



Promoting the deep retrofit of residential buildings in the
Mediterranean area

PRESENTATION OF THE MAIN PROJECT OUTPUTS



This project has received funding from the European Union’s Horizon 2020 Research and Innovation Programme under grant agreement n. 785072



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How to use this document

This document presents the innovative outputs produced by the HAPPEN project for supporting the deep retrofitting markets of the EU Mediterranean countries, with special reference to the residential sector. As a matter of fact, HAPPEN is an applied research project, and not a theoretical one: accordingly, its main outputs are fully exploitable by actors of the energy renovation sector like you, willing to promote market innovation.

To this end, this document is addressed to all the stakeholders who are interested to know more about the HAPPEN project and main outputs, and aims at triggering their availability to carry out joint exploitation activities in collaboration with the project consortium. For this reason, the document is conceived in order to allow you to get a first overview of the project outputs, so to put you in the best conditions to quickly understand which and where are the main contact points between your own objectives, issues and practices, and the innovation potential developed by the HAPPEN consortium.

Basing on this first contact, you are asked to report to the project partners you are in contact with about your potential interest to know more about one or more project outputs. This way, you could go into deeper theoretical or operational details, and investigate about possible ideas, opportunities and suggestions on how you may concretely contribute to the outputs exploitation in your renovation market.

To this end, the document is structured in the following three sections:

- A. Introduction to the HAPPEN project, highlighting its basic framework, the main objectives and the methodology adopted.
- B. Presentation of the main outputs developed by the [HAPPEN consortium](#), highlighting their mutual connections within the overall HAPPEN strategic vision for boosting deep retrofitting in the Med area, which allow to set-up an integrated “ecosystem” of innovative tools and solutions.
- C. Factsheets of each individual project output, summarizing its technical features and highlighting its unique added value for each group of actors of the retrofitting value chain, included how they can be used by you, and how they can help improving your work.

For your commodity, you can print this document in a double-side layout, and gain separate printed sections; in particular, you'll get one double-side factsheet for each individual project output.



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PART A: INTRODUCTION TO THE HAPPEN PROJECT

This section will provide a preliminary introduction to the H2020 HAPPEN project: Holistic APproach and Platform for the deep renovation of the med residential built ENvironment. For more information about the project, please visit the project homepage at: www.medzeb-happen.eu



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Introduction to the HAPPEN project

Around 75% of existing buildings in Europe are energy inefficient, yet almost 85-95% of today's buildings will still be in use in 2050.

If we consider that buildings account for 40% of the energy consumed and 36% of energy-related greenhouse gas emissions, it appears crucial to bring energy renovation of existing buildings on top of the European and Global agenda. Furthermore, the residential sector alone is responsible for the 27% of the overall energy consumption in EU.

The European Commission has established a legislative framework to boost the energy performance of buildings, in particular through the [Energy Performance of Buildings Directive](#) 2010/31/EU (EPBD) and the [Energy Efficiency Directive](#) 2012/27/EU.

In October 2020, the Commission launched its new Renovation Wave strategy as part of the European Green Deal, aiming at doubling the annual energy renovation rate of buildings by 2030 and fostering deep renovation.

Within this framework, the development of the deep retrofitting market is a significant challenge throughout Europe,¹ which faces particular conditions **in the Mediterranean region** due to specific environmental and climatic factors, to the structure of the ownership and of the built stock, to social and economic factors, and to the consequences of economic crisis, which struck European Med countries with a higher impact than the other countries in EU.²

A specific approach is therefore needed when it comes to promoting **deep energy retrofitting of the residential built environment in the Mediterranean area**. To this extent, the consortium of the H2020 HAPPEN project has developed the **MedZEB approach** (Mediterranean Zero Energy Building), adapting the concept of nZEB (nearly Zero Energy Building) to the specific characteristics of the Med area. The MedZEB approach is characterized by the following features:

- it is **tailored** for achieving deep retrofit standards (i.e. >60% energy savings respect to actual consumptions) for the EU Mediterranean zone, by basing on homogeneous sets of climate zoning, reference buildings and technical solutions specific for the Med area;
- it is **holistic**, i.e. aimed at integrating the most relevant aspects of the retrofitting supply chain (engagement and training, technical and financial, operational and social aspects, etc.) according to a cost-optimal approach which also includes step-by-step renovation options;
- it is **transparent**, i.e. aimed at putting on the market an innovative framework and dedicated tools for enhancing investors' trust;

