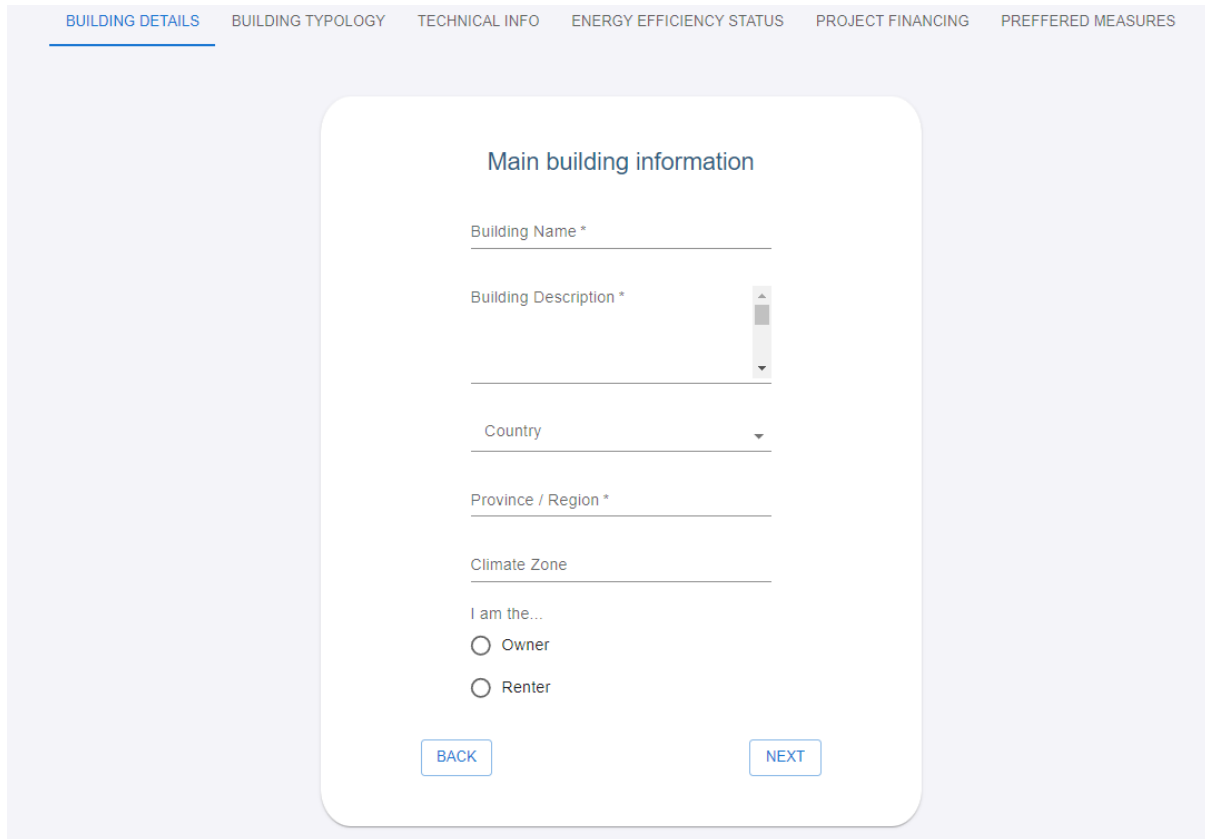
⁹ <https://www.eeef.lu/home.html>

¹⁰ <https://www.eib.org/en/products/advisory-services/elena/index.htm>

¹¹ https://commission.europa.eu/business-economy-euro/economic-recovery/recovery-and-resilience-facility_en

¹² <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32021D1130>

After the addition of the public building in the platform, the Implementors and Financiers in the platform can access the information (UC6 and UC7).



BUILDING DETAILS BUILDING TYPOLOGY TECHNICAL INFO ENERGY EFFICIENCY STATUS PROJECT FINANCING PREFERRED MEASURES

Main building information

Building Name *

Building Description *

Country

Province / Region *

Climate Zone

I am the...

☐ Owner

☐ Renter

[BACK](#) [NEXT](#)

Figure 17: Fetch Stage user interface: building information

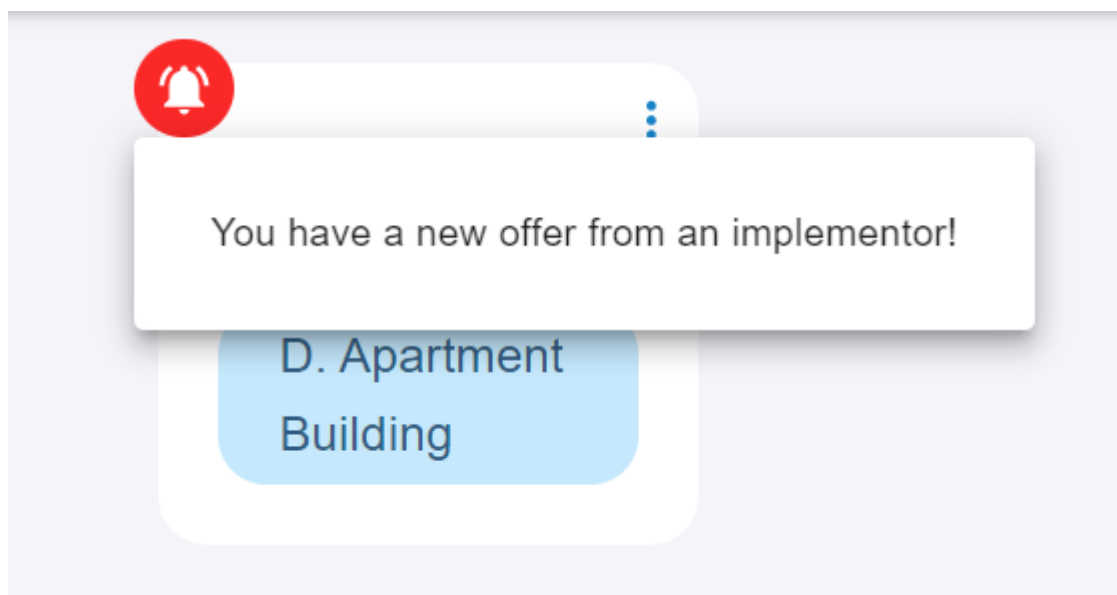


Figure 18: Fetch Stage user interface: notification

INITIAL OFFER

FINAL OFFER

Initial Offer

Company Name

im_test

Email

im_test@mail.com

Company Address

im_test

Country

im_test

Technology / Type of measure interest

Building Envelope

Insulation

✓ Thermal insulation of outer walls and thermal bridges

✓ Thermal insulation of walls

Renewable Systems

Application of Heat Pump for High Temperature Cooling System

✓ Water/water

✓ Ground sources - horizontal loops

Offer for a walkthrough *

ABC Energy Solutions is pleased to offer a comprehensive Walkthrough Energy Audit to help you identify and capitalize on energy-saving opportunities within your facility. Our expert team will conduct an in-depth inspection of all major energy-consuming systems, including HVAC, lighting, and appliances. This audit includes a review of your historical energy bills and operational practices to establish a baseline for energy consumption. We will

Other details

XYZ Energy Audits, with over 20 years of experience in the industry, specializes in conducting comprehensive energy audits for commercial and industrial facilities. Our team of certified energy auditors uses state-of-the-art technology to analyze your energy consumption patterns and identify inefficiencies. We

GO BACK

Figure 19: Fetch Stage user interface: initial offer

BUILDING DETAILS
BUILDING TYPOLOGY
TECHNICAL INFO
ENERGY EFFICIENCY STATUS
PROJECT FINANCING
PREFERRED MEASURES

Preferred Project Financing

Type of Financing

☒ No Finance Needed
☐ Need Financing

☒ EU Funding

- ☐ European Regional Development Fund (ERDF) ⓘ
- ☐ European Social Fund PLUS (ESF+) ⓘ
- ☐ European Agricultural Fund for Rural Development (EAFRD) ⓘ
- ☐ Public sector Loan Facility under Just Transition Fund (PSLF) ⓘ
- ☐ Connecting Europe Facility (CEF) ⓘ
- ☐ EU renewable energy financing mechanism ⓘ
- ☐ European Energy Efficiency Fund ⓘ
- ☐ European Local Energy Assistance (ELENA) ⓘ
- ☐ Recovery and Resilience Facility (RRF) ⓘ
- ☐ Cohesion Fund (CF) ⓘ

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Figure 20: Fetch Stage user interface: EU funding mechanisms

4.2.3. Process Stage

In the process stage, the Implementor needs to finalise the offer of the building (applicable only for private buildings: UC1, UC2, UC3, UC4). Not all the elements will be available to both the Financiers and the Building Owners (see the last column of Table 24).

Offer finalisation

Table 24: Finalised offer

Information entries	Details	Explanation	Classification	Visible to...
Project details for which finance is needed	Text field	Provide a brief description of the project. Click on the field to see an example.	Optional	Building Owners, Financiers
Pipeline Size	Text field Number (euros)	The pipeline size for energy efficiency projects refers to the total value or number of projects that are planned, under development, or ready for execution. It reflects the market potential and readiness for	Optional	Financiers

Information entries	Details	Explanation	Classification	Visible to...
		investment in energy-saving initiatives.		
Energy savings assessment (per measure category)	Text field Number (kWh/ye ar)	Please provide the annual electricity savings that you estimate will be resulted by the renovation in kWh/year.	Mandatory	Financiers
		Please provide the annual thermal savings that you estimate will be resulted by the renovation in kWh/year.		Financiers
Total energy savings (sum of the inputs above)				Financiers, Building Owners
Estimated CO2 Abatement	Text field Number (tCO2/ye ar)	Calculate the CO2 savings. You may use the official conversion factors that are applicable in the country of the building.	Mandatory	Financiers, Building Owners
Measurement and Verification Protocol	Upload	Upload your measurement and verification protocol	Mandatory	Financiers, Building Owners
Energy Class After implementation	Text field A, B, C etc.	Estimate the new energy class of the building as a result of the measures applied.	Mandatory	Financiers, Building Owners
Reduction in O&M costs (per measure category)	Text field Number (euros)	Add any estimated reduction in costs for the operation and maintenance of the equipment as a result of the measures applied (on a yearly basis).	Mandatory	Financiers
CAPEX (per measure category)	Text field Number (euros)	The capital expenditure required for the implementation of the measures.	Mandatory	Financiers
Investment-Upfront payment needed	Text field Number (euros)	The initial investment or upfront payment required to start the project (covered by end client).	Mandatory	Building Owners
Avoidance Cost (per measure category)	Text field Number (euros/k Wh)	Expresses the average cost of an intervention for each kWh of energy saved.	Mandatory	Financiers
Payback Period (per measure category)	Text field Number (years)	Expresses the number of years required to recover the investment.	Mandatory	Financiers, Building Owners
IRR (per measure category)	Text field Number (percent age %)	The annual rate of growth that an investment is expected to generate. IRR represents the rate at which the net present value of cash flows from an investment equals zero.	Mandatory	Financiers
NPV (per measure category)	Text field Number (euros)	The net present value of the projects, representing the difference between the present value of cash inflows and outflows over the project's lifetime.	Mandatory	Financiers
Access to subsidies	Tick the box Yes	If you have access to subsidies, please enter the percentage of the	Optional	Building Owners, Financiers

Information entries	Details	Explanation	Classification	Visible to...
	No Text field appears if "yes" is clicked.	total investment you plan to cover with your own funds. If no subsidies are available, this field is not required.		
Final offer for the project	Free text field	Add the information related to the final complete financial offer (e.g. total CAPEX and OPEX etc.)	Optional	Building Owners, Financiers
Type of contract proposed	Dropdown menu	See Table 25.	Optional	Building Owners, Financiers
Upload Certificate, Insurance, Construction Permit (optional), Energy Audit etc.	Upload	-	Optional	Financiers
Stage of the project	Dropdown menu - Implementation - Completed - Incipient / design	-	Optional	Financiers
Construction Finance	Dropdown menu - Bridge loan - Own funds - Other	Specify the finance that they have for the construction phase. e.g. to apply for building permits, feasibility study, etc. See Table 26.	Optional	Financiers
Yield	Text field Percentage (%)	Yield refers to the income generated from an investment, expressed in annual percentage rate/or simply percentage.	Optional	Financiers
Contribution by end client	Text field Percentage (%)	Percentage asked from the client in terms of contribution from the overall cost of the project.	Mandatory	Financiers

Table 25: Type of contract proposed

Type of contract options	Description
Power Purchase Agreement	Contract where a power producer sells electricity to a consumer at a fixed price over time.
As a Service	Business model where services are provided on a subscription or pay-per-use basis.
Energy Performance Contract (EPC)	Agreement where an energy service company implements energy-saving measures in a client's facilities, recouping costs through savings.
Operating Lease	Lease where the lessee uses an asset for a period, with the lessor retaining ownership and responsibility for maintenance.

