EEnvest

DE-RISKING AND MAINSTREAMING ENERGY EFFICIENCY INVESTMENTS IN THE BUILDING RENOVATION SECTOR

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EEnvest context and objectives

The perception of risk surrounding building renovation operations is an important driver in most of the energy efficiency related financing operations. However, investment decisions in building renovation are still largely based on empirical methods which rely solely on company business specific experiences. Significant investments need to be mobilised to achieve the ambition set by the European Green Deal and the objective to reduce EU dependence on fossil fuels imports set out in the very recent REPowerEU plan. While significant public sector expenditure is allocated to leverage private finance for sustainable energy (e.g. through the InvestEU facility), many private investors still lack sufficient incentives and tools to overcome the perceived complexity and risks associated with this kind of projects. Sustainable energy investments as investments in energy efficiency of buildings eventually integrating renewable energy sources, need de-risking and mainstreaming into the strategic and operational approaches of market actors, in particular private financial institutions i.e. investment funds.

On the other hand, the investment market is calling for solid knowledge-based evaluation methods to facilitate technical/financial due-diligence and drive financial operations related to energy retrofits of buildings.

EEnvest aims at securing investors' trust in energy efficiency actions for existing buildings, through the development of a combined technical-financial risk evaluation framework focused on the renovation of commercial buildings. Having in mind the EU's sustainable finance strategy, EEnvest aims to embed sustainability into investment processes by a proper implementation of the associated policies, in particular the EU taxonomy regulation, the proposal for a Corporate Sustainability Reporting Directive, the Banking Package 2021, the EU green bond standard and labels for retail investment products, and propose a methodology to guide market actors to change their practices.

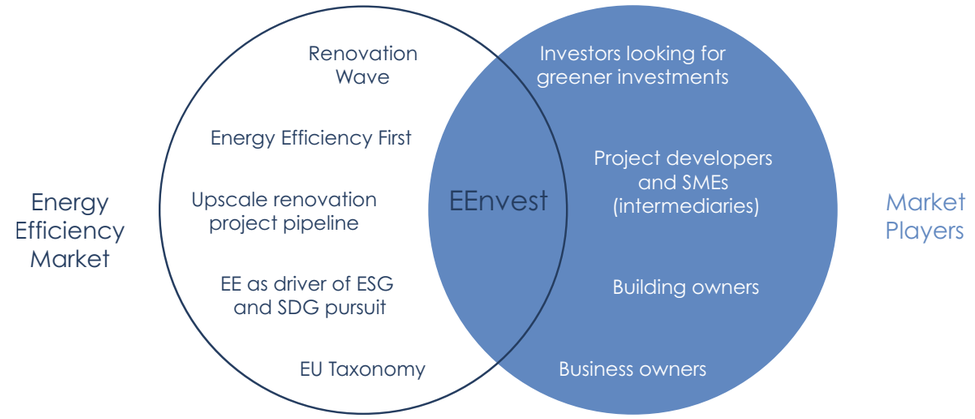
In this context, adequate tools and methodologies are needed to attract private finance to sustainable energy investments in the energy efficiency segment of commercial buildings, together with the need to encourage investment alignment with regulatory requirements and policies on sustainable finance, both on the supply and on the demand of finance, to foster a massive upscale of retail investments in sustainable energy and via the securitization of sustainable energy assets and access to the secondary market.

Sustainable energy interventions are often part of a broader investment; hence they are not always identified as sustainable assets, which reduces their visibility for investors, therefore the risk models, the methodology and derived web platform are modular and replicable to different type of assets, in order to extend evaluations to clusters of small investments and to portfolios. While keeping the focus at project level, EEnvest deals with creditworthiness analysis, quality standards and data benchmarking, and offers outputs to enable internal ratings-based approaches, climate stress-testing, analysis of sustainable energy aspects of investment strategies at portfolio level.

***The first objective** of the EEnvest project is the development of a comprehensive technical risk evaluation framework for the full set of considered energy efficiency investments, with a focus on building energy performance driven renovation. The framework allows investors to evaluate risk connected to energy efficiency on the technical side without the need to go in depth into building energy performance aspects.*

***The second objective** is to boost energy efficiency financing by making them able to equally compete with other categories of investments, thanks to both technical risk identification, quantification and mitigation, and financial risk assessment.*

EEnvest aims at supporting investors' decision making process by translating building's energy efficiency technical requirements into economic indicators. These indicators are in turn used to evaluate financial risks associated with deep renovation investments and to include non-energy benefits in asset evaluation models. EEnvest allows the financial community to accurately assess Energy Efficiency (EE) and accelerate decision making in this sector. Moreover, EEnvest aims to increase financers', investors', owners' and users' mutual trust, by identifying, quantifying and mitigating technical risks associated to those investments as well as by reducing the cost of credit for lenders through targeted risk reduction actions. EEnvest has in fact developed an effective evaluation method for the technical/financial risks correlation by categorizing some major technical risks and quantifying their impact on investors' confidence. And all these are calculated on a user-friendly platform.



EE Market Dynamics and positioning of the EEnvest project

Indeed, EEnvest project's main outcome is a digital platform, where investors and project developers can share information on energy efficiency project easily and transparently. The process is that, first, project developers and promoters share the details of energy efficiency projects, specifically for commercial office buildings energy renovation projects, onto the platform. Based on that, an algorithm assesses the technical and financial risks related to the specific project, and lastly a report is exposed to the investors.

The investors can benefit from the choices of technical nature (e.g., probability distribution of energy performance gap and expected damage) already represented into financial indicators. Blockchain guarantees the report authenticity and any further update or modification to information would make the report invalid. By this innovation, the burden of understanding technical aspects is no more shifted to the investors, which can complete their portfolio based on financial risk profiles. Further support may be delivered by partners as consultancy services.

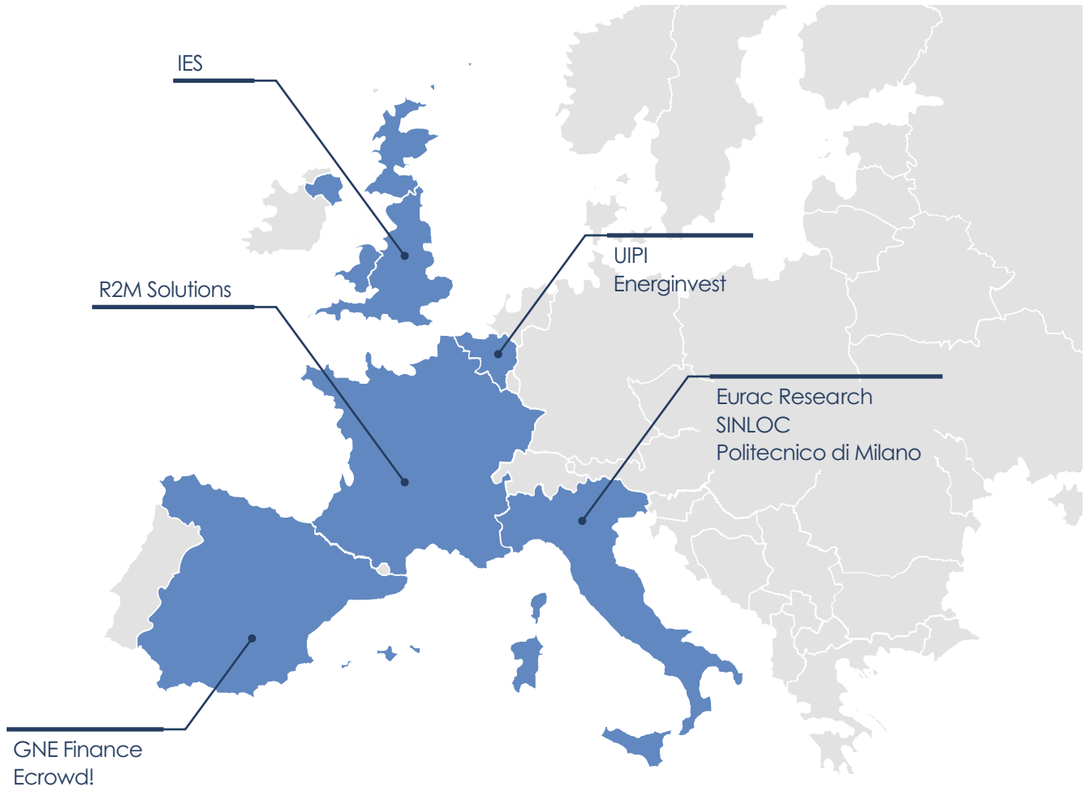
The platform targets a specific range of investment: from EUR 200,000 to EUR 2,000,000, representing a large number of cases where buildings gets renovated but the overall investment is not as high to allow for a standard due-diligence approach to be economically viable. The methodology is being tested on two demo case sites, located in Italy and Spain.

Moreover, specific types of investors can get additional value from the platform, as the possibility to evaluate quality and risks linked to different project alternative for the same site (ESCOs) or to evaluate EU Taxonomy and contribution to Sustainable Development Goals (SDGs) such as CO_2 emission reduction goals for asset management companies and impact investors.

Among the project results, an energy efficiency project quality self-assessment tool for building developers helps to increase investor's confidence, and multi-criteria decision analysis tool supports the decision-making process of investors by benchmarking different investment opportunities.

The following chapters introduce the consortium partners, the methodology and its components, the tools and web platform, and finally the demonstration of the methodology on two pilot projects. EEnvest project cooperated with other EU funded projects and initiatives, which are described in the last chapters.

Our Consortium in a nutshell



EEnvest consortium comprises a heterogeneous group of partners with extended expertise on the topics of energy efficiency, financing, and IT.