¹ BPIE – Financing Energy Efficiency (EE) in Buildings – Background paper: input to the European Roundtable, 2010

² Energy Efficiency Trends and Policies in the Household and Tertiary Sectors; an analysis based on the ODYSSEE and MURE databases; June 2015, p. 41



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- *it is **adaptive***, i.e. aimed at enhancing “soft added values” of the retrofitting (e.g. comfort and well-being, environmental sustainability, flexibility of the interventions and the related funding, etc.).

The MedZEB framework was developed by HAPPEN thanks to a **circular knowledge creation approach** among technical and scientific development on one side, and on-field testing and stakeholders’ engagement on the other. The technical activities consisted in a **background work** aimed at optimizing the available knowledge in a way to tailor the research results for the specific needs of the residential built stock and social contexts of the Mediterranean area. On-field testing was based on the activation of [10 pilot sites](#) from 7 EU Med countries, where Living Labs were set-up, aimed to engage all the different stakeholder groups of the renovation value chain, so to foster dialogue and mutual understanding of needs and issues, and to fruitfully cooperate with the project consortium in streamlining the background research work. In particular, the project addressed the following target groups:

- **Clients** (e.g. *real estate owners, private or public, small or large*) who want to renovate their homes or buildings; they represent the **demand side** of the renovation market.
- **Makers** (e.g. *designers, building professionals, solutions and materials providers, building companies, financial institutions*) who want to expand their skills, relations and business opportunities; they represent the **offer side** of the renovation market.
- **Influencers** (e.g. *policy makers, public administrations, associations, NGOs, media companies*) who want to gain an overview of the retrofitting market trends, and to access relevant data ; they represent those **market enablers** and **disseminators** who play a great role in fostering positive decision making from clients, and high quality standards from makers.

Pilot sites were chosen by basing on the availability of relevant **pilot buildings** where to carry out renovation interventions according to the MedZEB approach; these pilot buildings allowed to concretely test the project results in real life conditions, to involve the Living Labs actors in the operational, and not just theoretical, development of new tools and solutions, and thus, to accelerate the market maturity of the project main outputs.

The final phase of this circular interaction between research and market are the so-called **HAPPEN Incubators**, in which the group of stakeholders which was initially involved in Living Lab activities will be enlarged and scaled up; the main aims of the Incubators will be: i. to receive feedbacks on the market potential of the outputs produced; ii. to better steer the last mile of their development; iii. to foster their joint exploitation.

This phase is starting now, and this document was created to launch it:

Welcome to the HAPPEN Incubators!



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PART B: PRESENTATION OF THE MAIN PROJECT OUTPUTS

In this section we will explore the project main outputs and showcase the way in which they are logically interconnected, in order to form a holistic framework for the renovation markets. We will also illustrate the way such framework enables the implementation of the HAPPEN Program, that is the strategic vision elaborated by the project for boosting the deep retrofitting markets in the Med area.



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Presentation of the main project outputs

HAPPEN has developed five main outputs (see Part 3 for their detailed factsheets):