Table 26: Construction finance

Construction Financing options	Description
Bridge Loan	Short-term financing used to bridge the gap between the purchase of a new property and the sale of an existing one, or to cover costs during the construction phase of a project.
Own Funds	Funds provided by the project owner or developer, typically from their own resources or investments, to finance construction or development without external borrowing.

Calculations of financial indicators

As a verification mechanism for the users of the ENERGATE platform, the platform calculates the financial indicators of the finalised offer. The “Economic Indicators” feature provides preliminary insights into a project's financial outcomes. The values calculated include the Internal Rate of Return (IRR), Net Present Value (NPV), Avoidance Cost, Payback Time, Cost Savings, Total Energy Savings, Total CO₂ Savings and the total CAPEX. These indicators are based on data from the “Finalised Offer” tab and are designed to offer an initial estimate of what users might expect from their projects (Table 27).

Table 27: Information entries enabling the calculation of economic indicators

Metrics	Measurement units
Energy price (electricity)	Euros/kWh
Energy price (thermal)	Euros/kWh
Inflation rate	%
Discount rate	%
Emission factor (electricity)	tCO ₂ /MWh
Emission factor (thermal)	tCO ₂ /MWh

While not exhaustive, these calculations provide valuable insights into the potential economic benefits and risks associated with the project, helping to guide decision-making during the early stages of assessment. This feature supports Implementors in evaluating project viability and making informed decisions.

BUILDING INFORMATION INITIAL OFFER FINAL OFFER <u>ECONOMIC INDICATORS</u> TERM SHEET					
Explore the economic performance of energy efficiency measures across various building systems. Compare metrics such as cost savings, IRR, payback time, and CO2 reductions, along with total CAPEX and energy savings, to evaluate the impact of these initiatives.					
Energy Efficiency measures	Cost savings (€)	Internal Rate of Return	Payback Time (Years)	Net Present Value	Avoidance Cost
Building Envelope	9000	13.675%	8.6	55796.8960	9.0000
	1000				
Lighting	0	0.000%	0.0	0.0000	0.0000
Heating, Ventilation, Air Conditioning Heat Pumps, Automation etc	0	0.000%	0.0	0.0000	0.0000
	0				
Photovoltaics	0	0.000%	0.0	0.0000	0.0000
Total energy savings		CO2 savings		Total CAPEX	
200		200		90000	

Figure 21: Process Stage user interface: Economic Indicators

The values that are being displayed at Figure 21 are calculated through the platform's backend. Internal Rate of Return (IRR), Net Present Value (NPV), Avoidance Cost, Payback Time, Cost Savings are divided into four categories depending on the category on the energy efficiency measures chosen by the Implementor for the specific building when preparing the finalised offer. These four categories are:

- Building Envelope
- Lighting
- Heating, Ventilation and Cooling (HVAC) etc
- Renewable systems

These four categories have different project lifetimes depending on which category of measures the Implementor has chosen. The project lifetimes assumed to enable the calculations are presented in Table 28.

Table 28: Project lifetime of energy efficiency measure categories

EE measure categories	Project lifetime
Building envelope	25 years
Lighting	7 years
HVAC/ heat pumps/ automation etc.	15 years
PV	25 years

The format of the results is shown in Table 29 and Figure 21.

Table 29: Economic indicators: presentation of results

Energy Efficiency measures	Cost Savings(€)	Internal Rate of Return (%)	Payback time (years)	Net Present Value (€)	Avoidance Cost (€/kWh)
Building Envelope	Electricity cost savings (€)	IRR (Building envelope)	PBT (Building envelope)	NPV (Building envelope)	Avoidance Cost (Building envelope)
	Thermal cost savings (€)				
Lighting	Electricity cost savings (€)	IRR (lighting)	PBT (lighting)	NPV (lighting)	Avoidance cost (lighting)
HVAC/heat pumps/ automation etc	Electricity cost savings (€)	IRR (HVAC, heat pumps, automation)	PBT (HVAC, heat pumps, automation)	NPV (HVAC, heat pumps, automation)	Avoidance cost (HVAC, heat pumps, automation)
	Thermal cost savings (€)				
Photovoltaics	Electricity cost savings (€)	IRR (PV)	PBT (PV)	NPV (PV)	Avoidance cost (PV)
Total energy savings (kWh)		Total CO₂ Savings (tCO₂/kWh)		Total CAPEX (€)	
Total energy savings		Total CO ₂ Savings		Total CAPEX	

Those values are being calculated at the platform's backend based on the following equations.

- **Cost Savings (€):** Cost savings are calculated by multiplying the electricity or thermal savings provided by the implementor with the respective energy price. This value, in euros, shows the financial benefit from reduced energy use. Cost Savings for each category of measures is being calculated based on the following equations:

$$\text{Cost savings (electricity)} = \text{Electricity savings} * \text{Energy Price (electricity)}$$

$$\text{Cost savings (thermal)} = \text{Thermal savings} * \text{Energy Price (thermal)}$$

- **Internal Rate of Return (IRR) (%):** IRR represents the rate at which the project breaks even, indicating the efficiency of the investment. It's the discount rate that makes the net present value (NPV) of cash flows equal to zero, providing insight into the project's profitability. IRR for each category of measures is being calculated based on the following equations:

$$NPV = 0 \rightarrow$$

$$-CAPEX + \sum_{i=1}^{\text{project lifetime}} \frac{\text{Net cash flow}_i}{(1 + IRR)^i} = 0$$

- **Payback Time (years):** Payback time is the period required to recover the initial investment from the project's cash savings. It indicates how quickly the project will start generating net positive returns. Payback time for each category of measures is being calculated based on the following equations:

$$PBT \text{ Building Envelope} = \frac{CAPEX \text{ building env.}}{Cost \text{ savings building env.} + O\&M \text{ reduction building env.}}$$

$$PBT \text{ lighting} = \frac{CAPEX \text{ lighting}}{Cost \text{ savings lighting} + O\&M \text{ reduction lighting}}$$

$$PBT \text{ HVAC etc.} = \frac{CAPEX \text{ HVAC etc.}}{Cost \text{ savings HVAC etc.} + O\&M \text{ reduction HVAC etc.}}$$

$$PBT \text{ PV} = \frac{CAPEX \text{ PV}}{Cost \text{ savings PV} + O\&M \text{ reduction PV}}$$

- **Net Present Value (NPV) (€):** Net Present Value represents the difference between the present value of cash inflows and outflows over time. A positive NPV indicates that the project is expected to generate more value than it costs, signifying profitability. NPV is being calculated for each category of measures based on the following equations:

$$NPV = \sum_{i=0}^{\text{project lifetime}} \text{Discounted cash flow}_i$$

$$\text{Discounted cash flow}_0 = -CAPEX$$

$$\text{Discounted cash flow}_i = \frac{\text{Net cash flow}_i}{(1 + \text{Discount Rate})^i} \quad i \geq 1, 1 \leq i \leq \text{project lifetime}$$

$$\text{Net cash flow}_1 = \text{Cost savings}_1 + O\&M \text{ reduction}_1$$

$$\text{Net cash flow}_i = \text{Net cash flow}_{i-1} \cdot (1 + \text{inflation rate}) \quad i \geq 2$$

- **Avoidance cost (€/kWh):** Avoidance cost refers to the expenses avoided by implementing energy-saving measures or efficiency improvements. It quantifies the cost of mitigating or avoiding higher future expenses, such as energy consumption or maintenance. Avoidance cost for each category of measures is being calculated based on the following equations:

$$\text{Avoidance cost building envelope} = \frac{\text{building envelope CAPEX}}{\text{Total energy savings (building envelope)}}$$

$$\text{Avoidance cost lighting} = \frac{\text{lighting CAPEX}}{\text{Total energy savings (lighting)}}$$

$$\text{Avoidance cost HVAC etc} = \frac{\text{HVAC etc CAPEX}}{\text{Total energy savings (HVAC etc)}}$$

$$\text{Avoidance cost photovoltaics} = \frac{\text{photovoltaics CAPEX}}{\text{Total energy savings (photovoltaics)}}$$

- **Total energy savings (kWh):** Total energy savings expresses the summary of energy savings from each category of energy efficiency measures.

$$\text{energy savings building env.} = \text{electricity energy savings} + \text{thermal energy savings}$$

$$\text{energy savings lighting} = \text{electricity energy savings}$$

$$\text{energy savings HVAC etc} = \text{electricity energy savings} + \text{thermal energy savings}$$

$$\text{energy savings photovoltaics} = \text{electricity energy savings}$$

$$\text{Total energy savings} = \oplus \left\{ \begin{array}{l} \text{energy savings building envelope} \\ \text{energy savings lighting} \\ \text{energy savings HVAC etc} \\ \text{energy savings photovoltaics} \end{array} \right.$$

- **Total CO₂ Savings (tCO₂/kWh):** Total CO₂ savings represent the reduction in carbon dioxide emissions achieved through the project. It quantifies the environmental benefit by measuring how much CO₂ is avoided due to energy efficiency or renewable energy measures. The CO₂ savings are being calculated based on the following equations:

$$\text{CO}_2 \text{ savings} = \text{emission factor (electricity)} * \text{total electricity savings} \\ + \text{emission factor (thermal)} * \text{total thermal savings}$$

$$\text{Total electricity savings} = \oplus \left\{ \begin{array}{l} \text{electricity savings building envelope} \\ \text{electricity savings lighting} \\ \text{electricity savings HVAC etc} \\ \text{electricity savings photovoltaics} \end{array} \right.$$

$$\text{Total thermal savings} = \oplus \left\{ \begin{array}{l} \text{thermal savings building envelope} \\ \text{thermal savings HVAC etc} \end{array} \right.$$

- **Total Capex (€):** Total CAPEX represents the total investment required for purchasing, installing, and commissioning assets or equipment for the project. It includes all upfront costs needed to get the project operational and it is being calculated based on the following equation:

$$\text{Total Capex} = \text{Capex for building envelope} + \text{Capex for lighting} \\ + \text{Capex for HVAC etc.} + \text{Capex for PV}$$

Aggregation and matchmaking process

When the Implementor has completed several offers, hs/she can proceed to aggregate buildings in order to create an attractive investment package for the Financiers in the platform.