Some general information about the project

- ***EU Project duration***
  from July 2019 until June 2022
- ***Coordinated***
  by Eurac Research
- ***9 Partners***
  from the technical and financial field
- ***Advisory Board***
  composed by members from the Real Estate, Energy Efficiency and Financial Institutions
- ***2 demo sites***
  in Italy and in Spain, raising up to 25000 m² net surface

Eurac Research is a private research centre based in Bozen, Italy. The Institute for Renewable Energy conducts applied research on advanced energy systems, based on or including sustainable energy sources. Its activities include national and international research projects, promotion of renewable energy technologies and scientific consultancy to political decision-makers.

Role in the project

Eurac Research is responsible for the overall scientific and administrative management of the project activities. Eurac Research is in charge of defining technical risk typologies, together with associating related mitigation measures and making recommendations for risk limitation and mitigation in the form of guidelines.

www.eurac.edu

GNE Finance is a high impact investment company focused on providing financing for the built environment. GNE Finance is a leader in leveraging finance to deliver innovative solutions that maximize social and environmental impact while delivering sustainable returns to capital providers. GNE Finance supports homeowners throughout the renovation process and offers affordable and customized financing solutions.

Role in the project

GNE is developing a framework to evaluate the impact of both energy and non-energy related benefits on asset value, and the corresponding business case after renovation. Specifically, GNE focuses on the validation of the financial risk evaluation model.

www.gnefinance.com

SINLOC was founded in 1981 in Padua (IT) and is an Italian leading company in the market for local development initiatives. It operates both as economic, procedural and financial advisor, as well as equity investor in PPP initiatives with a particular emphasis on social, economic and financial sustainability of projects.

Role in the project

Sinloc is responsible for the development of the financial risk evaluation model. In coordination with the technical risk activities, Sinloc mainly defines the parameters of correlation between technical and financial risks as well as the setting up of the financial evaluation model. Sinloc also contributes to the development of the investment evaluation model and of the demo case.

www.sinloc.com

Energinvest is a strategic, financial and operational consulting firm specialized in the development and implementation of public and/or private initiatives to scale up investments in energy transition. Energinvest offers extensive expertise of third-party financing mechanisms, energy performance contracting (EPC), energy public-private partnerships (EPPP) and public-private third-party investment (TPI) social models in the Energy Efficiency sector.

Role in the project

Energinvest contributes in the research work on existing risk evaluation frameworks and aim to test and validate the financial risk models developed within the EEnvest project. Energinvest also work on the valuation methodology of non-energy related benefits and their possible inclusion in the business case, and also perform a technical/financial due diligence on the demo-case building.

www.energinvest.be

IES is recognised as a world leader in performance analysis technology that reduces the carbon emissions of buildings and cities worldwide. It delivers integrated performance-based analysis, offering a number of solutions from the masterplanning level, to citizen engagement, to regulations compliance, and district energy solutions.

Role in the project

IES is leading the development and testing of the investment evaluation platform, including the design of the platform architecture, the implementation of a structured, interoperable and well organized knowledge base, as well as the integration of a strategy for validated and secure information exchange based on distributed ledger technology.

www.iesve.com

R2M is an integrated and multi-disciplinary entrepreneurial innovation company that aggressively targets filling the gap between research activities and market implementation. R2M helps companies grow and acts as an accelerator for bringing technologies and services to the market across the fields of Innovation Management, Engineering, Energy, and ICT/Automation.

Role in the project

R2M has the role of Innovation Manager of EEnvest, overseeing communication, dissemination and exploitation activities.

www.r2msolution.com

UIPI is a pan-European non-profit association comprising of 31 organisations from 28 countries. Jointly, they represent more than 5 million private property owners of some 20 to 25 million dwellings all over Europe, ranging from individual home owners to landlords with large portfolios in the private-rented and commercial sectors. Founded in 1923, UIPI aims to protect and promote the interests, needs and concerns of private landlords and owner-occupiers at national, European and international levels.

Role in the project

UIPI will bring in the consortium property owners' perspective and assist on the replication of the EEnvest platform to the residential sector.

www.uipi.com

Politecnico di Milano was established in 1863 and is the largest school of engineering, architecture and industrial design in Italy. It is organized in 12 Departments devoted to research and 6 Schools dedicated to education activities. The EEnvest project has involved a multidisciplinary team with a wide expertise in H2020 Programme.

Role in the project

POLIMI supported the Consortium by analyzing technical risks associated with investments on building energy renovation strategies, contributing also to the definition of the methodology for data structuring within the platform.

www.polimi.it

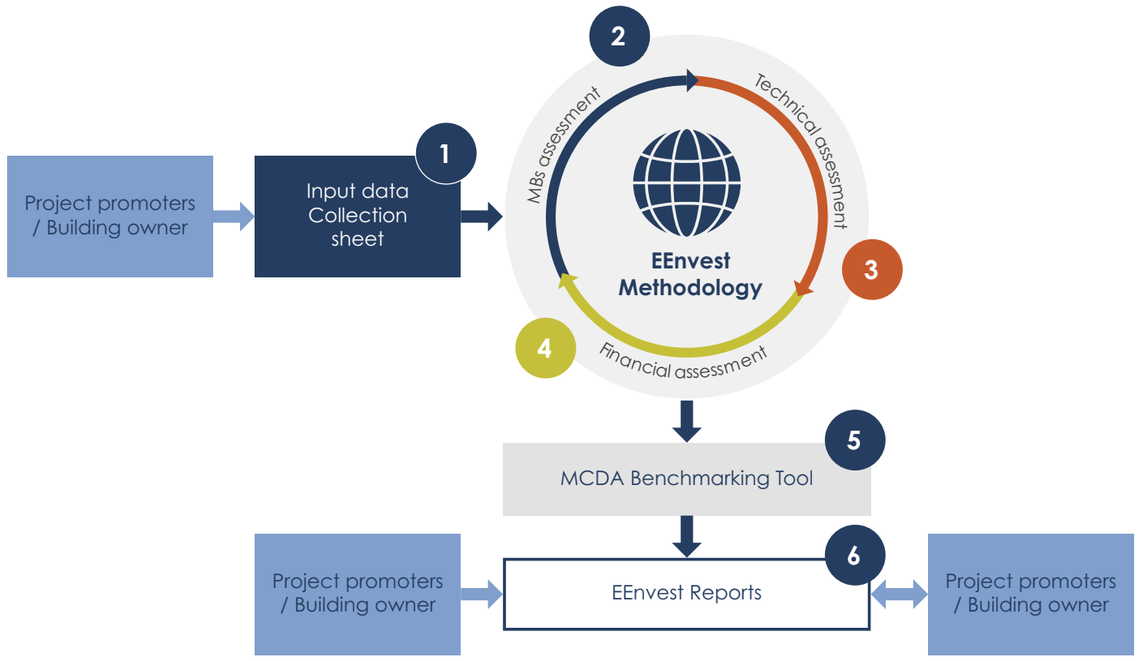
Ecrowd! is a crowdlending platform for positive impact investment projects, which includes energy efficiency projects, and was established in 2013. Crowdlending is crowdfunding for loans, where private entities (companies, municipalities, associations) request a loan not to a bank, but to a pool of retail investors through Ecrowd's platform.

Role in the project

Ecrowd's task in the project is to bring practical experience in project due diligence and financing of energy efficiency projects.

www.ecrowdinvest.com

EEnvest methodology in brief



The EEnvest methodology mechanics

The EEnvest methodology enables investors to streamline and standardise internal evaluation processes that lead to decision of investing in energy efficiency projects. The methodology adapts to a wide range of users, from private investors, asset managers, financial institutions and property owners, enabling informed decision-making over investments related to building energy efficient renovation, in terms of associated technical and financial risks as well as sustainability.

In particular, the EEnvest methodology assesses Deep Energy Retrofit (DER) projects under three dimensions and works on an input-output basis.

The assessments dimensions of the EEnvest Methodology are the:

i. **Technical Risk Assessment**,
ii. **Financial Performance Assessment** and the
iii. **Multi-Benefits Assessment**.

As illustrated in the figure on the left, the EEnvest methodology mechanics comprise of:

1. **Input Data Collection Sheet**
2. **Technical Risk Assessment**
3. **Financial Performance Assessment**
4. **Multiple-Benefits Assessment**
5. **MCDA Benchmarking Tool, to benchmark different project alternatives**
6. **EEnvest Risk Assessment Report, jargon-free KPI information and recommendation for investors.**

1. Input data collection

A fundamental step of the EEnvest methodology is the data collection from the building developer/project promoter, who provides necessary information about the building and the characteristics of the proposed renovation project.

Inputs are divided in a few mandatory information, some additional and optional shown only when needed, in a user-friendly way.

2. Technical Risk Assessment

The EEnvest Technical Risk Assessment identifies and quantifies the technical risks of deep energy renovation projects by the process in Figure 5. The computation relies on the EEnvest Technical Risk Database that accounts for all the possible risk combinations linked to each single renovation measure.

The outputs of the Technical Risk Assessment are

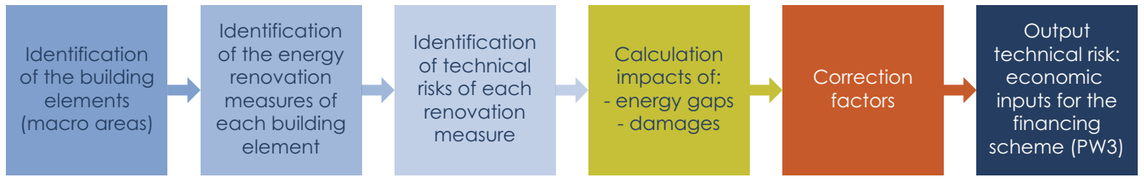
1. **Energy performance gap**, it is the indicator that estimates the deviation between the planned and the real energy consumption of the building for thermal and electric consumption
2. **Damage**, it is the indicator that estimates the deviation cost of the renovation investment respect to the planned one for failure, malfunction, or breakage at the building elements.