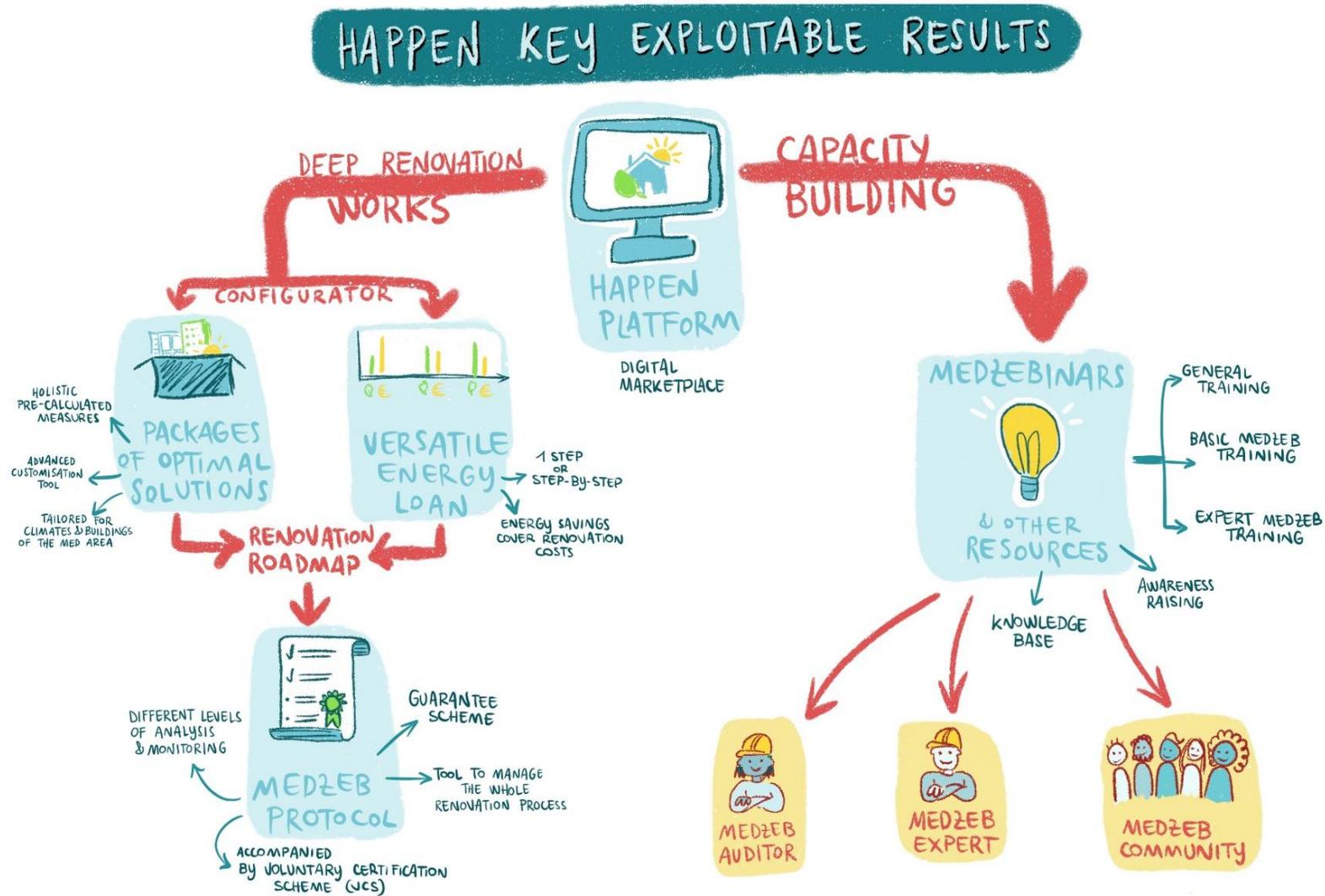
1. **HAPPEN digital platform:** it acts as an assisted digital marketplace aimed at matching the demand and offer sides of the Med retrofitting markets, where all actors involved in the renovation process can meet, build their knowledge about the Mediterranean way to deep energy retrofitting, and get guidance for the generation of cost-optimal renovation projects through dedicated tools and services.
2. **Packages of Optimal technical Solutions (POS):** it is an extensive set of integrated and holistic deep retrofitting solutions, based on a homogeneous database of climates and building types typical of the Mediterranean area, and calculated according to a cost-optimal approach; POS are arranged in a "one-step" or in a "step-by-step" renovation approach, and have been turned into a digital tool hosted in the platform, which allows to customize an array of technical parameters so to enable designers to quickly produce tailored and credible preliminary renovation layouts for their clients.
3. **Versatile Energy Loan financial solution (VEL):** it allows to define the best way to finance the renovation works by relying on the energy savings achieved, thus boosting the financial sustainability of the interventions; VEL is fully integrated with the POS, also in the form of a digital tool on the platform, which guides the designer to quickly shaping integrated technical and financial renovation proposals.
4. **MedZEBinars and other training resources:** it is a system of courses, tools and documents to build the knowledge and skills of home owners, renovation professionals, policy makers about the MedZEB approach and the energy renovation of buildings in the Med area.
5. **MedZEB Protocol and Voluntary Certification Scheme:** it is a guarantee framework conceived to foster quality and viability of the deep retrofitting projects along the whole renovation process and value chain.