The platform can group the buildings according to the filters shown in Table 30.

Table 30: Aggregation information entries

Aggregation process filters
Same Building Owner
Same country
Same energy efficiency measures
Same building typology

Same type of finance

These filters allow the Implementor to detect similarities between the projects and this helps him/her with the decision-making process of creating a cluster.

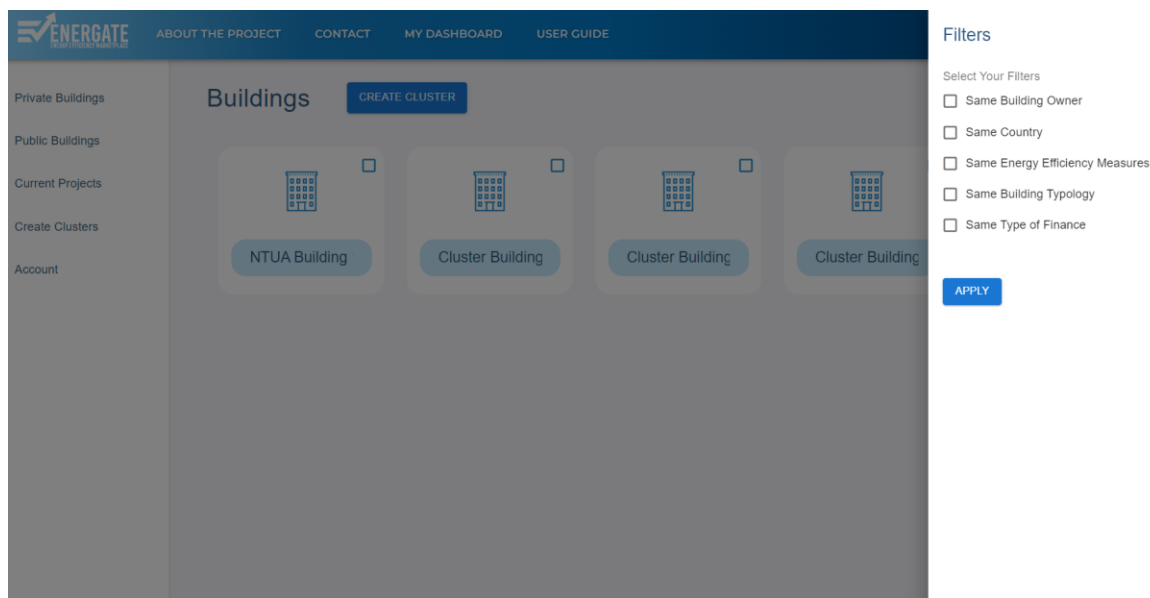


Figure 22: Process Stage user interface: aggregation

At this stage, the Implementor has fully defined the energy efficiency project and it will now appear to the Financier.

Table 31: Matchmaking information entries

Matchmaking filter	Input
Country	Tick the boxes • Greece • Italy • Spain • France • Austria • Latvia • Hungary
Financing type	Tick the boxes • As a service • Energy Performance Contract • Operating lease • Power Purchase Agreement • Other
Building Typology	Tick the boxes • Commercial Building • Municipal Building • Industrial Building • Factory / Manufacturing • Office Space • Residential

Matchmaking filter	Input
	• Shared Space • Accommodation / Hotel Spa Resort • Education Facility • Healthcare Facility • Sport Facility • Other
Energy efficiency measures	Tick the boxes • Building envelope • Lighting • Automation • HVAC • Renewable systems
Minimum IRR	Text field Percentage (%)
Max payback time	Text field Number (years)
Minimum project size	Text field Number (euros)
Maximum investment	Text field Percentage (%)
Investment along subsidies	Tick the box • Yes • No

Another service provided to the Financier is the prioritisation of projects based on the filters in Figure 23.

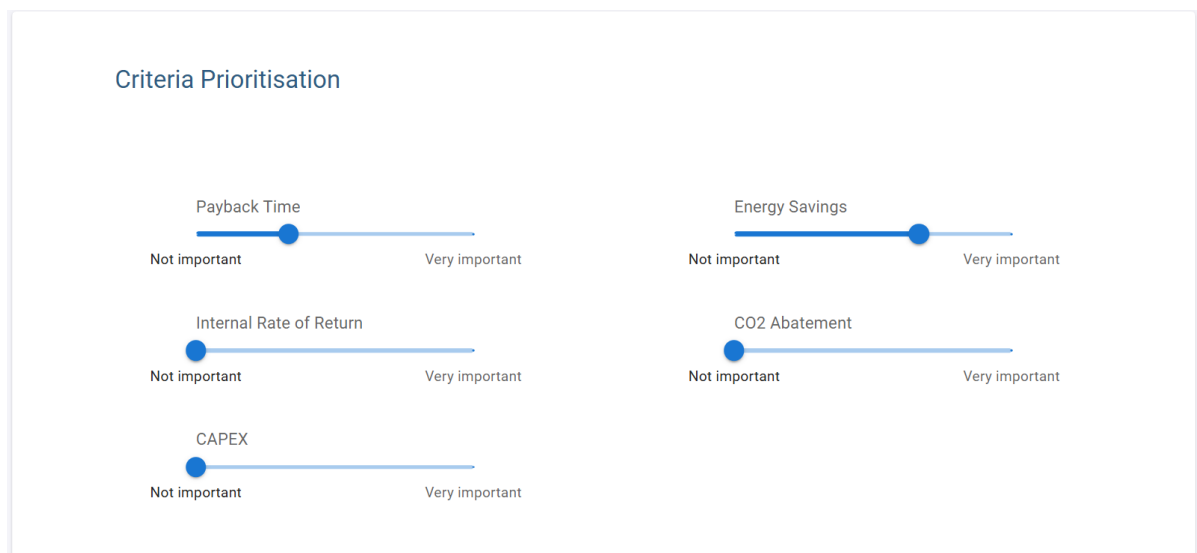


Figure 23: Process Stage user interface: prioritisation filters

When a Financier selects a project, he/she will be able to upload a term sheet, and the Implementor will be notified.

4.2.4. Deliver Stage

The Deliver Stage has not been fully defined yet. Various synergies are being explored to enable advanced visualisation and M&V techniques, while the established cooperation between the ENERGATE project and [MATRYCS project](#) will be exploited in this stage.

Furthermore, this stage will incorporate non – energy benefits. A preliminary overview of the information entries at this stage, per user type, is provided in. More details will be presented in the next and final version of the present report.

Table 32: Deliver Stage information entries

User Type	Input
Building Owner	Reports on savings and EPC level
Implementor	Reports on: • Energy savings • CO₂ abatement • M&V used • Projects successfully financed by X amount • Project status
Financier	Invested amount since they became a member

4.3. User performance system

As an additional incentive for users in the ENERGATE platform, as well as a means of ensuring increased success rates of projects, quality and efficacy, users' profiles in the ENERGATE platform will allow a user performance feature (previously called user rating/ranking system). The scope of the user performance system is to incentivise the users to be active in the platform and possibly to ensure that they will not try to manipulate the algorithms by providing unrealistic metrics (e.g. overestimating energy savings so that more matches can be achieved). The user performance feature aims to ensure that the users are active and provide realistic metrics, anticipated to have an effect in increasing trust, preventing abuse of the platform, as well as to introduce a gamification logic in deal making.

The user performance feature will be divided into two stages: before the implementation of the energy efficiency project and after the implementation of the project. The current definition of the user performance regards the first stage and the three user profiles: Building Owner, Implementor, Financier. The related information entries are described in the following tables:

Table 33: User performance feature: Building Owner

Metric	Explanation	Output
Number of buildings	The Building Owner will receive badges depending on the number of buildings they have inserted into the platform.	3 types of badges depending on the amount of buildings: 5, 10, 20+
New building	Each time a Building Owner adds a new building, it will update the ranking of the Building Owner compared to other Building Owners in the platform, with respect to the total number of buildings inserted	1 type of badge depending on the top 5%, top 10% or top 20%

Potential Implementors	When a Building Owner adds a building in the platform, he/she waits to receive an offer by an Implementor. In the meantime, it would be encouraging to know if there are Implementors in the platform that might match with the building.	Notification displayed once a building matches with Implementors preferences. Demonstration of total number of Implementors that are a potential match.
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Table 34: User performance feature: Implementor

Metric	Explanation	Output
Number of offers	The Implementor will receive badges depending on the number of offers they have created in the platform.	3 types of badges depending on the amount of offers: 5, 10, 20+
Cost effective offer	The Implementor that will add the most cost-effective offer in a specific category of measures will receive an award as a positive output. The cost – effectiveness is measured through the maximisation of energy savings and minimisation of CAPEX.	Notification: “You have the most cost – effective offer in the platform for ...” • Building Envelope • Lighting • Heating, Ventilation and Cooling (HVAC) etc • Renewable systems
Rate of acceptance of offers	This field helps Implementors understand the success rate of the matchmaking between them and Building Owners.	Notification every time an offer is accepted: “Your acceptance rate is ...%”

Table 35: User performance feature: Financier

Metric	Explanation	Output
Rate of acceptance of term sheets	This field helps Financiers understand the success rate of the matchmaking between them and the projects.	Notification every time a term sheet is accepted: “Your acceptance rate is ...%”
Number of clusters	This field aims to incentivise Financiers to invest in clusters of buildings.	Notification every time a match with a cluster is achieved: “You have provided term sheets with ... clusters”
Geography covered	This field aims to incentivise Financiers to invest in multiple countries.	Notification: “Congratulations! Your term sheets have been accepted in ... countries”

The approach followed for the first stage of the user performance feature described above relies on achievements that are expected to encourage the users to keep using the platform and act as a gamification incentive.

For the second stage of the user performance feature, a quantitative approach, such as an overall score, could be adopted. This could be based on objective criteria, such as success rates. Another option would be calculating the score based on the interaction of the users with the platform, using SQL queries to extract metrics and statistics. This could result in outputs to the user such as “you are in the TOP 3 Financiers of the platform”.

In any case, due care should be taken in the application of metrics and user scores to profiles where such practice may appear disadvantageous, for instance, in the case of small private property owners, socially sensitive renovation plans, etc. It should also be clear that the user performance system reflects the activity of the user solely in the platform. It does not reflect the quality/ abilities/ experience etc. of the professional. To mitigate the risk of reputation/ liability issues arising as a result of the outputs of the user performance feature, the scope and

the functionality of the feature will be clearly explained in the user terms and conditions of the platform, emphasising the fact that the feature is based solely on the activity of the user in ENERGATE. Furthermore, the results will not be publicly available, instead, each user will be able to see their own score and achievements, unless they choose to share that information with other users.