Provided both as KPI value and in terms of probability distribution, EEnvest Technical Risk Database collects for each building element/component and for both two indicators:

- several probabilistic impact data of possible occurrences and failures that can happen at the building elements and technical systems
- mitigation measures, used to reduce the technical risks (as use of certification protocols, monitoring, or maintenance programme…).

Technical risk data collection process has been developed according to a top-down approach, spanning from a general to a specific issue, in relation to the users' inputs (building features, renovation solutions set, boundary condition) for both indicators: energy renovation gap and damages.

Probability and respective impacts have been identified through literature reviews, interviews (real data collected by interviews to building experts), and parametric energy simulation.



Identification process of the technical risks connected to the EE renovation projects

3. Financial Performance Assessment

An innovative aspect of the EEnvest methodology is the calculation of the financial performance, combining the results of technical risk analysis (energy performance gap and damage indicators) with the variability of energy prices and future climate (in terms of heating degree days). This process computes not only the KPIs value but goes beyond the state of the art by providing the corresponding probability distributions, which can play a key role for decision-making in investment alternatives selection, enabling unmatched capabilities as sensitivity analysis and value-at-risk analysis.

The outputs of the Financial Performance Assessment are the financial indicators calculated by the platform:

- **Payback time**: it is the amount of time that the investment will take to recover the initial cost, when the length of the investment time reaches a breakeven point
- **Maturity**: it is defined as the total duration of the project needed to achieve a zero NPV (IRR equal to cost of capital)
- **Internal Rate of Return (IRR)**: it is the discount rate that makes the net present value (NPV) of a specific project equal to zero
- **Net Present Value on Investment (NPV)**: it is the value of all future cash flows (positive and negative) over the entire life of an investment discounted to the present. The NPV/investment ratio gives a measure of profitability of the project
- **Debt-Service Coverage Ratio (DSCR)**: it is an indicator of the project's ability to repay a debt. It is calculated as the ratio between the operative cash flows generated by the project and the cash flows for debt, lease or other obligations (debt service, both for interests and principal payment) due in one year.

All these KPIs, together, can provide the investor with all the necessary information to get the performance and the riskiness of the investment.

4. Multiple-Benefit Assessment

Multiple-Benefits are benefits realised by the project execution, which go beyond the monetary value and financial returns (i.e., pure financial parameters). Indeed, they accrue to three impact dimensions: environmental, economic, and social, and they can create additional value for the investors and other stakeholders.

The Multiple-Benefits Assessment builds upon the definition of Multiple-Benefit KPIs for both the investor and the project promoters/building developers. The project promoter may be the building owner or an external party representing the building owner interests. In this case, the promoter aims to define a set of building improvements and then to build a sound investment case for convincing investors to finance the project.

On the other hand, the multiple-benefit approach for investors utilizes KPIs that unfold the impact of the investment that goes beyond financial risks and financial returns.

This responds to the investor's need for reliable methods to properly understand the impact of investment opportunities, beyond the traditional financial parameters.

The KPIs chosen for building owner and project promoter focus on assessing not just the building's needs but people's needs in terms of health and safety, in terms of thermal comfort, visual comfort, acoustic comfort, Indoor Air Quality (IAQ) and Productivity.

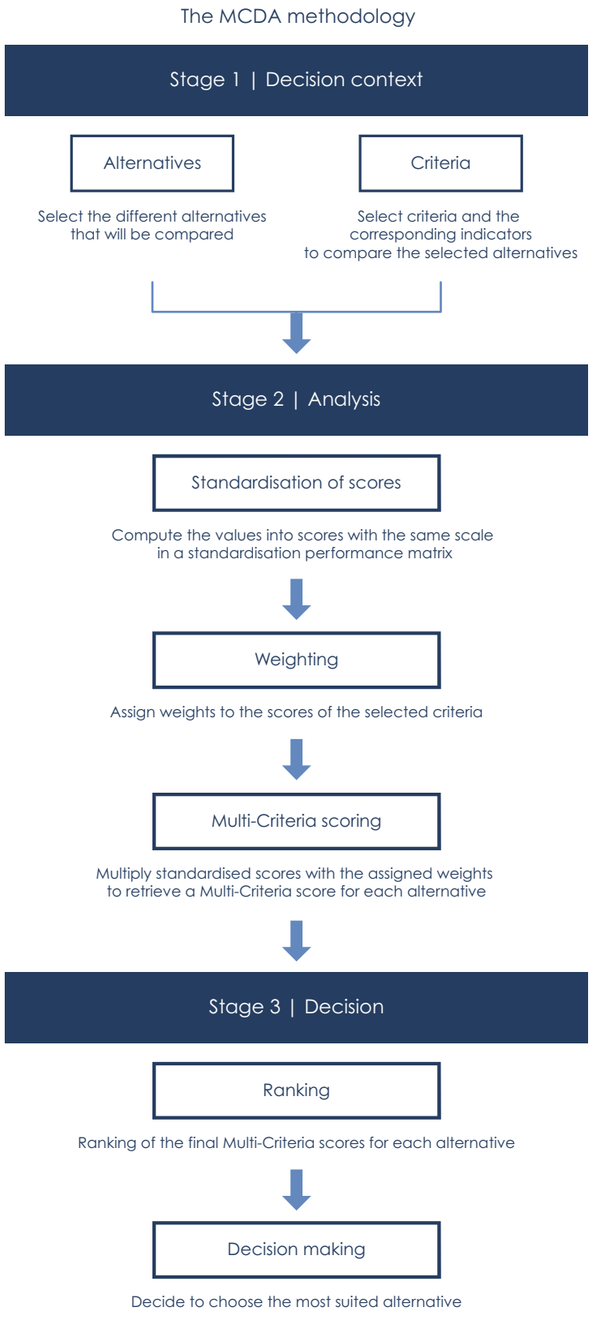
The KPIs specifically selected to address the investor needs, based on an extensive desk research, interviews and questionnaires to the stakeholders and the partners expertise, are:

- **CO_2 emission reduction**: decrease of CO_2 emissions as a result of undertaking the renovation project
- **Predicted Primary Energy Savings**: the difference between the actual energy consumption of the building (baseline) and the estimated energy consumption after the renovation project
- **Number of jobs created**: new jobs created as a result of the investment. This KPI is based on a BPIE study that states that per 1 million euro invested on energy efficiency projects, 18 new jobs on average are created. It can vary depending on location of building (i.e., country) and the amount of the investment
- **EU Taxonomy compliance**: whether the investment complies with the minimum requirements defined by the EU Taxonomy for Climate Change Mitigation. Specifically, whether the project being assessed has a minimum of 30% energy consumption reduction
- **Property Value Increase**: possible increment on the value of the asset after the renovation project. This is also referred to as the "greemium". this metric is qualitative, and it provides a range of possible value increase backed-up by literature
- **Contribution to Sustainable Development Goals (SDGs).**

5. Multi-Criteria Decision Analysis MCDA - Benchmarking

Once the outputs from the Technical, Financial, and Multi-Benefits assessment are calculated, they will be used as inputs for the MCDA for benchmarking different investment alternatives.

The MCDA follows a step-by-step basis. A first step refers to selecting the different investment alternatives that are of interest to the user, as well as selecting the criteria (i.e., KPIs) that will be used to study the investment alternatives. For the case of choosing quantitative criteria, the result will be numerical. On the other hand, when the selected criteria refer to qualitative parameters, the result may be specific wording or a written description. For the case of DER projects and the EEnvest project, by alternatives we refer to renovation projects, by criteria we refer to the technical, financial and multiple-benefit KPIs and by results of the criteria, we refer to the outcome of computing the KPIs.



The process of the MCDA methodology

A second step consists of transforming the information retrieved about different alternatives into harmonised scores that are transversal for the different alternatives under analysis. This is done by standardising all the different types of data from the KPIs into a standardised performance matrix. Then, weights are assigned to the different indicators, the KPIs in this case. This enables decision makers to prefer specific criteria of the different options.

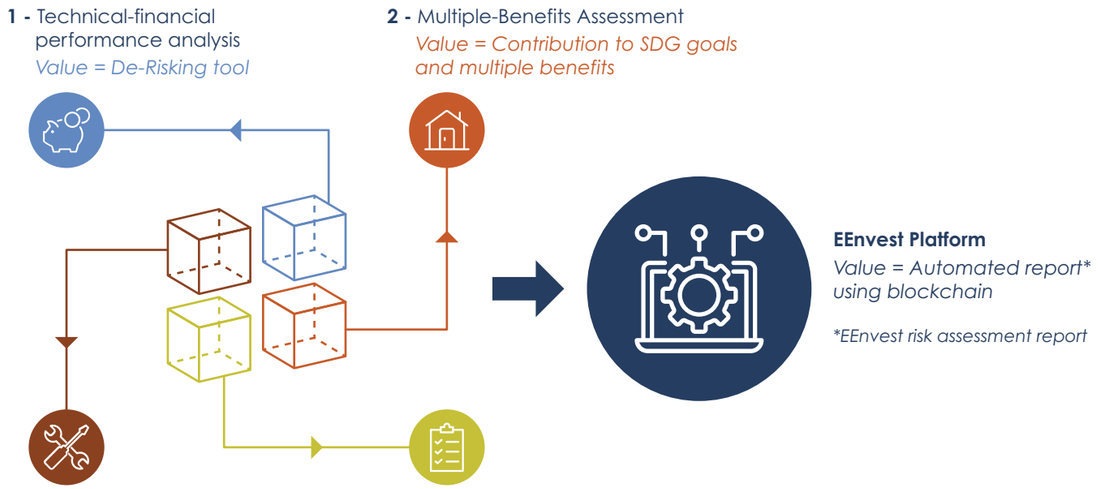
Then a third step is about the actual decision resulting from the analysis. With the final Multi-Criteria score values, the projects can be ranked and the preferred projects for the investor are shown. As a result, the investor is now able to choose the preferred project according to the MCDA analysis.