These outputs are all made available and usable through the HAPPEN platform, and are arranged together in order to form a supportive and integrated ecosystem of solutions aimed at boosting deep retrofitting markets in the Med area, which is well illustrated in the following pictures.

It is relevant to highlight that you can exploit each project output either individually, or as a part of this integrated ecosystem, according to your specific needs and objectives, and to the highest value that you can find here.



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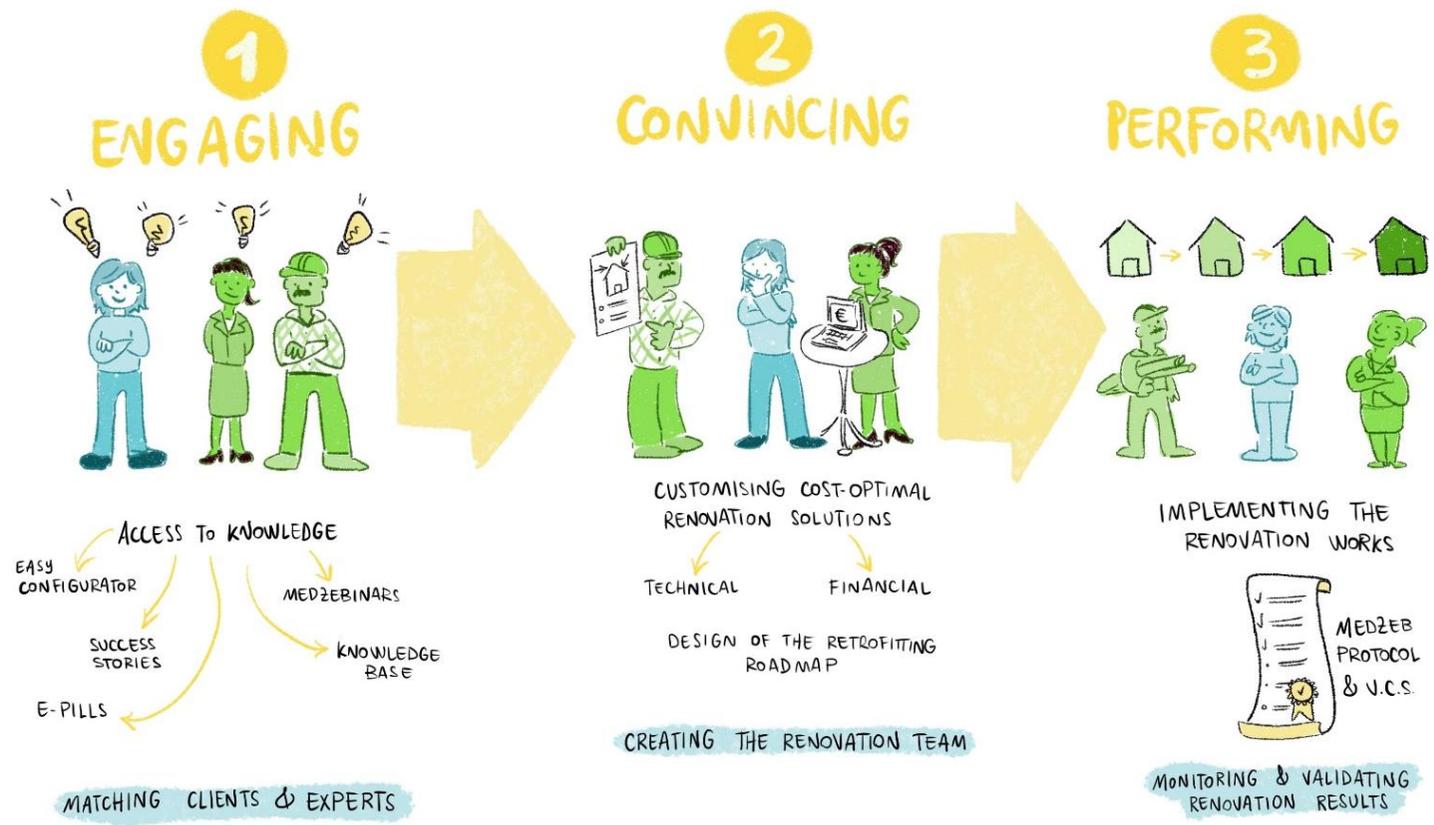
This picture shows how the main HAPPEN outputs are connected with each other to form the operational framework of the MedZEB approach.