4.4. Risk assessment protocol

The scope of the risk assessment protocol of ENERGATE is to help Implementors estimate the risk of their energy efficiency projects, so as to take appropriate action to mitigate risks and increase chances of finding finance. The risk assessment protocol has been based on previous experience of the consortium through the [Triple-A](#) and [LAUNCH H2020](#) projects. The information entries considered to assess the risk of the energy efficiency projects are the following:

INTERNAL RISKS

- **Credit risk:** Credit worthiness indicates the financial capacity of the borrower to pay off his debt and is a critical factor from the perspective of a financial institution or bank. For instance, bankers evaluate the physical person's or company's creditworthiness by collecting indicative data regarding their financial position. Various aspects are considered such as = income, debt to income ratio, company's revenue, debt to equity, etc.
- **Technical risk (complexity of technology):** The technical complexity is related to the complexity of the energy efficiency measures implemented from a technological point of view. It affects chances for successful project implementation by increasing the possibility that expected energy savings are not achieved.
- **Performance risk (low quality of savings assessment/rebound effect):** The low quality of initial savings assessment is associated with the capacity to accurately predict the expected energy savings and define the baseline energy consumption properly. Different practices used to estimate energy savings are using computational tools and simulation models from certified experts, empirical approaches and processes and results from other similar projects. Defining the baseline of energy consumption is crucial for the better prediction of the project's energy savings, as well as for the measurement and verification of the energy savings during the project's lifetime. The rebound effect describes a specific behavioural bias. It affects the end-user and mainly emerges when the implementation of an energy efficiency investment leads to lower costs for energy services, which invokes an increase in the demand for such services, thus resulting in higher final energy consumption than anticipated. This may lead to energy savings being significantly lower than planned.
- **O&M risk:** Inadequate Operation & Maintenance (O&M) represents the uncertainty regarding the proper operation and maintenance of equipment. O&M is considered a crucial factor in the achievement of expected energy savings. Monitoring the operation of the equipment is very important and can be conducted through on-site audits and measurements during the preliminary and regular operation of the equipment.
- **Low-quality equipment/ poor project design:** The implementation of low-quality equipment or poor project design refers to the equipment and design characteristics of the examined project. According to the quality of the equipment and the design, a level of risk

can be defined. A leading source of risk is that the equipment could fail to perform at an initially specified level. On the other hand, the risk of poor project design could even lead to the underperformance of high-quality equipment. Such failures could result from a lack of competence and expertise of the party responsible for the implementation of the project or even from the unclear assignment of tasks in case several parties are involved.

- **Pipeline risk:** Pipeline Risk denotes a specific type of price risk that may occur in the process of financial product origination, where the terms of the contract may have been agreed but the client still has the option not to close the transaction.
- **Prepayment risk:** Prepayment risk is the risk related to potential premature return of the original amount of money borrowed or invested on a fixed-income security. The prepayment risk is highest for fixed-income securities, such as callable bonds and mortgage-backed securities (MBS). Bonds with prepayment risk often have prepayment penalties.
- **Management risk:** Management risk is the risk, financial, ethical, or otherwise associated with ineffective, destructive, or underperforming management. Management risk can be a factor for investors holding stock in a company. Management risk can also refer to the risks associated with the management of an investment fund.
- **Occupancy Risk:** Occupancy risk refers to the uncertainty and potential variability in the usage patterns and behaviours of the occupants of a building, which can impact the expected energy savings from those investments.
- **ESG risk:** ESG risks are those arising from Environmental, Social and Governance factors that a company must address and manage. These risks are a combination of threats and opportunities that can have a significant impact on an organisation's reputation and financial performance. In the case of environmental risks, companies that do not comply with environmental regulations can face significant legal sanctions. In terms of social risks, poor management can damage a company's image and affect its relationship with customers and employees. Governance risks, if mismanaged, can lead to scandals that can seriously damage a company's reputation and finances.

EXTERNAL RISKS

- **Regulatory risk:** Regulatory risk is the risk that a change in regulations or legislation will affect the energy efficiency project. Companies must abide by regulations set by governing bodies that oversee their industry. Therefore, any change in regulations can cause a rippling effect across an industry.
- **Market risk (economic environment/ tax volatility):** The weak economic environment is related to poor economic conditions in the country that the energy efficiency investment takes place. It is connected to, among other indicators, interest rates, inflation, availability of finance. A weak economic environment can negatively influence the investment in many ways, affecting the investment's profitability through inflation or KPIs through interest rates.
- **Risk of energy prices:** Energy prices volatility is related to the uncertainty of energy prices and influences the decision to undertake an energy efficiency investment, leading to uncertainty about monetary savings and returns.

- **Currency risk:** Currency risk is commonly referred to as exchange-rate risk. It arises from the change in price of one currency in relation to another. Investors or companies that have assets or business operations across national borders are exposed to currency risk that may create unpredictable profits and losses.

The risks are divided as “internal”, meaning that they are project specific and are influenced by the organisations involved and the specific activities within the project, and “external” meaning that they depend on the environment of the country in terms of economic, legal and political circumstances.

To be able to assess the risk of a project, it needs to be considered that not all of the afore mentioned risk factors have the same influence and importance in the final risk assessment. Therefore, it is necessary to calculate the weights of these risk factors.

To achieve this, the methodology shown in Figure 24 was followed:

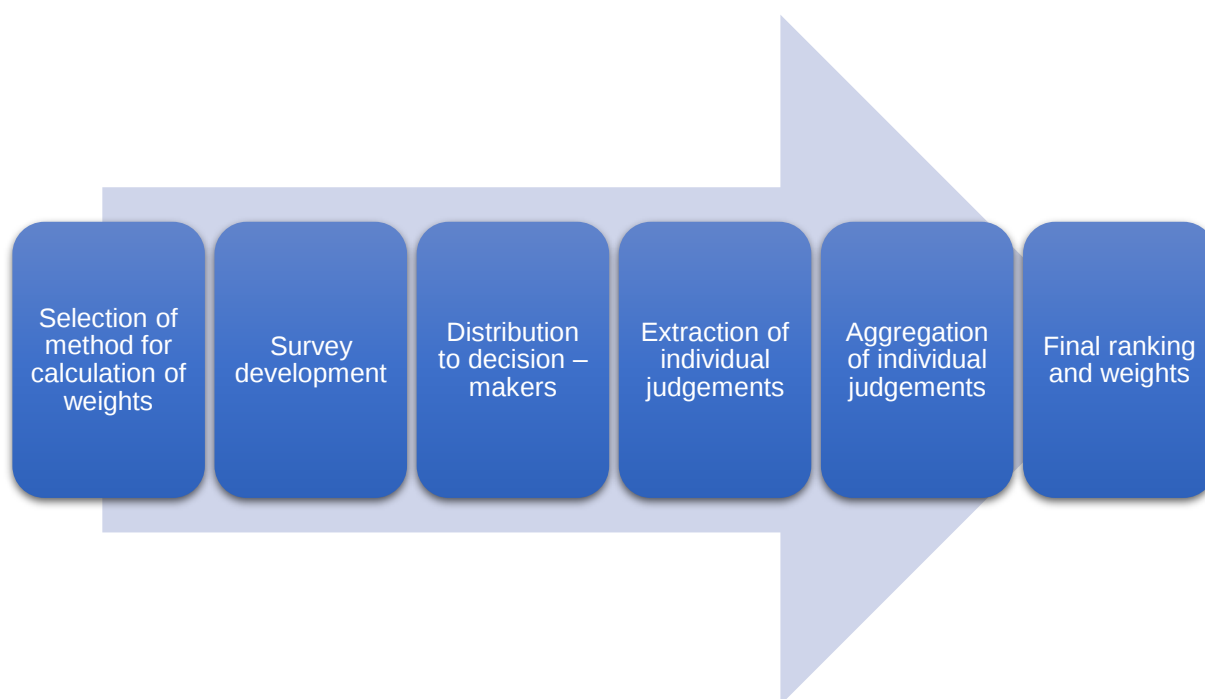


Figure 24: Methodology of weights calculation

As shown in the figure, a multicriteria decision making method is selected as a first step towards the evaluation of the identified risk factors. The Analytical Hierarchy Process (AHP)¹³ for Group Decision Making, allowing ranking of criteria and calculation of weights considering the opinions of multiple decision makers, was selected for this application. AHP is based on two-way comparisons between alternatives, representing their relative importance, on a 9-point scale.

Table 36: AHP 9-point scale

1	Equal importance
3	Moderate importance of one over the other

¹³ Saaty, T. *The Analytic Hierarchy Process (AHP) for Decision Making*; McGraw-Hill: New York, NY, USA, 1980; Volume 1, p. 69.

5	Strong or essential importance
7	Very strong or demonstrated importance
1	Equal importance
9	Extreme importance
2, 4, 6, 8	Intermediate values

Specifically, a questionnaire (available in Annex) was given to consortium members representing the three major target groups of ENERGATE. The scope of the questionnaire was to externalise the preferences of Decision Makers (DMs) by asking them to conduct pairwise comparisons between the criteria. More specifically, the following Decision Makers (partners from the ENERGATE projects) completed the questionnaire:

- DM1: COMMUTY (representing the “Building Owner” user category)
- DM2: LDK (representing the “Implementor” user category)
- DM3: Enersave capital (representing the “Financier” user category)

Based on the DMs’ responses in the survey, for n evaluation criteria, $A_{n \times n}$ judgement matrixes for each DM are extracted, whose elements (a_{ij}) are the comparison between criterion i and j . The row geometric mean of each criterion (equation (1)) results in priority vectors, while the consistency is also calculated (equation (2)). The aggregation of individual judgements of k decision makers (λ symbolising their weights) is represented by the collective judgement matrix, calculated by equation (3). The collective priority vector (CPV) (equation (1)) and final ranking are extracted.

$$w_i = \frac{\sqrt[n]{\prod_{j=1}^n a_{ij}}}{\sum_{i=1}^n \left(\sqrt[n]{\prod_{j=1}^n a_{ij}} \right)} \quad (1)$$

$$GCI(A) = \frac{2}{(n-1)(n-2)} \sum_{i < j} [\ln(a_{ij}) - \ln(w_i) + \ln(w_j)]^2 \leq 0.37, \quad n > 4 \quad (2)$$

$$\alpha_{ij}^{(c)} = \prod_{k=1}^m (a_{ij}^{(k)})^{\lambda_k} \quad (3)$$

Based on the AHP results, the ranked list of the risk factors and their weights are the following:

Table 37: Internal risks: ranking and weights

Rank	Risk factors	Weight
1	Credit risk	0.202031
2	Technical risk	0.140233
3	Performance risk	0.126611
4	Occupancy risk	0.106769
5	Pipeline risk	0.105295
6	Low quality equipment/ poor project design	0.09407
7	Management risk	0.083467
8	ESG risk	0.051352

9	Prepayment risk	0.045126
10	O&M risk	0.045047

Table 38: External risks: ranking and weights

Rank	Risk factors	Weight
1	Volatility of energy prices	0.324821
2	Market risk	0.285532
3	Currency risk	0.195279
4	Regulatory risk	0.194368

Having calculated the weights of the risk factors, the methodology for the assessment of the risk level of energy efficiency projects needs to be defined (Figure 25).