6. EEnvest Risk Assessment Report

The EEnvest Report collects the output of the methodology: starting from general and technical data, it produces a full and straightforward assessment of technical risks, financial and multi-benefit performance, quantifying the specific KPIs outputs under different categories.

The EEnvest Report consists of an increasingly detailed, user-friendly document, available as PDF document as well as digital verified content. The information, available on the EEnvest platform or through APIs for interoperability, enables investors to compare different energy efficiency projects based on standardized KPIs. Additionally, the report allows investors to perform several operations: on one side, uploading data for the knowledge base with different levels of specificity, displayed in a simple and effective graphic; on the other side, it permits to compare investment opportunities showing suitable financing mechanisms available for the specific energy renovation project. Finally, the report contains recommendations and actions that can be implemented as mitigation measures.

EEnvest tools



Overview of the EEnvest tools

EEnvest De-Risking tool for technical-financial performance analysis

The technical risk calculation process runs as an online tool on the EEnvest web-platform, by extracting from the EEnvest technical risk database all the technical risk combinations specific to the energy efficiency project, then producing a probability distributions for both Energy Performance Gap and Damage KPIs.

Then, based on the financial inputs (investment cost and economic energy savings), probability distributions for energy prices and future climate conditions, the tool calculates the financial performance of the investment.

While the financial analysis typically calculates the expected value of the financial KPIs, meaning one single and precise value, the tool provides an additional and valuable information: the probability distribution of each KPI.

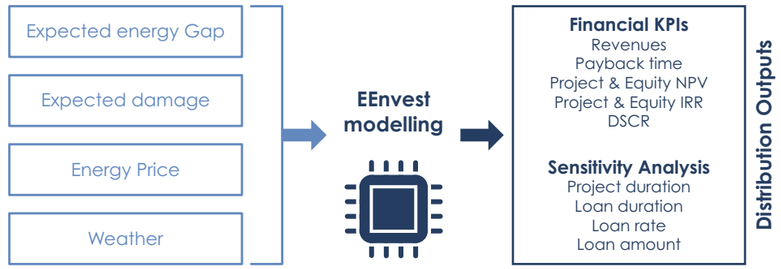
Though it might not be so easy to understand for a non-financial user, the probability distribution of a financial KPI shows what is the probability of the actual outcome of that KPI to be within a certain confidence interval.

This can be interpreted in many ways, bringing additional information such as:

- What is the minimum likely value that can be expected for a KPI if things go wrong (for example, what is the minimum value of IRR that can be expected with 98% probability)
- How probability is concentrated around the expected value (for example, what is the interval of minimum and maximum likely values of payback time with 98% probability)
- How "asymmetric" is the probability distribution, meaning if and how much is the negative outcome more likely and severe than the positive outcome.

The width and asymmetry of the probability distribution is mainly due to the technical risks

- Value = De-Risking tool
- Calculation model back-end and cloud deployment completed
- Users can run millions of simulations on the cloud, **derisking and banchmarking projects**



Overview of the calculation of the financial risk according to EEnvest platform

(energy performance gap and damage). Instead, in the EEnvest calculation model and risks related to the variation of energy prices and heating degree days are supposed to be normally distributed, so having equal probability density on the "left" and on the "right" of the mean value.

All these data and information contribute to de-risk the investment, by providing a clearer view, awareness and understanding of the actual riskiness of the investment.

So, it will help increasing the confidence of investors, that can better assess and evaluate the projects and apply a more correct (lower) risk-premium.

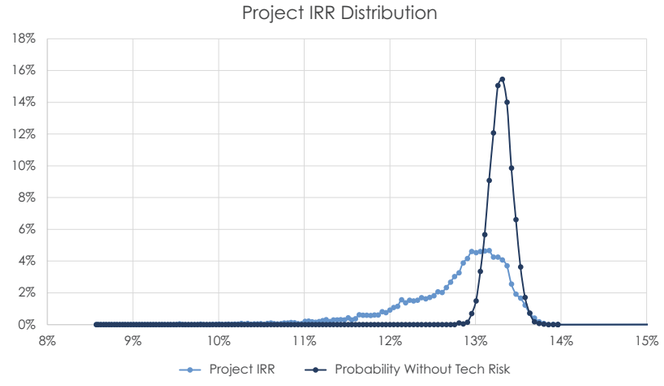
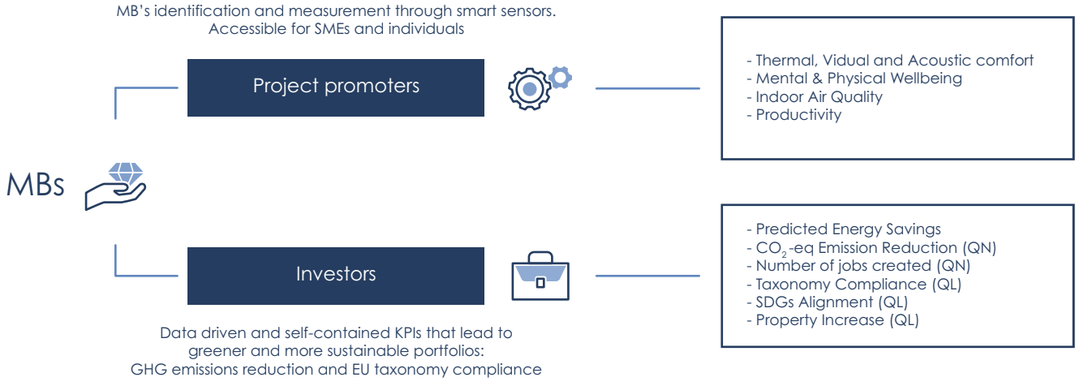


Diagram showing the probability distribution of IRR in a sample project. By including technical risks in the analysis, the investor can check that there is a relevant probability of having a low IRR (light blue curve), which cannot be considered by financial models

Multiple-Benefits Assessment tool

The Multiple-Benefits Assessment tool enables computation of Multiple-Benefits KPIs.



Explanation of the difference between project promoters and investors

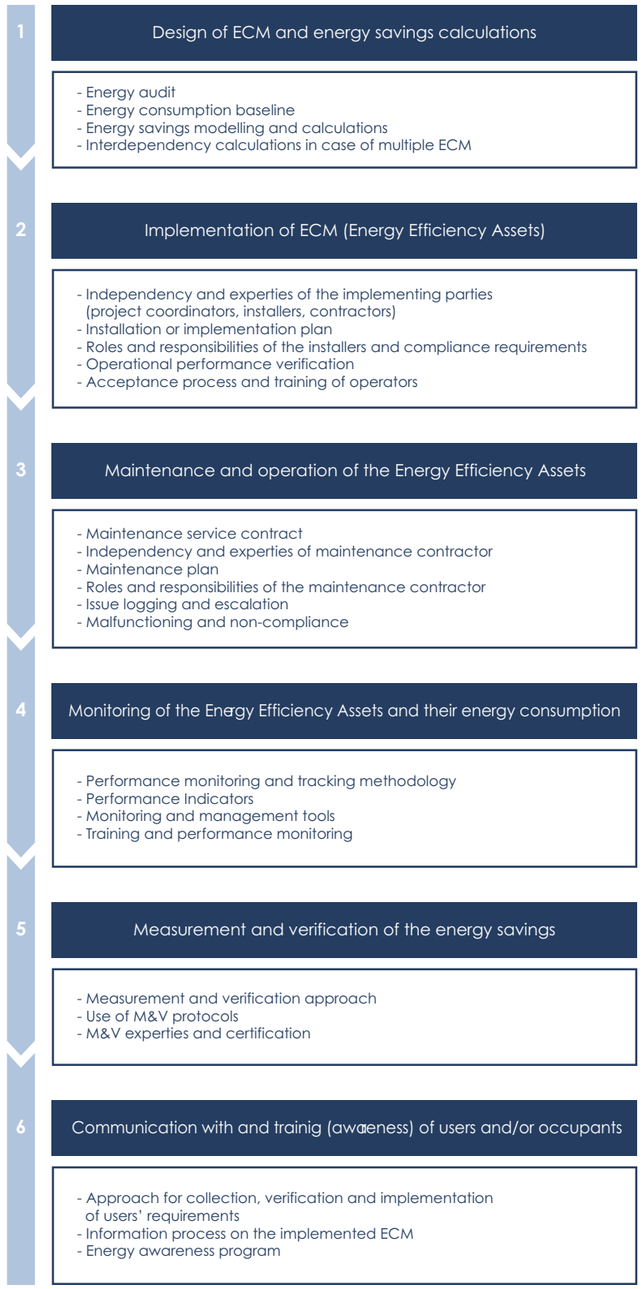
Project Quality Self-Assessment tool

The Project Quality Self-Assessment Tool (PQSA) has been developed to provide an early indication of the quality of design, implementation and ongoing operation of an energy efficiency project and of the possible risks associated with the resulting quality.

The indication of quality is based on the answering of a specifically developed Excel-based Desktop Due Diligence Questionnaire (DDDQ) consisting of 33 main questions classified in six Themes, basically representing the different stages of an energy efficiency project (e.g., the design, implementation and ongoing operation of an energy efficiency project), and on the application of a related scoring methodology.