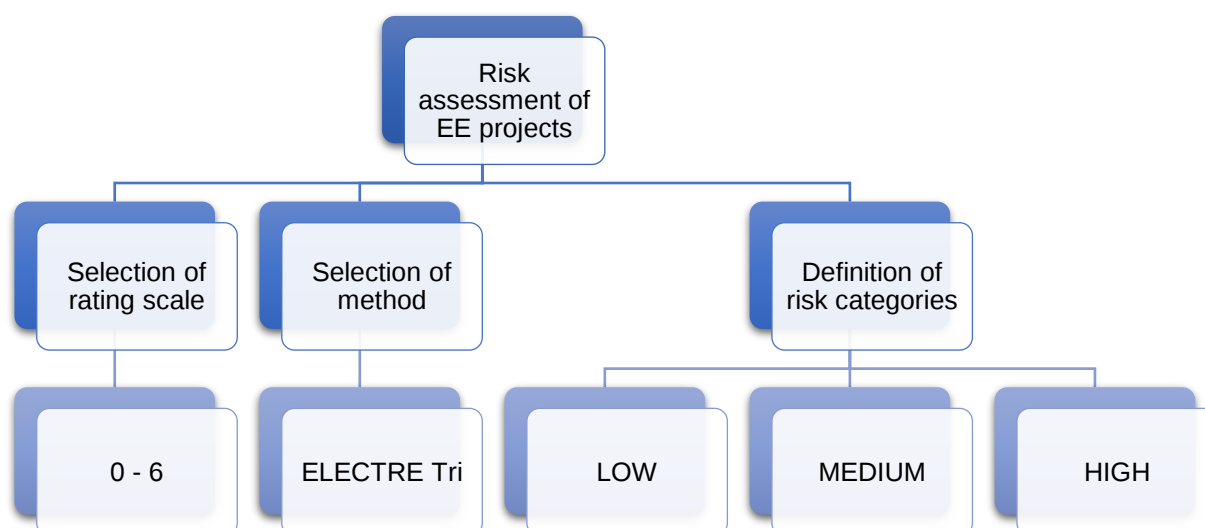


Figure 25: Risk assessment protocol definition

To implement the risk assessment protocol, the platform will ask users to provide a rating of their project with respect to each risk factor. The rating will be given on a scale 0 to 6, as shown in Table 39.

Table 39: Rating energy efficiency projects with respect to risk factors

Rating of risk factor	Explanation
0 – 2	The project has a low performance with regards to this risk factor (i.e. the risk is high)
2.1 – 4	The project has a medium performance with regards to this factor (i.e. the risk is medium)
4.1 – 6	The project has a high performance with regards to this factor (i.e. the risk is low)

The risk assessment protocol will use the multicriteria method ELECTRE tri¹⁴ to classify the projects in three categories: LOW, MEDIUM and HIGH risk. The classification is based on the following steps:

Step 1: Design the Decision Matrix

The matrix includes the scores of the alternatives across the evaluation criteria, where each alternative is evaluated according to each criterion. The alternatives are represented by the energy efficiency projects, and the criteria represent the risk factors used to assess these alternatives.

Step 2: Design the Reference Matrix

This matrix includes the scores of the reference points across the evaluation criteria. For this decision-making problem, two references are defined (between the three classes): $b_1 = 2$ and $b_2 = 4$ for all criteria. Each reference alternative is assessed according to the criteria, similarly to the decision matrix, showing how each alternative scores in terms of each criterion.

Once the cut-off threshold (λ) indifference thresholds (q), preference thresholds (p), and veto values are determined (v), these will influence the calculations that follow. The cut-off threshold represents the minimum concordance level required for one alternative to outrank another. The indifference threshold is the maximum difference in the performance of two alternatives on a criterion for the decision-maker to consider them essentially equivalent for that criterion. The preference threshold is the minimum difference in performance required on a criterion for the decision-maker to strongly prefer one alternative over another for that criterion. Finally, the veto value is the performance difference beyond which an alternative is excluded from outranking another, regardless of how well it performs on other criteria. For this decision-making problem, the following values are defined:

$$\lambda = 0.7 \quad (4)$$

$$q = 0.1 \quad (5)$$

$$p = 0.5 \quad (6)$$

$$v = 1 \quad (7)$$

Step 3: Calculation of the Partial Concordance Index Matrix

This matrix assesses the partial concordance, meaning the extent to which each alternative's performance is aligned with the reference values according to the criteria, using indifference and preference thresholds for each criterion. In equation 8, $g_j(x)$ represents the performance of x (which is either an alternative ($x \rightarrow a$) or a reference ($x \rightarrow b$)) to criterion j .

$$c_j(a, b_h) = \begin{cases} 0, & g_j(a) \leq g_j(b_h) - p_j(b_h) \\ \frac{g_j(a) - g_j(b_h) - p_j(b_h)}{p_j(b_h) - q_j(b_h)}, & g_j(b_h) - p_j(b_h) < g_j(a) \leq g_j(b_h) - q_j(b_h) \\ 1, & g_j(a) > g_j(b_h) - q_j(b_h) \end{cases} \quad (8)$$

¹⁴ Rogers, M., Bruen, M., Maystre, L.Y. (2000). The Electre Methodology. In: ELECTRE and Decision Support. Springer, Boston, MA. https://doi.org/10.1007/978-1-4757-5057-7_3

Step 4: Calculation of the Overall Concordance Index Matrix

The overall concordance matrix calculates a summary concordance score, indicating the degree to which one alternative is generally more favorable compared to a reference based on the criteria and weights assigned.

$$C(a, b_h) = \frac{\sum_{j=1}^a w_j c_j(a, b_h)}{\sum_{j=1}^a w_j} \quad (9)$$

Step 5: Calculation of the Discordance Index Matrix

This matrix calculates discordance scores, which identify criteria where significant differences between alternatives indicate a veto effect. Veto thresholds are used here for each criterion to identify where one alternative does not outperform another.

$$d_j(a, b_h) = \begin{cases} 0, & g_j(a) \leq g_j(b_h) - p_j(b_h) \\ \frac{g_j(a, b_h) - g_j(a) - p_j(b_h)}{v_j(b_h) - q_j(b_h)}, & g_j(b_h) - v_j(b_h) < g_j(a) \leq g_j(b_h) - p_j(b_h) \\ 1, & g_j(a) > g_j(b_h) - q_j(b_h) \end{cases} \quad (10)$$

Step 6: Calculation of the Credibility Matrix

The credibility matrix combines concordance and discordance information to calculate a credibility score. This score reflects the strength of evidence that one alternative is at least as good as a reference alternative, considering both positive and vetoed aspects of each criterion.

$$\sigma_j(a, b_h) = C(a, b_h) \prod_{j \in \bar{F}} \frac{1 - d_j(a, b_h)}{1 - C(a, b_h)} \quad (11)$$

$\bar{F} = \{j \in F \mid d_j(a, b_h) > C(a, b_h)\}$ and F is the set of evaluation criteria.

Step 7: Creation of Dominance Relations

Dominance relations are then simplified into binary dominance relationships using a cutoff threshold, which represents the minimum credibility score required to consider one alternative superior to a reference.

$$\sigma(a, b_h) \geq \lambda \Leftrightarrow a S b_h \quad (12)$$

This final step results in preference relations, distinguishing cases where one alternative is preferred, equivalent, less preferred, or incomparable to another based on the calculated dominance scores.

$a \mid b_h \Leftrightarrow a S b_h \text{ and } b_h S a$

$a > b_h \Leftrightarrow a S b_h \text{ and not } b_h S a$

$a < b_h \Leftrightarrow \text{not } a S b_h \text{ and } b_h S a$

$a R b_h \Leftrightarrow \text{not } a S b_h \text{ and not } b_h S a$

5. Stakeholder Consultation: Key Takeaways

In this section, the key takeaways from the stakeholder consultation, that have shaped the current version of the platform, are presented, so as to be correlated with the newly defined user requirements.

As described in Section 2, after defining the first ENERGATE use cases and workflows and their incorporation into the GUI, the most important action for ensuring that the ENERGATE platform is a useful tool for market actors, is the engagement of relevant stakeholders to collect feedback. The feedback received shaped the current version of the workflow of the platform, whilst additional functions and services are currently being explored to be incorporated in the next platform upgrade.

The process followed for engaging stakeholders and collecting feedback has been tailored per country and partner, with an emphasis on the ENERGATE pilot countries (Greece, Italy, Spain, France, Austria, Latvia). For instance, in Greece, various stakeholder types have been consulted. The platform has been presented to real estate firms, to companies that are involved in the implementation of energy efficiency measures and installment of equipment (e.g. heat pumps, PVs, meters and so on), to major Greek banks, and to several municipalities. To ensure engagement with key market actors, project partners participate in fairs and exhibitions in Greece, such as [Energia-tec](#) and [Build Expo](#). In Spain, the consultation was focused mainly in the financing community, engaging major banks as well as alternative lenders. In Italy and France, on the other hand, the consultation was primarily directed to the real estate sector, which also resulted in the identification of several buildings as pilot cases (mainly hospitals, commercial and industrial buildings). In Latvia, numerous municipalities as well as ministries have been involved in the stakeholder consultation process. The engagement has also targeted other European countries, such as Ireland, Belgium, Hungary and Croatia. To engage key market actors across Europe, partners have participated in key events such as [EXPO REAL](#) and [Enlit](#). Apart from the primary target groups of ENERGATE, additional stakeholders such as policy makers, researchers, and partners involved in other partner projects (beyond MATRYCS) that share common aspects of the ENERGATE vision (i.e. energy efficiency in buildings, renovation rates acceleration, smart finance for smart buildings, smart energy services, energy data platforms, etc), have provided useful feedback based on their experience and expertise in the energy efficiency sector.

The stakeholder engagement approach that has been followed in ENERGATE greatly benefited from participation in the [#SmartEnergyCluster](#) initiative, which provided a collaborative effort uniting over 20 EU projects focused on advancing integrated energy services and addressing market fragmentation. Through this initiative, which is coordinated by NTUA, ENERGATE leveraged access to a broad network of diverse project partner and relevant stakeholder across the EU energy sector, which enriched its engagement strategies and facilitated knowledge-sharing.

By being part of the Cluster, ENERGATE could directly address shared challenges, gain insights into best practices, and explore opportunities to create synergies with projects that have complementary goals (not only in terms of dissemination, e.g. joint participation in Enlit Europe, but also in terms of synergies in technical aspects, development of services etc. such as the synergies established with DIGIBUILD, Fortesie, MODERATE, ENERSHARE, etc..

General feedback

In brief, the platform is very well-received and stakeholders are interested in learning more about and using it. However, many potential users' express concerns with regards to data management. It is important for them to know who is managing the data, who has access to them and at what stage. They are also very keen on understanding how the platform will continue to operate after the project's end. The validation of the data is an important aspect, which is currently ensured through the terms and conditions and privacy policy of the platform, according to which each user who registers is responsible for providing real data, otherwise their profile will be terminated. The users need to feel confident that the companies on the platform are actually who they claim to be (to prevent misbehavior, such as the registration of a company as one of its competitors, with a malicious intend). Currently, the registration process is monitored by the data manager (National Technical University of Athens). To ensure that the platform will continue to operate smoothly regardless of the scale expansion that will most likely occur by the end of the project, a verification mechanism should be added, which will probably be one or multiple official documents confirming the identity of the company and the authorisation of the user.

Another aspect of data validation regards the KPIs that are inserted in the platform as part of the energy efficiency project's definition. To be able to verify that the metrics provided by the Implementor are realistic, the platform calculates the financial indicators as a verification mechanism, and benchmarking of KPIs will also be added as a feature at a later stage. Another addition that has improved the chances of receiving correct information in each field is the inclusion of explanations for the fields, to make sure that the users understand the input that is expected from them.

Feedback for the “Building Owner” and “Public Body” profiles and workflow

A significant remark received from the side of public building stakeholders, was the fact that the “Building Owner” workflow is not tailored to their needs and processes. Specifically, the energy renovation of a building, where the costs exceed a predefined threshold (which may differ from country to country), cannot simply be assigned to an Implementor due to public procurement processes that need to be followed, which hinders the matchmaking process of the platform. When it comes to the financing part, most energy efficiency projects rely on subsidies and grants. Especially in Latvia, most projects are financed through EU funding mechanisms. The use of subsidies reduces the motivation of public entities to explore other financial mechanism significantly for implementing energy efficiency projects, while there are complexities and regulatory barriers for using Energy Performance Contracting. In terms of aggregation in the public building renovation project in Riga, the "One building | one project | one application" rule is a common pattern, so project aggregation is not so popular.

In Greece, national subsidies are the most popular financing source of energy efficiency projects in the public sector. The municipalities that participated in the consultation process, stated that a library of information on EU funding mechanisms would be very useful, since EU funding programmes can be a very promising financing source for bigger projects, that cannot be covered by national schemes. An additional feature to help municipalities would be assessing their suitability to apply to different funding sources, so that instead of needing to evaluate a long list of different sources, they can easily detect those that are more suitable to them. Since Building Owners of private buildings can also apply to several funding programmes for energy efficiency projects, it was suggested that a similar list of funding schemes could also be created for the private sector, to make Building Owners aware of the different funding options available.

It is noteworthy that both Latvian and Greek public stakeholders have expressed concerns when it comes to private investment for public buildings, since the experience is limited in this sector. Nonetheless, it is clear that such investments should be encouraged to enable an increase in renovation rates. Therefore, the platform could help public bodies in this aspect. By fostering collaboration and providing actionable insights, ENERGATE can bridge funding gaps. Its user-friendly design attracts diverse audiences, and make the processes simpler to non experts in municipalities.

Feedback for the “Implementor” profile and workflow

It is recognised that the platform’s “Implementor” profile is very suitable for a variety of users, especially Energy Service Companies (ESCOs). It is also important to highlight that in environments such as the Greek and Spanish market, the ESCo model is not so widely implemented and has faced significant problems through the years (In Greece, ESCOs mostly operate as subsidiaries of large enterprises for in-house energy efficiency /Renewable Energy Sources (RES) installation purposes). However, ESCo models are very popular in Italy, German and Ireland. That is to say, not all implementors of energy efficiency projects will also assume the responsibility to find finance for the energy efficiency projects. In fact, some might request proof that the Building Owner can secure the finance before designing the energy efficiency project.

Furthermore, stakeholders belonging in the “Implementor” category mentioned that it is difficult to estimate the energy savings and relevant indicators for an energy efficiency project, just though the user input and without visiting the actual building (of course, an Energy Performance Certificate can help with this, which is why it can be uploaded in the platform by the Building Owner). This feedback resulted in the division of the offer provided by the Implementors to the Building Owners in two stages. This allows the Implementors to firstly offer a walkthrough (e.g. an on-sight visit) and then proceed with a detailed and well-structured offer, containing a very detailed list of energy efficiency measures, energy savings and relevant KPIs. The Building Owners receive a simplified version of the offer, while the Financiers may access the fully finalised offer. More details are available in Section 4.2.

Last but not least, it was expressed by various implementors the fact that they see value in platforms that provide standardised approaches and can generate business leads. To this end, the matchmaking service of the platform matches implementors with interested investors based on project details and specific criteria and this can be coupled with a User Performance System that allows users to showcase their compliance and quality metrics, attracting more visibility and trust among potential investors.

Feedback for the “Financier” profile and workflow

Stakeholders (mainly financiers and implementors) share a critical need for standardised, data-driven tools to guide decisions. EPC norms, while widely used and simple to understand, lack consistency across countries and are insufficient alone for investors to assess long-term value.

it has been recognized by the stakeholders involved in the consultation that the selection criteria and prioritisation filters for the decision-making process of the energy efficiency project financing are very useful and could be enriched with additional financial indicators. It needs to be taken into account that certain financiers will not provide the actual minimum values, so a margin of tolerance might be provided in some cases, or the KPI will not act as a prioritisation filter instead of a selection filter (so that projects are not entirely excluded from the matchmaking process if the value of a KPI is not ideal, instead they appear lower in the list of matched projects).

Different types of financial stakeholders have different motives to use the ENERGATE platform. This results in different user requirements and needs within the platform. For instance, it appears that the current version of the profile for the Financiers is well adjusted to the needs of private funds aiming to deploy capital in energy efficiency projects with specific characteristics. Other types of private investors might use the platform to find energy efficiency projects that could help them reach their sustainability goals and support them in prioritising Green financial products or investments. Public fund managers might use the platform to provide them with an additional communication channel to raise awareness about available funding opportunities for energy efficiency projects.

The banks that participated in the consultation process also stated that the platform's Financier profile would be a very useful tool for them. Suggestions were made in line with the feedback received from the Implementors, since the banks confirmed that on one hand the connection with the Implementor is useful, and additional information from the side of Implementors could also be requested (files such as business plan, certifications, insurances and so on). On the other hand, it is important that the platform includes a path of direct connection with the Building Owner (even when the Building Owner does not have a technical team in house, and thus is not the one providing the details of the project in terms of energy – related and financial indicators). The financial information provided in the platform's issued offers is vital and provides an overview of the Implementor's business plan, however the most important criterion for the bank to proceed with the financing of the project is the credit profile of the end client. The necessary documentation and information to evaluate the end client will most likely not be provided through the platform, which is why the platform serves the purpose of initially bringing the different users in contact with each other, but the process of Due Diligence is the responsibility of the users. Stakeholders from banks also suggested that they could use the platform as an additional communication channel for the financing tools and banking products that the bank provides and that could be used to finance energy efficiency renovations, while they would also be interested in receiving notifications, once an energy efficiency project that fits the requirements of the afore mentioned tools or products is inserted into the platform. According to the feedback, especially when it comes to Greek banks, the structure and guidelines of the national schemes shape the relevant banking products. In general, national schemes and subsidies are very important to motivate stakeholders to engage in energy efficiency projects, while it was also suggested that certain Implementors might aggregate projects under the same subsidy and reach out to banks to support them financially in the initial stages of the projects, to avoid delays.

It also needs to be highlighted that a few financiers, primarily banks, were sceptical about the term sheet that they are asked to upload when they are interested in investing in an energy efficiency project, since they would not feel comfortable to share the terms of the agreement through the platform. The fact that the term sheet is supposed to be provided as a pdf file might be convenient from this perspective, since it provides flexibility to the users. The financiers may add conditions in their term sheet, to make sure that they are not binded to an agreement before they proceed with the Due Diligence and final decision. Alternatively, the term sheet can act as a simple declaration of interest and the rest of the communication can happen offline. However, this may pose some challenges, as this part of the process lacks standardization, which is a crucial element for the ENERGATE marketplace overall.

Additionally, some stakeholders have suggested that a predefined template in this stage might be helpful. Therefore, the possibility of including predefined information entries is being examined and discussed with more financiers, to better understand if this would facilitate them or not. These predefined information entries could also be a list of requirements that the Financiers often have, to be able to decide if they will finance the project or not. The Financiers

could click on different items on the list in order to allow the Building Owners or Implementors, depending on the case, to acquire and prepare the required information.

The Financiers that participated in the consultation process have also been asked to provide their viewpoint on the importance of risk assessment and management, specifying whether or not the platform can help them with this. All Financiers stated that risk assessment is important, but they have their own internal processes to evaluate the risk and would most likely not use the platform's risk assessment protocol. Experience from previous projects, such as the [LAUNCH project](#), also shows that Financiers have their own processes for risk evaluation, however, other market actors involved in energy efficiency projects (primarily "Implementors" according to ENERGATE's user classification) might benefit significantly from guidance with regards to risk assessment and mitigation. Taking this into account, it was decided that ENERGATE will provide an optional risk assessment protocol that Implementors can use to evaluate the risk of an energy efficiency investment and to take appropriate action to mitigate risks when identified. The risk assessment protocol was based on the experience and content from both the [LAUNCH](#) and the [Triple-A](#) projects.

Finally, during the consultations, it has been mentioned that Financiers are likely to be highly interested in EU taxonomy-aligned building renovations / interventions, but from the perspective of the stakeholders assessing the compliance with the EU taxonomy through the ENERGATE platform would be important due to the complexity of the regulation, as well as the fact that any input used for the EU taxonomy evaluation would have to be user-defined. Taking this into account, the platform could support the EU taxonomy self-assessment by providing simplified information and guidance. In any case, this matter needs to be discussed with more stakeholders to better understand the importance of the EU taxonomy for the different target groups as well as the role that the platform can have in facilitating the relevant processes for these stakeholders.

Additional services

The feedback received was also used to shape the complementary services that ENERGATE provides in different stages of the process. For instance, the aggregation process, which enables the clustering of buildings so that they can be financed as a single energy efficiency project, has attracted the interest of many stakeholders involved in the consultation process. According to the market actors, the aggregation filters are very helpful and the ENERGATE platform should act as the aggregator. Furthermore, Financiers are interested in cases where Implementors represent many clients, which is why the Implementor assumes the responsibility of the aggregation process and the creation of the aggregates with the assistance of the platform's features. However, it must not be neglected that in certain countries – such as in Spain – the aggregation process is unlikely to be driven by the Implementor. The process of grouping buildings to present them to Financiers will usually be done by a real estate company with a large portfolio of buildings that need renovation. The possibility of aggregating buildings in a single project is also interesting for the Public Bodies of the platform, so that they are able to meet the minimum requirement in terms of investment costs, to apply for certain funding programmes (or to attract the interest of private financing bodies/ investors). This is usually done via One stop Shop structures such as VEB in Belgium the Flemish region or L'Energetica in Catalanian region in Spain.

Another additional feature that the stakeholders suggested regarded the analysis of the profiles of the users, helping them understand the rationale behind potential matches. This suggestion can be covered by the user performance feature, which is a system that analyses the activities of a user profile to boost the user's engagement and performance within ENERGATE. The results of this feature will include, among others, outputs such as badges and other forms of incentives which users can choose to share to demonstrate their active

engagement with the platform, thus proving that they are active users of the platform and highlighting their suitability as potential matches. Liability and reputation issues should be meticulously addressed for this feature, since it must be clear that the outputs rely solely on the activity of the user within the platform and do not undoubtedly reflect the credibility or the overall quality of the services provided by the user. More details are provided in Section 4.3.

Moreover, the users belonging to the “Building Owner”, “Public Body”, or even “Implementor” profile, would like to use the platform as a database of other projects that have been successfully implemented in the past, so that they can learn from best practices of previous energy efficiency projects and understand the possible impact of different actions in the building’s energy performance. This is also closely linked to another recommendation, which regards the provision of predictions, statistics and visualised results through ENERGATE. Such services can truly assist the users of the platform to comprehend the effects of the energy efficiency projects they apply and can also be a useful tool to validate and evaluate the results of the energy efficiency projects after they have been completed. According to the feedback received, the validation phase of the project should not only focus on the results of the energy efficiency and financial gains, but also on other indirect impacts (non – energy benefits) such as social inclusion, indoor air quality, improved health of the occupants, reduced noise levels, productivity, and resource management, to name but a few.

In Table 41, the stakeholder feedback is summarised, while the actions considered to address the feedback and incorporate suggestions in the ENERGATE marketplace are also described. Finally, the third column of Table 41 shows the specific stage of the integration of each suggestion made by the stakeholders in the platform, since several suggestions have already been integrated, while others have been developed and will be integrated soon, and there are also suggestions that are in the design or the development phase. Finally, some of the suggestions and remarks are currently discussed within the consortium so as to decide how they will be addressed.