As such, the PQSA tool provides an indication of the probability that an energy efficiency project will achieve its objectives in terms of energy savings, expected investment cost, expected amounts for operation and maintenance costs and envisaged user's requirements.

For each of the six Themes or stages of the DDDQ the most relevant items or elements were defined, which can be



Desktop Due Diligence Questionnaire (DDDQ) showing the questions included in six themes

standards, activities, documentation, tools, best practices, approaches or procedures, that need to be in place in order to assure a well-conceived and well-implemented energy efficiency project.

The DDDQ has been conceived and developed to meet the following three basic requirements:

- The time required to fill-out the questionnaire is limited to less than one hour. The assumption here is that the respondent is a person knowledgeable of the energy efficiency project
- Almost all questions require only a "Yes", "No" or "Not Applicable" answer and, based on these answers, feedback is provided on risk and quality
- There is no control, verification nor testing or physical assessment of the answers as this Desktop Due-Diligence has been developed for the benefit of the building owners and project promoters based on an honest and truthful judgement. As a result, the desktop-based questionnaire is not intended to provide any official certification nor provide any certification of quality assurance of any of the stages of the energy efficiency project.

The existence or absence of the defined elements in each of the six stages or Themes allow to have an idea of the quality of implementation and ongoing operation of the energy efficiency project and the possible risks associated with the resulting quality of implementation and operation. The better an energy efficiency project has been conceived and set-up, evidenced by the existence of the elements referred to in the different Themes, the more the risks and uncertainties surrounding the achievement of the energy efficiency savings, the size of the investment cost, the expected amounts for operation and maintenance costs and the envisaged user's requirements (e.g., comfort, indoor air quality, etc...) can be mitigated.

A **scoring and labelling methodology** has been developed in order to objectivise the quality of implementation and ongoing operation of the energy efficiency project. This is being achieved in two steps.

Firstly, the scoring methodology allocates a weight to the different Themes based on the relative importance or impact that these Themes can have on the results of an energy efficiency project. Within the different Themes the scoring methodology basically allocates a number of points or a score to the different required elements. In the case that all required elements are in place, the resulting sum of the points equals the weight associated to the individual Theme.

The sum of the scores of the individual Themes results in a global score. The logic behind the methodology is that the higher the obtained scores within the different Themes, the higher the global score will be, and consequently the higher the probability will be that the energy efficiency project will achieve its objectives. Secondly, the obtained scores for the different Themes and the Global scores are then incorporated in a five-level probability scale and, depending on the range, are given a colour label.

The five associated colour labels will indicate whether the different Themes and the global project have a very high probability, reasonable probability, low probability or very low probability to achieve their specific objectives. The colour labels will also feature a short description, the purpose being to provide a brief explanation and indication of the quality of conception and set up of the project as a whole (Global score) and of the six different Themes in particular.

370/400	**All of the Themes** have been adequately conceived and set up, **with some minor flaws, almost always** taking into account the highest standards, **highest** quality criteria and best practices. This level of conception and implementation indicates a **high probability** of the envisaged energy savings being reliable, consistent and achievable and the uncertainties surrounding the investment cost and future operation and maintenance costs being minimised.

Example of Global Scoring

Multi-Criteria Decision Analysis support tool

The MCDA tool is proposed to support the decision-making process of investors and guide them in benchmarking different investment alternatives. In specific, the MCDA tool helps decision-makers in choosing the right option for a particular project or activity that depends on multiple criteria points, i.e., when decision makers need to assess and rank multiple options that may have different measurement units or contain a mix of qualitative and quantitative criteria.

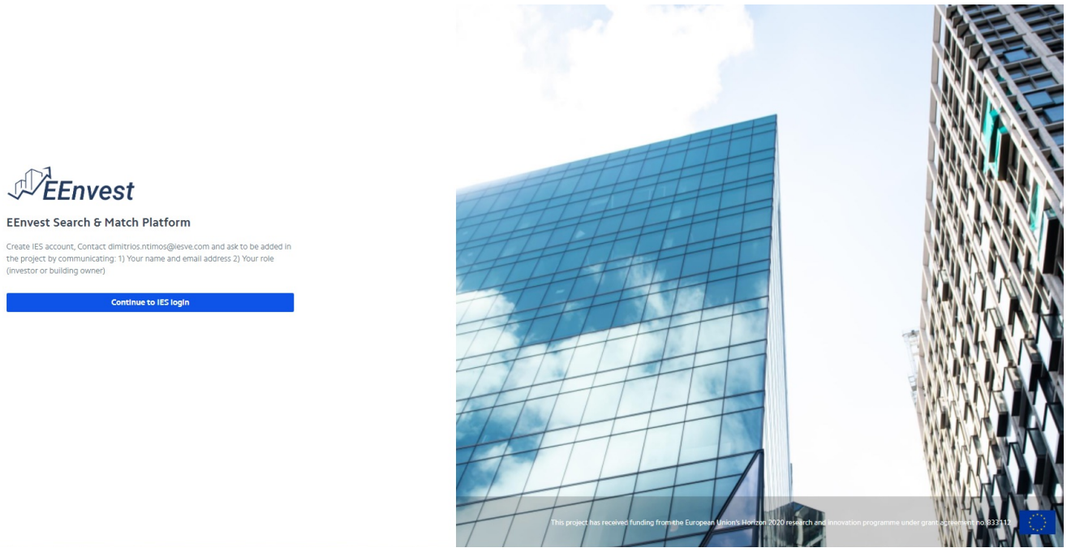
For instance, the predicted energy savings metric is quantified and thus serves as quantitative data whereas the EU Taxonomy Compliance is rather a qualitative parameter. From an investor point of view, both parameters are relevant to making the decision on which investment alternative to invest in.

The MCDA tool input table displays the building characteristics of the proposed projects, their investment cost and the KPIs of the different assessment packages corresponding to each alternative. Once the input table is filled in, the standardised performance matrix is created, and the standardised scores are calculated for each alternative and for each KPI.

By a visualization formatting by colour, investors can easily check which alternatives result in higher or lower scores on the different KPIs.

The investors can customise weights to be assigned, then the final multi-criteria scores can be calculated. The alternatives can be ranked and compared. The final scores are sorted by the contribution of each assessment package. This view helps investors to immediately get which investment option is more aligned with their preferences and which KPIs are contributing most to the total scoring.

EEnvest search & match web platform



Landing page of the EEnvest Search & Match platform

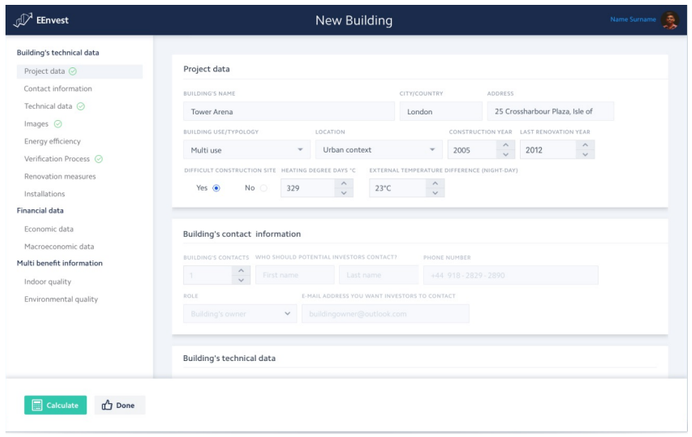
The EEnvest search & match web platform is the meeting point that brings together building owners, project promoters and investors. The platform enables building owners and project promoters to enter information about their building and calculate several technical and financial indicators related to proposed energy efficiency project. The platform allows then to minimise risks and attract investors, interested in low-risk investments. Investors can find and benchmark investment opportunities in renovations based on their preferences.

A user-friendly user interface has been designed based on the latest principles and practices and by enacting User-Centred Design based on user research and interviews to potential users. The basic principle was to recognise and satisfy our user needs early in the process, which puts the potential user in the centre.

The platform is based on a search & match concept, that allows the users to contribute on the growth of the platform. The platform operates fully on the cloud, requires an internet connection to access, and is accessible by the end-users via a web-user interface on a common web browser, responsive to all types of screens and devices.

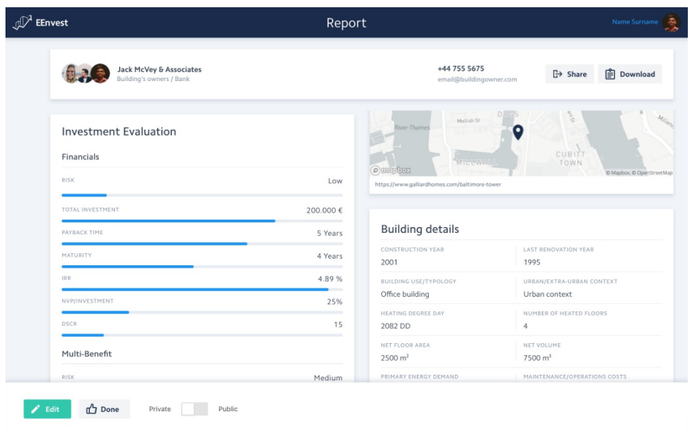
Once registered on the platform, the user is classified as a building owner/project promoter) or as an investor, with different permissions for each role.

On the one hand, the building owner is able to create a new project, gather and enter new data including technical, financial information about their renovation project on that asset. Based on the data they entered, the platform allows for online automated calculation of Key Performance Indicators (KPIs) related to their project, as it incorporates the de-risking tools developed in the project for technical-financial performance analysis and multi benefits assessment.