The explanation of the five integration stages of the stakeholder suggestions in the platform are provided in Table 40.

Table 40: Definition of stakeholder suggestions’ integration stages

Stage of integration	Explanation
Under discussion	The feedback was received recently and ENERGATE partners involved in the definition of the use cases, workflows and methodologies of the platform need to discuss and brainstorm ideas to determine how they can incorporate the suggestion. The partners need to consider the existing architecture of the platform and make sure that the modifications will fit into the platform’s structure and will respect the interoperability requirements. If the suggestion was received by few stakeholders (e.g.1 or 2) and is not confirmed by other stakeholders, then it might not be integrated into the platform. In any case the platform must maintain a balance between completeness and user-friendliness, ensuring that the required services are provided without significantly increasing the complexity for the users.
Under design	The feedback received has been discussed within the consortium and an initial high – level approach has been decided so as to address it. The specific elements are still explored (e.g. the steps of a use case are defined but the partners have not decided the final information entries for it).
Under development	The methodological approach to integrate the suggestion of the stakeholders has been partially or fully designed and the development of the relevant service, feature or use case is ongoing.
Developed	The service, feature or use case that was designed based on the suggestions of the stakeholders has been fully developed, is operational but is not yet integrated in the platform (e.g. because it is still in a testing phase or because it has not been decided how the inputs and outputs will appear in the platform’s frontend).

Stage of integration	Explanation
Implemented	The feedback received has been translated into a service, feature or use case, and it is fully designed, developed, and integrated into the platform.

Table 41: Overview of stakeholder suggestions and platform adjustments

Stakeholder suggestion/ remark	Platform adjustment	Stage of integration
S1 Difficulties convincing users to provide confidential or private information and documents in the platform as part of the Due Diligence.	The platform provides matchmaking, the Due Diligence is the responsibility of the users and happens outside the platform.	Implemented
S2 The values are user – defined and there is no verification mechanism to ensure that the metrics are realistic.	Calculations of financial indicators through the platform have been added as a verification mechanism.	Implemented
	Benchmarking of values can be provided. Synergies with other platforms are considered (DEEP - De-risk Energy Efficiency Platform)	Under development
S3 Certain financiers (especially banks) might be unwilling to share the terms of the agreement through the platform.	The term sheet that is uploaded by the financiers in the platform is a pdf file, which provides flexibility.	Implemented
	Certain information entries or a list of requirements of the Financier might help the users.	Under design
S4 It is not always clear what type of input is needed in each field.	Explanations for each field is provided as a tooltip. The fields are also categorized as mandatory and optional.	Implemented
S5 It is difficult for a technical expert to estimate energy savings without having actually visited the building.	The offer is divided into two stages. The initial offer is very general and includes details of a walkthrough, if needed.	Implemented
S6 The public buildings cannot follow the same path as private buildings, since there are strict procedures in the public sector.	A new separate “Public Body” profile has been created.	Implemented
S7 Large scale projects are of greater interest. The platform can act as an aggregator.	Filters are provided to help Implementors aggregate projects based on similarities.	Implemented
S8 It would be beneficial to have the possibility to directly connect building owners and financiers, especially in the case of banks.	Different scenarios for direct connection are being examined.	Under design
S9 Assessing the risk is important, but the majority of financiers relies mainly on their own risk assessment protocol.	The risk assessment protocol (using experience of the Triple-A and LAUNCH project) of ENERGATE results in a qualitative result that helps Implementors manage the project risk.	Developed
S10 When the Energy Performance Certificate is available, it is very useful and could be uploaded.	There is an optional field to upload the Energy Performance Certificate.	Implemented
S11 It would be useful to be able to learn from best practices from previous projects.	The ENERGATE database is used to find similar buildings and show key information.	Under development
	A machine learning algorithm is used to estimate the impact of different energy efficiency measures.	Under development

Stakeholder suggestion/ remark		Platform adjustment	Stage of integration
		A synergy with the Enershare project is examined, to integrate a service providing recommendations for energy efficiency measures.	Under discussion.
S12	A profile analysis would be useful.	The user performance feature will provide the profile analysis.	Under development
S13	There are different types of stakeholders involved in the design and execution of energy efficiency projects that have different roles. They often need to cooperate.	The segmentation of the “Implementor” profile to represent the different roles is considered.	Under discussion
S14	The municipalities might use the platform to connect with organisations that can provide technical studies and/or guidance.		
S15	The municipalities are often not aware of all the EU funding mechanisms for energy efficiency projects or are not familiar with the different databases that exist.	A library of EU funding mechanisms and relevant information is provided in the platform.	Implemented
S16	Fund managers could use the platform as an additional communication channel for the available funding sources.	The possibility of allowing fund managers to insert information about funding sources in the platform will be examined.	Under discussion
S17	The public bodies might need assistance in assessing their suitability to apply to different available mechanisms.	A methodology to filter the available mechanisms could be developed.	Under design
S18	A bank could use the platform as an additional communication channel to inform potential clients about financing tools and products.	The possibility of adding products through the financier’s profile is being examined.	Under design
S19	A list of available funding for private buildings could also be useful.	Building owners can declare if they have applied or will apply to subsidies. The possibility of adding a relevant list will be examined.	Under discussion
S20	Banks (especially in the Greek market) often work with subsidies.	A relevant use case is examined, allowing banks to provide financial support to Implementors that have multiple clients applying for the same subsidy.	Under discussion
S21	It would be good to provide information such as energy predictions, statistics and visualised results.	Synergies with projects such as MATRYCS and follow-up projects (e.g. Digibuild , MODERATE etc.)	Under development
S22	Users are concerned about the privacy of their data, the management of the data etc.	The terms and conditions and the privacy policy of the platform clearly state all relevant information.	Implemented
		Different scenarios are being examined so as to verify the identity and authorisation of the user upon registration, such as the use of standard documents to confirm that the user is an authorised representative from the specific company.	Under design
S23	The financiers might need additional information/files such as the business plan, certifications, insurances etc. to be able to evaluate an energy efficiency project.	A free upload field is available so that such files can be uploaded.	Implemented

Stakeholder suggestion/ remark		Platform adjustment	Stage of integration
S24	Social aspects and additional non – energy benefits could also be important to evaluate an energy efficiency project.	The incorporation of non – energy benefits in the methodology is being examined.	Under design
S25	EU taxonomy metrics could be included in the project offer.	The incorporation of EU taxonomy metrics will be examined.	Under discussion
S26	The projects could be prioritized based on their performance on the defined criteria.	A methodology to rank the projects is available based on multicriteria assessment.	Implemented
S27	Compliance with EU taxonomy is a very strong incentive to invest in a project.	The platform could provide support to guide users with regards to the EU taxonomy.	Under design
S28	Apart from the Internal Rate of Return (IRR), payback time etc. there are other indicators such as the Net Present Value (NPV) that are important.	The financial KPIs have been enriched.	Implemented
S29	The ESCos often have already established relationships with financial institutions.	It is not mandatory to find finance through the platform, an “Implementor” can simply enter to find clients.	Implemented
S30	The financiers could receive notifications when a project in the platform fits their criteria.	The possibility of adding notifications for the financiers will be examined.	Under discussion
S31	The real estate companies with large portfolios might be able to define the KPIs project without the assistance of an Implementor.	The real estate companies can register as Implementors.	Implemented
S32	Real estate companies with large portfolios might want to aggregate their own buildings without the involvement of an Implementor as an aggregator.		
S33	The Financiers might use platform services to evaluate project clusters.	An available tool from the MATRYCS project, which is based on a state-of-the-art machine learning approach and data from previously implemented energy efficiency projects, has been integrated in the Financier’s profile, classifying the clusters of buildings in “Class A”, “Class B”, “Class C” depending on their potential.	Implemented
S34	Users and visitors of the platform might be interested in exploring aggregated statistics of the energy efficiency projects that have been financed through the platform.	This feature will be made available once a sufficient number of projects has been added into the platform.	Under design
S35	The Building Owners that have available detailed data on energy consumption before renovation (e.g. hourly or half hourly data for the past year) could mention it.	The availability of such data would be of great help for the Measurement and Verification (M&V) of energy savings.	Under design

6. User requirements: updates

In this section, the updated user requirements (UUR) of the ENERGATE platform are outlined. These requirements represent the various functionalities that the platform needs to provide in order to enable the services that are expected by the different user types. The requirements were initially defined in the previous version of the report, through the analysis of the user stories and use cases. and were the foundation and guiding framework for the platform's development. The requirements have been updated and enriched based on the suggestions of the stakeholders.

6.1. Zero Stage

Table 42: Zero Stage user requirements

ID	Description	Related User Type	Related Use Cases	Related Stakeholder Suggestion	Implemented
UUR #01	ENERGATE platform allows user registration.	All	All	-	Yes
UUR #02	Users fill in their information (name, surname and position in organisation, contact details).	All	All	-	Yes
UUR #03	Company representatives fill information of the organisation (address, VAT number and others).	All	All	-	Yes
UUR #04	Implementors fill in information about their area of expertise (technologies provided, market experience, geography covered).	Implementor	UC1, UC2, UC4, UC6, UC7, UC10	-	Yes
UUR #05	Users provide proof/ verification that they are an authorised representative of the organisation.	All	All	S22	No

6.2. Fetch Stage

Table 43: Fetch Stage user requirements

ID	Description	Related User Type	Related Use Cases	Related Stakeholder Suggestion	Implemented
UUR #06	Building Owners create building profile.	Building Owner	UC1, UC3, UC4, UC9	-	Yes
UUR #07	Public Bodies create building profile.	Public Body	UC5, UC6, UC7, UC8	S6	Yes
UUR #08	Implementors create building profile.	Implementor	UC2, UC10	-	Yes
UUR #09	Users provide building description.	Building Owner, Implementor, Public Body	All	S6	Yes
UUR #10	Users insert in the ENERGATE platform the buildings' geographical information (e .g. Country, Province / Region, Climate Zone).	Building Owner, Implementor, Public Body	All	-	Yes
UUR #11	Users insert in the ENERGATE platform building ownership status.	Building Owner, Implementor	UC1, UC2, UC3, UC4, UC9, UC10	-	Yes
UUR #12	Users specify the building type.	Building Owner, Implementor, Public Body	All	-	Yes
UUR #13	Users provide building technical information (e. g. year of construction, EPC level, size, usage, occupancy level).	Building Owner, Implementor, Public Body	All	-	Yes
UUR #14	Users insert buildings' systems (type of heating, type of cooling).	Building Owner, Implementor, Public Body	All	-	Yes
UUR #15	Users insert buildings' previous renovation actions.	Building Owner, Implementor, Public Body	All	-	Yes

ID	Description	Related User Type	Related Use Cases	Related Stakeholder Suggestion	Implemented
UUR #16	Users insert buildings' baseline energy consumption (electricity, heating and cooling) (annual).	Building Owner, Implementor, Public Body	All	-	Yes
UUR #17	Users declare if they have data on energy consumption from meters and the frequency of the data (e.g. hourly)	Building Owner, Implementor, Public Body	All	S35	No
UUR #18	Users exploit platform services to understand the impact of different renovation actions and to learn from previous energy efficiency projects.	Building Owner, Implementor, Public Body	All	S11	Yes
UUR #19	ENERGATE platform provides project alternatives to Implementors.	Building Owner, Implementor	UC1, UC4, UC6	-	Yes
UUR #20	Implementors provide preliminary information on energy efficiency measures to be applied, walkthrough and similar projects implemented in the past.	Implementor	UC1, UC4	S5	Yes
UUR #21	Building Owners reject and accept offers.	Building Owner	UC1, UC4	-	Yes
UUR #22	Building Owners receive notifications from Implementors.	Building Owner, Implementor	UC1, UC4	-	Yes
UUR #23	Building Owners select their preferred type of finance.	Building Owner	UC1, UC3, UC9	-	Yes