Entering new project data in the platform prototype

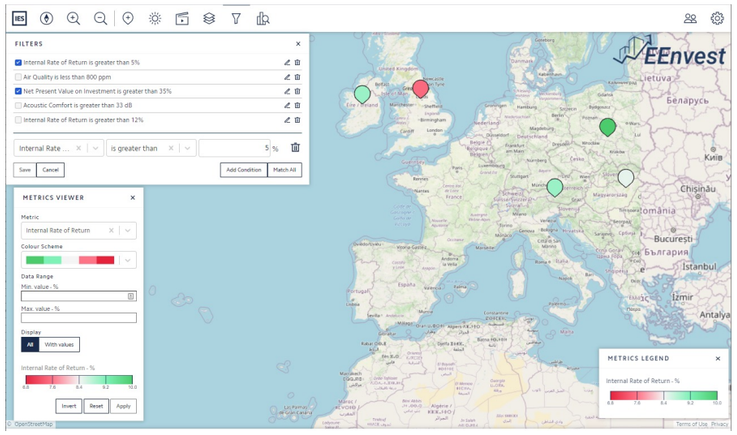
At this stage, the building owner is able to know all the KPIs related to their planned renovation project and is ready to be published to the marketplace to "attract" investors. They are also able to compare how their project scores against other projects from their own, or from other building owners' portfolios.



View of the project report in the platform prototype

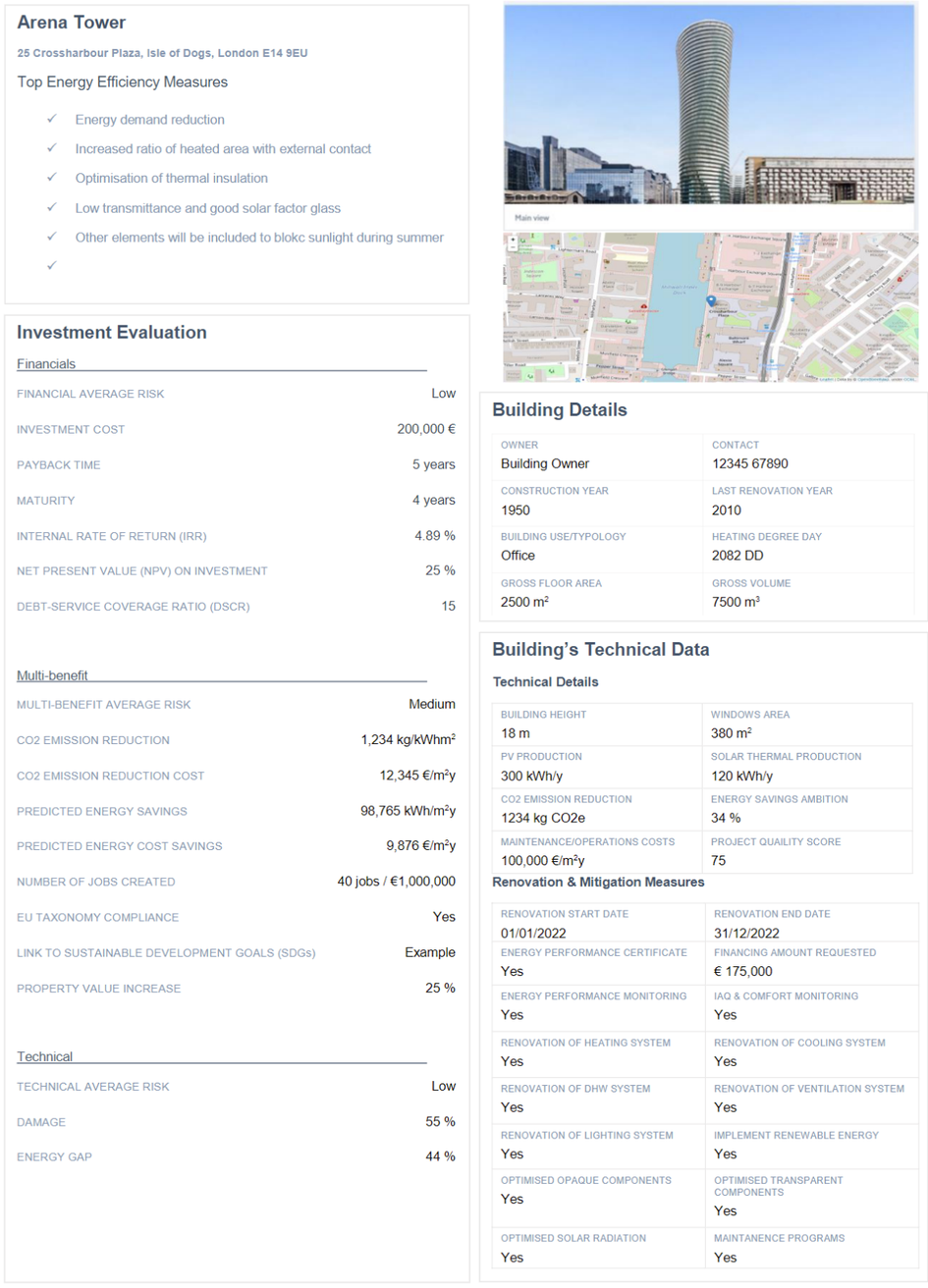
On the other hand, the investor creates an account and logs into the platform with the permissions to display and compare existing projects, since they are not authorised to create, edit, delete or execute calculations for projects. Using filtering and visualisation tools, they are able to display all the investment opportunities available in the platform and identify the projects of their interest without the need to dive into technical data or having any technical or financial expertise. The KPIs and de-risking capabilities of the platform enable them to assess and proceed with decision making regarding potential investment opportunities.

Using visualisation tools such as custom filters and colour coding, the investor can easily compare and identify the best investment opportunities based on their preferences, as seen in the example above. Once happy with an investment opportunity they can select it and display all the calculated KPIs to analyse it in more detail. Additionally, investors can download a very detailed analysis report document which is populated automatically based on the EEnvest tools and models, described in the previous paragraphs. This report includes all the information they need to know about the asset of their interest, including some more detailed analysis of the potential investment in the energy efficiency renovation of the asset.



Comparison of the available projects in the search & match platform

Furthermore, to enhance their trust in the calculations, a blockchain verification mechanism is integrated in the report generation process, which makes every report independently verifiable, unique and immutable. In the meantime, privacy is ensured since no data is transmitted to the public blockchain verifier. With the immutable nature of blockchain, the report validity can be trusted at any point in time. The blockchain's core value is enabling both parties in the marketplace to provably and permanently agree on what data was entered in the report, when and by whom, without relying on a trusted intermediary. Finally, data integrity is ensured by all the cyber security communication protocols integrated in the platform such as using OpenID user authentication.



Arena Tower

25 Crossharbour Plaza, Isle of Dogs, London E14 9EU

Top Energy Efficiency Measures

- ✓ Energy demand reduction
- ✓ Increased ratio of heated area with external contact
- ✓ Optimisation of thermal insulation
- ✓ Low transmittance and good solar factor glass
- ✓ Other elements will be included to blokc sunlight during summer
- ✓

Investment Evaluation

Financials

FINANCIAL AVERAGE RISK	Low
INVESTMENT COST	200,000 €
PAYBACK TIME	5 years
MATURITY	4 years
INTERNAL RATE OF RETURN (IRR)	4.89 %
NET PRESENT VALUE (NPV) ON INVESTMENT	25 %
DEBT-SERVICE COVERAGE RATIO (DSCR)	15

Multi-benefit

MULTI-BENEFIT AVERAGE RISK	Medium
CO2 EMISSION REDUCTION	1,234 kg/kWhm²
CO2 EMISSION REDUCTION COST	12,345 €/m²y
PREDICTED ENERGY SAVINGS	98,765 kWh/m²y
PREDICTED ENERGY COST SAVINGS	9,876 €/m²y
NUMBER OF JOBS CREATED	40 jobs / €1,000,000
EU TAXONOMY COMPLIANCE	Yes
LINK TO SUSTAINABLE DEVELOPMENT GOALS (SDGs)	Example
PROPERTY VALUE INCREASE	25 %

Technical

TECHNICAL AVERAGE RISK	Low
DAMAGE	55 %
ENERGY GAP	44 %

Main view

Building Details

OWNER: Building Owner	CONTACT: 12345 67890
CONSTRUCTION YEAR: 1950	LAST RENOVATION YEAR: 2010
BUILDING USE/TYPOLOGY: Office	HEATING DEGREE DAY: 2082 DD
GROSS FLOOR AREA: 2500 m²	GROSS VOLUME: 7500 m³

Building's Technical Data

Technical Details

BUILDING HEIGHT: 18 m	WINDOWS AREA: 380 m²
PV PRODUCTION: 300 kWh/y	SOLAR THERMAL PRODUCTION: 120 kWh/y
CO2 EMISSION REDUCTION: 1234 kg CO2e	ENERGY SAVINGS AMBITION: 34 %
MAINTENANCE/OPERATIONS COSTS: 100,000 €/m²y	PROJECT QUAILITY SCORE: 75

Renovation & Mitigation Measures

RENOVATION START DATE: 01/01/2022	RENOVATION END DATE: 31/12/2022
ENERGY PERFORMANCE CERTIFICATE: Yes	FINANCING AMOUNT REQUESTED: € 175,000
ENERGY PERFORMANCE MONITORING: Yes	IAQ & COMFORT MONITORING: Yes
RENOVATION OF HEATING SYSTEM: Yes	RENOVATION OF COOLING SYSTEM: Yes
RENOVATION OF DHW SYSTEM: Yes	RENOVATION OF VENTILATION SYSTEM: Yes
RENOVATION OF LIGHTING SYSTEM: Yes	IMPLEMENT RENEWABLE ENERGY: Yes
OPTIMISED OPAQUE COMPONENTS: Yes	OPTIMISED TRANSPARENT COMPONENTS: Yes
OPTIMISED SOLAR RADIATION: Yes	MAINTANENCE PROGRAMS: Yes

Example of the search & match auto generated report

Applying EEnvest methodology to building renovation projects

Two demo-case buildings participating in the EEnvest project (i.e., Rome, Italy and Olot, Spain) have been subjected to an investment evaluation following the EEnvest Methodology based on their respective EEnvest Risk Assessment Report.

The investment evaluation of the Italian demo-case

The investment evaluation of the Italian demo-case building revealed that from a technical risk point of view, assessed according to the EEnvest methodology, this energy efficiency project can be considered very low risk. From a financial performance point of view the project is performing well with e.g., a relatively short payback time, a rather high IRR and a probability distribution of IRR indicating that the financial risk on the investment is very low. It was concluded that from a financial point of view the project is interesting as an investment opportunity both for the property owner itself or for third party financiers.

Considering the Italian demo-case under the multi-benefit perspective, the project is classified with a low average performance, and this is due to the non-compliance with the EU-Taxonomy (at least 30% of reduction of primary energy demand was needed). Overall, accomplishing the 27% over 30% goal can still be evaluated very positively in terms of environmental benefit.

The Italian demo-case performs well under the others multi benefit KPIs and the CO_2 emission reduction achieved with the renovation contributes to the Sustainable Development Goals targets: 8.4, 11.6, 11.9, 12.2. About economic benefit, the Italian project size contributes to the creation of 23.5 jobs approximately.

Altogether, the project results in terms of non-energy benefits are positive and it integrates the sustainability criteria to design the renovation. Qualitative and quantitative impacts have been achieved, including environmental, economic and transversal benefits, as the contribution to the SDGs in respect of Affordable and Clean Energy, Good Jobs and Economic Growth, Responsible Consumption and Production, Industry, Innovation, and Infrastructure, Sustainable Cities and Communities.

EEnvest Risk Assessment Report for the Italian demo case

EEnvest Risk Assessment Report for the Spanish demo case

The investment evaluation of the Spanish demo-case

Regarding the Spanish demo-case building, the investment evaluation showed that from a technical risk point of view the project has mixed technical risk indicators, the Damage risk indicator pointing to very low risk and the Energy Gap indicator pointing to high risk. From a purely financial point of view the project would be qualified as not performing well with a long payback time, barely positive IRR and a negative NPV, though with limited financial risk on the investment as measured by the probability distribution of IRR and Payback time. The less well performing financial values are consistent though with the type of renovation executed, i.e., a complete renovation and restructuring of the building. This type of renovation typically shows very long payback terms and very low IRR.

The Spanish demo-case under the multi-benefit perspective achieves a High average performance. The deep energy retrofit led to high primary energy savings, achieving 97%, ensuring the EU Taxonomy compliance.

Measures implemented generate relevant impact in terms of environmental benefits, predicted energy savings and CO_2 emission reduction. About economic benefits, the project size created approximately 4.5 new jobs. This project also achieves to incorporate the sustainability criteria and contributes to the SDGs in respect of Affordable and Clean Energy, Good Jobs and Economic Growth, Responsible Consumption and Production, Industry, Innovation, and Infrastructure, Sustainable Cities and Communities.

The residential context

Added value of EEnvest for building owners, contractors/ engineers and banks

The question that naturally arises is whether EEnvest methodology can be replicated to buildings in the residential sector, which contains most of buildings in Europe. The project has identified the necessary requirements to replicate the EEnvest approach outside of the reference market that we are targeting during the project, to set the foreground for ease of replicability after project ends in other geographic and building use markets, with a specific focus on residential buildings. Once target requirements were identified, a gap analysis has been performed to benchmark the current status of EEnvest framework with respect to residential buildings to clearly identify actions to be undertaken in the short term to eliminate shortcomings and foster extensive replicability of the approach after project ends.

The objective here is to raise the level of confidence of residential building owners and contractors in investing in the energy efficiency market, by providing a robust and standard methodology for a fast screening of energy efficiency projects in the residential sector and therefore increase the acceleration of energy efficiency projects in the residential sector.

After a specific market analysis, it was found that, pending the final vote on the new EPBD (Energy Performance Building Directive) Recast, the core of energy efficiency residential market potential will be driven by this EPBD Recast, most probably leading to new investments in the range between €40,000 to €200,000.

Technical Risks

Within the EEnvest project, it was found that these very developed databases for risk probability curves do not distinguish fundamentally for building elements in the commercial and residential sectors. Therefore, the EEnvest platform has been made capable of equally handling applications in the residential sector.

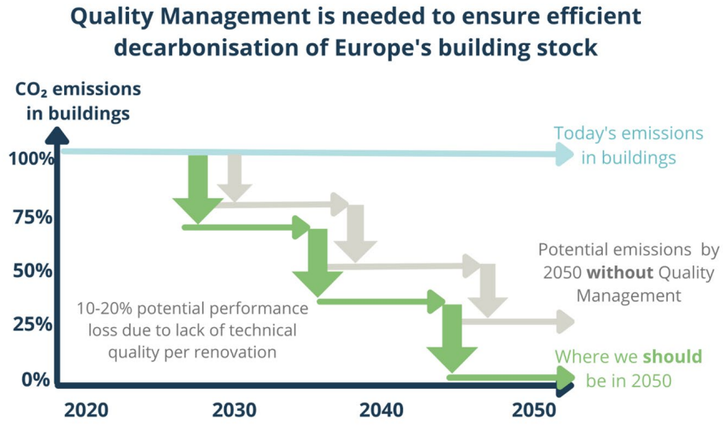
The Project Quality Self-Assessment tool is of primary importance to complement the EEnvest methodology, as it evaluates to which extent the project could provide quality outcomes even in lower budget projects like residential sector.

Insights from correlated projects

The QUEST project: Climate change, building performance and quality management

Given that 36% of European emissions are caused by buildings, addressing buildings is essential in fighting climate change.
To reduce emissions, owners, developers, private companies, and public administrations need to invest heavily in the green transformation of the European building stock.
A primary barrier to investment in buildings is the 'performance gap', where the performance of buildings targeted in the design phase is not met by their operational performance.

This gap is illustrated in Figure 19, which shows that over the lifespan of a building, multiple instances of renovation exist, and at each stage there is a risk of a deficit between the targeted performance and the real performance.
This can lead to a significant gap between the ideal building performance and the reality in 2050.



Pathways of Europe's building stock toward a green transformation in CO_2 emissions, with and without quality management in building projects

When investments do not deliver on the desired outcomes, they lose their value, and in the worst cases, they become stranded assets. This has become even more prominent after the introduction of the EU Taxonomy by the European Commission, which classifies what economic activities can be considered truly sustainable. Investors who want to ensure that their building projects are truly green and in line with the sustainability requirements of the Taxonomy need to have procedures in place during the design phase to guarantee that their investments will deliver on their predefined targets. This is where Quality Management Services can support investors and owners during the design phase of construction and renovation projects, and the post-evaluation phase.

Colloquially, quality is often used as a synonym for 'good' or 'high' quality. In the fields of engineering and business, however, quality also refers to the degree to which a unit (e.g., a product) meets the requirements set for it. Quality management supports the fulfilment of these requirements. In addition to the definition of requirements, testing the degree of fulfilment (which consists of defining and applying the testing methodology) is a central component of the quality management process.

Quality Management Services (QMS)

In recent years, the first well-defined Quality Management Services (QMS) have been established on this basis in the construction and real estate industries. These services utilize digitisation to varying degrees, making them technically and economically feasible on larger scales, and mitigating technical risks to building performance.

Quality Management Services (QMS) aim to ensure that buildings meet the predefined sustainability requirements placed on them. How these requirements are defined is dependent on the owners or investors. QUEST supports the integration of three separate Quality Management Services into building projects, each of which covers aspects of how to ensure buildings meet the requirements determined by owners and investors. In this chapter, we provide an overview of the process of each QMS, what it seeks to do, and how it can be implemented. The three Quality Management Services that are covered by QUEST are the following:

i. Technical Monitoring (TMon)
ii. Building Commissioning (Cx)
iii. Green Building Certification

The scope of the three Quality Management Services supported by QUEST. Green Certification can encompass both Building Commissioning and Technical Monitoring, and Building Commissioning can encompass Technical Monitoring

While TMon and Cx are services focused on minimizing the 'performance gap' between predicted and actual performance, Green Building Certification is a means of helping building investors and owners judge what requirements are 'green', for individual buildings. As illustrated in figure 2, green certification is a QMS which can encompass both TMon and Cx, and Cx can encompass TMon.

The QUEST Project and the QUEST Technical Manual

The objective of the QUEST project was to support the integration of Quality Management Services in building projects and how they support to reduce risks involved in green building investments. The QUEST Technical Manual, based on the results of the European QUEST project, helps owners, investors, and developers achieve a higher level of technical quality in their projects with Quality Management Services (QMS), while accelerating the implementation of these services.

The manual provides two solutions to support the integration of QMS into building projects.

The QUEST Tool

is an easy-to-use tool which calculates appropriate budgets for Quality Management Services in the early phases of a project to ensure the maximum value-add for the project. The tool can be used at https://quest-tool.synavision.de/.

The QUEST Data Engine

is an open-source data set for Certifiable Post-Project Evaluations based on a unified data set that enables the continuous documentation and evaluation of measures taken and the impact of QMS.

The Technical Manual explains the underlying technical causes of quality deficits, explains the application of Quality Management Services, gives a short introduction to the application of the QUEST Tool and Data Engine, and provides templates for tender documents and procurements. Their application will help to remove risk from green investments and bring about success in the green transformation of European building stock.