6.3. Process Stage

Table 44: Process Stage user requirements

ID	Description	Related User Type	Related Use Cases	Related Stakeholder Suggestion	Implemented
UUR #24	Implementors provide KPIs on environmental impact like energy savings, estimated CO ₂ emissions, M&V protocols and class after renovation.	Implementor	UC1, UC2, UC3, UC4, UC10	-	Yes
UUR #25	Implementors provide the proposed contract type and financial KPIs of the project (e.g. upfront payment, CAPEX,	Implementor	UC1, UC2, UC3, UC4, UC10	S28	Yes

ID	Description	Related User Type	Related Use Cases	Related Stakeholder Suggestion	Implemented
	avoidance cost, payback time, IRR, NPV).				
UUR #26	Implementors can upload files such as business plan, certifications, insurances, protocols etc.	Implementor	UC1, UC2, UC3, UC4, UC10	S23	Yes
UUR #27	The platform verifies KPIs that the Implementor inserts through internal calculations.	Implementor	UC1, UC2, UC3, UC4, UC10	S2	Yes
UUR #28	The platform provides benchmarking of KPIs.	Implementor	UC1, UC2, UC3, UC4, UC10	S2	No
UUR #29	ENERGATE platform provides aggregation filters to aid Implementors to create a cluster of different projects.	Implementor	UC1, UC2, UC3, UC10	S7, S32	Yes
UUR #30	Financiers provide matchmaking filters.	Financier	UC1, UC2, UC3, UC7, UC8, UC9, UC10	-	Yes
UUR #31	Financiers provide prioritisation filters.	Financier	UC1, UC2, UC3, UC10	S26	Yes
UUR #32	Users can evaluate EU taxonomy compliance.	Implementor	UC1, UC2, UC3, UC4, UC10	S27	No
UUR #33	ENERGATE platform sends notifications to financiers when their criteria are met.	Financier	UC9	S30	No
UUR #34	Financiers evaluate the project clusters through the platform's services.	Financier	UC1, UC2, UC3, UC10	S33	Yes
UUR #35	Financiers request documents proving end client's reliability.	Financier	UC1, UC2, UC3, UC8, UC9, UC10	-	No
UUR #36	Financiers send a term sheet to Implementors.	Implementor, Financier	UC1, UC2, UC3	-	Yes
UUR #37	Financiers send a letter of interest to Building Owners or Implementors.	Building Owner, Implementor, Financier	UC1, UC2, UC3, UC9, UC10	S3, S8	No
UUR #38	Financiers select from a list of requirements the input they need	Building Owner,	UC1, UC2, UC3, UC9, UC10	S3	No

ID	Description	Related User Type	Related Use Cases	Related Stakeholder Suggestion	Implemented
	from Building Owners or Implementors.	Implementor, Financier			
UUR #39	Implementors can accept or decline the term sheet.	Implementor, Financier	UC1, UC2, UC3	-	Yes
UUR #40	Implementors and Building Owners can accept or decline the letter of interest.	Building Owner, Implementor, Financier	UC1, UC2, UC3, UC9, UC10	S3, S8	No
UUR #41	Financiers can inform platform users about banking products/ financing tools.	Financier	UC9	S18	No
UUR #42	Building Owners are informed about available financing tools and methods.	Building Owner	UC1, UC3, UC9	S19	No
UUR #43	Users need explanations of the information entries to provide correct input.	All	All	S4	Yes
UUR #44	The risk assessment provided by the platform should be an optional service aiming to assist users.	Implementor	UC1, UC2, UC3, UC4, UC10	S9	No
UUR #45	Implementors cooperate with each other if they provide different services.	Implementor	Undefined	S13	No
UUR #46	Public Bodies are informed about funding sources.	Public Body	UC5(R)	S15	Yes
UUR #47	Public Bodies are assisted by the platform to select the best funding source.	Public Body, Financier	UC5R	S15, S16, S17	No
UUR #48	Public Bodies inform market actors about energy efficiency projects and public procurements.	Public Body, Implementor, Financier	UC6.A	-	Yes
UUR #49	Public Bodies are matched with Implementors to provide technical support in energy efficiency projects with investment cost below tender threshold.	Public Body, Implementor	UC6.B	-	No
UUR #50	Public Bodies connect with Implementors that can provide technical studies.	Public Body, Implementor	UC.6	S14	No

6.4. Deliver Stage

Table 45: Deliver Stage user requirements

ID	Description	Related User Role	Related Use Cases	Related Stakeholder Suggestion	Implemented
UUR #51	Building Owners provide reports on savings & EPC level.	Building Owner	UC1, UC3, UC4, UC9	-	No
UUR #52	Implementors report on project status, achieved energy savings, CO ₂ emissions abatement, M&V used, projects successfully financed.	Implementor	UC1, UC2, UC3, UC4, UC10	-	No
UUR #53	Financiers report on the total invested amount since they became a member.	Financier	UC1, UC2, UC3, UC8, UC9, UC10	-	No
UUR #54	Users are interested in monitoring non-energy benefits caused by the energy efficiency projects.	All	All	S24	No
UUR #55	Users would like to have a profile analysis.	All	All	S12	No
UUR #56	Users would like to have access to energy predictions, statistics and visualised results.	All	All	S21, S34	No

7. Conclusions

The present deliverable is the second report from a series of three reports specifying the input information as well as the GUI for the ENERGate platform's acquisition frontend, for a standardised method of collection of information for user registration, project description, aggregation and matching processes and follow – up on realised projects. The report also specifies the type of users, details the use cases for the use of the platform and the system of user performance.

To extract the platform's workflow, the user types and user roles, the input information and any additional methodologies and services, a methodological framework is followed consisting of concrete steps. The methodology relies on the creation of a prototype GUI that is used in order to collect feedback from consultation (both within the consortium and with external stakeholders). The GUI is finetuned according to the results of the consultation and it guides the platform's development. The most important element of the methodology is the feedback loop ensuring continuous enhancement of the platform according to the identified needs of market actors.

At this stage of the project the first version of the ENERGate platform has been officially launched and is available to the public. The current version of the platform is based on the initial user requirements that were identified by M6 (in the previous version of the report) as well as additional requirements that were identified through the stakeholder consultation process. In total, the feedback received was translated into 35 stakeholder suggestions. The partners of the project have identified 38 actions to address the suggestions and remarks, out of which 16 are already implemented, another 16 are either under design/ development or already developed and will be integrated in the platform, and another 6 are under discussion.

Furthermore, at this stage, 4 user profiles and 9 use cases have been proposed. When it comes to the information entries, they have been updated to incorporate the feedback from stakeholders and primarily to host the new user profile of "Public Bodies". They have also been classified as "optional" and "mandatory", so as to achieve a balance between completeness and user friendliness in the platform. The short explanations of the information entries which are presented as tooltips in the platform also contribute to the user friendliness of the ENERGate interface. The information entries will continue to be updated so that the newly defined use cases can be incorporated in the platform.

The report also presents the user performance feature, taking into account specific metrics per user profile, and the risk assessment protocol, which is based on 14 risk factors and two multicriteria decision making methods (one for the matchmaking process and one for the risk assessment). Moreover, 56 updated user requirements are listed, out of which 34 are already fully implemented in the current version of the ENERGate platform.

In the next and final version of the report, the final definition of user profiles will be provided, possibly considering a segmentation of the Implementor profile to represent the different roles of market actors involved in the implementation of energy efficiency projects in buildings. Furthermore, the stakeholder remarks that have not been addressed yet and any additional feedback received from stakeholders will be translated into modifications in the workflow, when applicable. The use cases will be finalised, along with their information entries. The information entries and workflow of the Deliver Stage will be elaborated, also incorporating non – energy benefits. The user performance system will also be finalised, describing not only the badges and outputs that act as gamification incentives during platform use, but also the scoring system which will draw information from the Deliver Stage. The risk assessment protocol will be examined to be enriched to provide further guidance to the users (e.g. by

providing suggestions for risk mitigation). Finally, additional elements, services and methodologies with regards to verification and data validation, decision making support in the selection of financing schemes, and guidance for the EU taxonomy and the Smart Readiness Indicator, among others, will be identified and presented, if applicable.

Annex

The following questionnaire was used to extract the input needed for the AHP method to calculate the weights of risk factors to be used in the risk assessment protocol:

Pairwise comparisons of risk factors of energy efficiency investments:

By filling in this survey you help ENERGATE develop an assessment protocol to assist stakeholders involved in energy efficiency projects to estimate the risk of investments.

Before we start, we would like you to provide us with some information regarding the type of institution you are currently working in, or the position you have in your company.

Comparison of internal risks:

Internal risks or project - specific risks refer to the internal environment, meaning that they apply to a specific energy efficiency project (as opposed to external risks, which refer to the external regulatory, economic, market environment).

Compare risks in the left column to credit risk

	Other risks								Equal	Credit risk							
	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9
Technical risk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Performance risk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
O&M risk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Low-quality equipment/ poor project design	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Pipeline risk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Prepayment risk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Management risk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Occupancy risk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
ESG risk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Compare risks in the left column to technical risk

	Other risks								Equal	Technical risk								
	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	
Performance risk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
O&M risk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Low-quality equipment/ poor project design	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Pipeline risk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Prepayment risk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Management risk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Occupancy risk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
ESG risk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	

Compare risks in the left column to performance risk

	Other risks								Equal	Performance risk								
	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	
O&M risk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Low-quality equipment/ poor project design	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Pipeline risk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Prepayment risk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Management risk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Occupancy risk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
ESG risk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	

Compare risks in the left column to O&M risk

	Other risks								Equal	O&M risk								
	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	
Low-quality equipment/ poor project design	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Pipeline risk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Prepayment risk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Management risk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Occupancy risk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
ESG risk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	

Compare risks in the left column to low-quality equipment/ poor project design

	Other risks								Equal	Low-quality equipment/ poor project design								
	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	
Pipeline risk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Prepayment risk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Management risk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Occupancy risk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
ESG risk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	

Compare risks in the left column to pipeline risk

	Other risks								Equal	Pipeline risk								
	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	
Prepayment risk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Management risk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Occupancy risk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
ESG risk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	

Compare risks in the left column to prepayment risk

	Other risks								Equal	Prepayment risk								
	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	
Management risk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Occupancy risk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
ESG risk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	

Compare risks in the left column to management risk

	Other risks								Equal	Management risk								
	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	
Occupancy risk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
ESG risk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	

Compare ESG risk to occupancy risk

	ESG risk								Equal	Occupancy risk								
	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	

Comparison of external risks:

External risks refer to risks that are not project-specific and depend on external factors, therefore they can be common among projects e.g. depending on the country.

Compare risks in the left column to regulatory risk

	Other risks								Equal	Regulatory risk								
	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	
Market risk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Energy prices volatility	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Currency risk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	

Compare risks in the left column to market risk

	Other risks								Equal	Market risk								
	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	
Energy prices volatility	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Currency risk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	

Compare energy prices volatility to currency risk

	Energy prices volatility								Equal	Currency risk								
	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	

OUR TEAM

Project Coordinator



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