More information at: https://project-quest.eu/

Other projects

Triple-A

"Enhancing at an Early Stage the Investment Value Chain of Energy Efficiency Projects" is a Horizon 2020 project with a practical result-oriented approach. It seeks to identify which energy efficiency investments could be considered as Triple-A investments by fostering sustainable growth, while also having an extremely strong capacity to meet their commitments, already from the first stages of investment generation and preselection/pre-evaluation.

Triple-A was initiated in September 2019 with the support of the European Union's Horizon 2020 Research and Innovation Programme, and it lasts 2.5 years. The Triple-A consortium consists of 12 institutions all over Europe, including financing bodies, project developers, policy support and research institutes.

Triple-A aims to identify and mainstream energy efficiency investments focusing on the pre-screening process, where no standardization procedures exist yet. To this end, Triple-A creates standardized tools and benchmarks in order to support the identification of attractive project ideas.

The "gap" that the Triple-A scheme tries to cover concerns the development phase of energy efficiency investments, where plenty of project ideas exist.

These projects, however, tend to never get financed for various reasons, either because project developers do not have the expertise or resources to make a convincing financing case for investors or because most of the banking sector does not adopt energy-efficiency-based criteria for financing project ideas.

Triple-A, therefore, adopted a very practical result-oriented approach, seeking to address this challenge by answering the following questions:

- How do we assess the financing instruments and risks at an early stage?
- How do we agree on the Triple-A investments, based on selected key performance indicators?
- How do we assign the identified investment ideas with possible financing schemes?

The Triple-A scheme is comprised of three steps, Assess-Agree-Assign, answering each of the abovementioned questions, with the following main outputs:

Step 1

Assess the results in member states' risk profiles and mitigation policies, including a web-based database that enables comparability per member state and sector, identification of market maturity, exchange of experiences regarding good practices among member states and facilitation of the replicability, leading to a fruitful policy analysis for scaling up energy efficiency investments and reducing uncertainty for investors/financiers. A complete risk assessment of projects and the incorporation of EU taxonomy eligibility criteria are the main pillars of the Assess step.

Step 2

Agree results in standardized Triple-A Tools and Benchmarks with guidelines translated into all languages of the consortium partners, templates and procedures, accelerating and scaling up private Triple-A investments in energy efficiency.

Step 3

Assign results in in-country demonstrations, replicability and overall exploitation, including recommendations on what energy efficiency investments are realistic and feasible in the national and sectoral context, as well as on how they could be financed in practice in the short or medium term. Recommendations on realistic and feasible investments are foreseen in the national and sectoral context, as well as for short- and medium-term financing.

Triple-A methodology and standardized tools create effective links and exploit information and outcomes from relevant energy efficiency platforms, in order to create a synergistic ecosystem. The De-Risking Energy Efficiency Platform (DEEP) has been efficiently bridged with Triple-A, by the harmonization of key performance indicators and the utilization of data statistics for the development of the standardized Triple-A tools. In addition to the Triple-A tools, a Triple-A Interactive Web-based Database is available, providing interactive maps and graphs that display the results of the Triple-A risks assessment on energy efficiency investments in several European countries.

Standardized Triple-A tools are available online. The tools target project developers, bankers and financiers, enabling them to check the European Union taxonomy compliance, assess the total risk and benchmark the estimated performance of energy efficiency projects. The tools could be used not only to evaluate projects, but also to receive a suggested portfolio of already-benchmarked Triple-A projects, parameterized to the user's needs.

Triple-A investments are being identified in the following eight case study countries: Bulgaria, Czech Republic, Germany, Greece, Italy, Lithuania, Spain and the Netherlands.

The case studies were strategically selected to promote diversity considering economic conditions, the progress on energy challenges, the geographical location and the regional role. A consultation process has been organised so as to engage national stakeholders: including stakeholders' identification, questionnaires, bilateral meetings, Capacity Building Webinars and Regional Training Workshops, in each case study.

Three Triple-A Standardised Tools have been developed, the "Assess" Tool performs risk assessment and EU Taxonomy compliance of the EE project ideas', the "Agree" Tool benchmarks and classifies these projects, while the "Assing Tool" match the benchmarked projects with financing institutions (e.g., funds, investors, banks) that are in search to invest in green EE projects and create a green portfolio. The Triple-A Web-Based Database incorporates data and functionalities that enable the effective and interactive communication of the Triple-A methodology's results on the fundamental aspects of Energy Efficiency financing to the key involved actors.

More information at:
https://aaa-h2020.eu

LAUNCH

is an EU H2020-funded project that aims to accelerate deal closure and pipeline growth for Sustainable Energy Assets through standardised material. This includes a standardised 'As a Service Agreement', a standardised Risk Assessment Protocol for investors, Standardized Financial Spreadsheets and PowerPoint templates to facilitate the access to growth capital and market-tested Value Propositions for project developers' end-clients.

Under the LAUNCH project all the market tools developed were tested by the pilots and the different stakeholders. For all the material provided working sessions were set up with the different pilots to ensure the uptake of the materials.

As a next step, the partners: Joule Assets Europe (Italy), the research institution TNO (Netherlands), EnerSave Capital (Luxembourg) and New Energy Group (Ireland) have successfully secured a new EU H2020 funded project: PROPEL (Energy Efficiency Finance), which started in June of 2021.

The PROPEL project will build on the consortium's significant ownership of, and access to, the full range of necessary standardised financing collateral, and deploy this collateral in the market. The PROPEL project will develop an integrated ecosystem of financing collateral and relevant actors, which together will drive the market for sustainable energy assets forward.

PROPEL will at the same time firmly establish an industry association, the Sustainable Energy Finance Association (SEFA), which will act as the knowledge and resource centre for the mainstreaming of finance into sustainable energy assets.

SEFA's mission is to act as the holistic center of competence of the sustainable energy market in Europe, connecting and enabling key actors to accelerate deal closure and boost market growth. SEFA provides all the critical collateral required to help its members implement clear and effective pathways to a successful clean energy transition.

More information at:
https://www.launch2020.eu

CitizEE

is a European funded project bringing together 8 partners from all over Europe with the aim at supporting European public authorities to scale up investments for energy efficiency in the building sector through attracting citizen private investments.

There is currently a particular deficit in finding suitable financing programmes for the implementation of energy efficiency measures. Innovative financing solutions are needed to enable energy-efficient retrofits on a large scale and to strengthen collaboration between all stakeholders (project promoters, public/private financial institutions, end-users) and especially with citizens.

CitizEE's ambition is to put in place a sound enabling legal, financial and operational environment aimed at: (i) making a more efficient use of public funds (ii) mitigating performance & credit risks, (iii) closing financing gaps, (iv) enlarging citizen access financing, (v) reducing transaction costs, (vi) enhancing capacity of local crowdfunding operators and cooperatives and (vii) stimulating the required investment towards higher renovation rates and thus a more efficient building stock.

Four demonstrators (in Portugal, Belgium, Lithuania and Croatia) have been selected to establish the CitizEE platforms as well as to demonstrate the replication possibilities of the project financing schemes at regional or country level, while a dedicated toolkit will be developed by the project aimed at providing citizens, investors and public authorities alike with a better understanding of the adoption of citizen financing for energy efficiency renovations.

More information at:
https://www.citizee.eu

Conclusion

Under a context in which energy efficiency and sustainability are rapidly gaining importance in driving investment decisions, while energy prices and climate conditions are affected by high uncertainty, EEnvest project developed databases, models, methodologies, tools and web platforms to provide a solid backbone for directing and supporting private investments into the energy efficiency projects. Whereas energy efficiency investments are usually expected to be paid back exclusively through the reduction of energy bills, there has been increasing evidence that non-energy benefits play a key role in the decision to invest in energy efficiency. Depending on the type of investor, this ranges from increased thermal comfort, reduced productivity cost, higher air quality level, lower vacancy rates etc. that translates into property value increase, and more recently to the ability to allocate capital into EU Taxonomy aligned, sustainable investments.

EEnvest developed a methodology to enable the evaluation of the performance of investment in energy efficiency projects leading to different key performance indicators, related to technical risk, financial performance and multiple benefits, thus streamlining the selection and decision-making on such investments. EEnvest methodology relies on innovative approaches that consider multiple driving factors such as financial-technical and non-energy benefits at the same time. Such multi-variables approach goes beyond the established decision-making process based on a distinct evaluation of traditional indicators such as Net Present Value (NPV) or Payback time. Furthermore, more sophisticated analysis capabilities are enabled by managing risks as probability distribution, which can lead to significantly different financial results.

The developed methodology includes several components and tools, each one with its own functional autonomy, which span from technical risk and financial performance evaluation, technical/financial due-diligence and project quality assessment, evaluation of multiple benefits under both the building owner and the investor perspectives, benchmarking and decision-making support tools.

The methodology has been successfully tested on case study buildings located in Italy and Spain, as part of the demonstration activities of the research project, showing that:

- accounting for context risks, such as energy price and climate variability, as well as technical risks, such as energy gap and damage, has relevant impact on project financials, such as IRR
- assessing Multiple-Benefits is of primary importance and has relevant consequences in the sustainability of the investment, such as EU Taxonomy alignment
- technical risk, financial performances, project quality and the attractiveness of the investment are highly related, and de-risking energy efficient investment must be done considering synergies and mitigation factors across different domains.

While EEnvest project demonstrates the high relevance of its results on specific building typology, as the commercial office building, specific activities confirmed that the risk databases, the risk models, the methodology and the resulting search& match web platform are built on a highly standardized, modular and layered structure, and therefore their replicability to other types of assets, as residential buildings, is straightforward.

EEnvest

Read more on www.eenvest.eu

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