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HAPPEN PROGRAMME



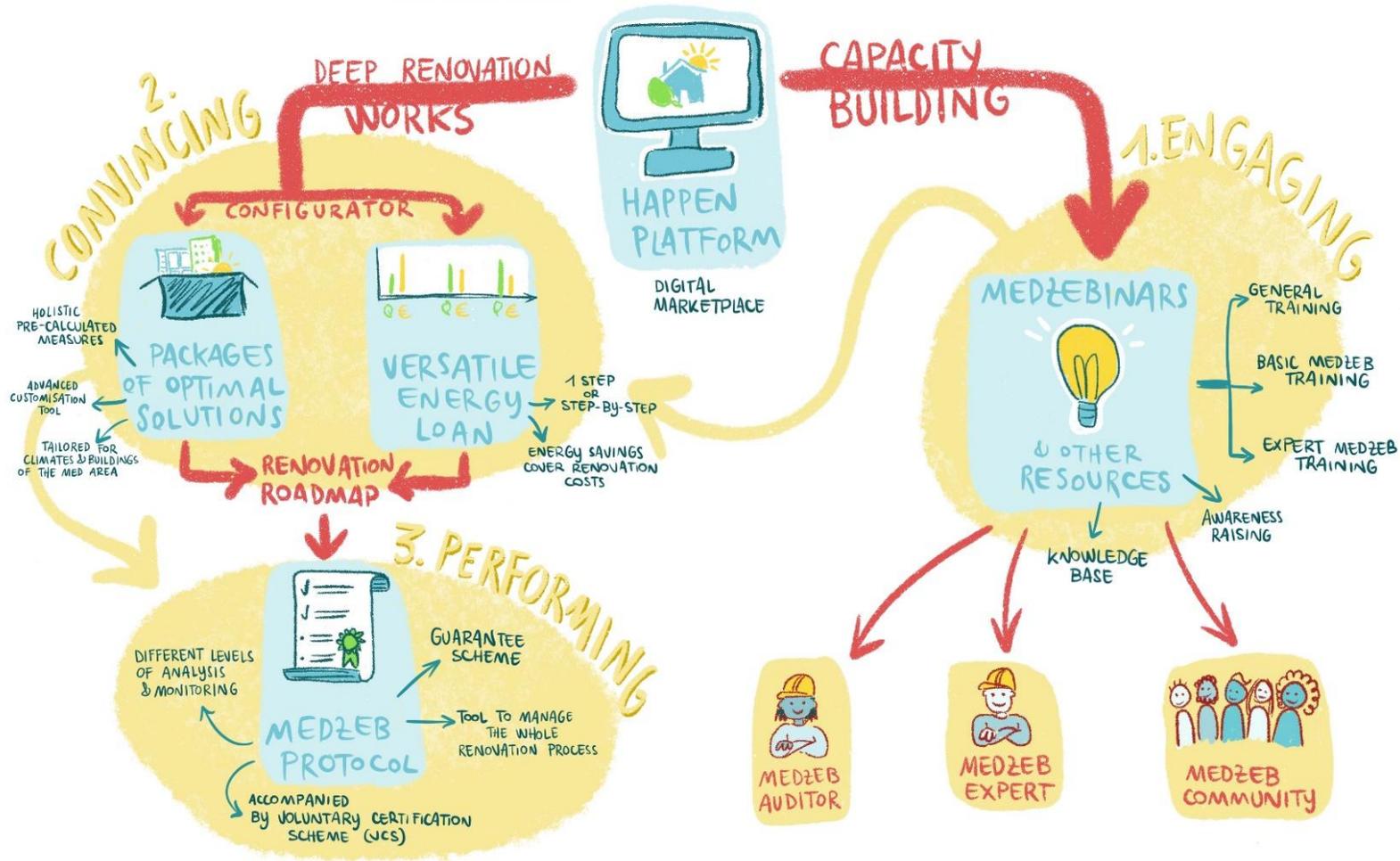
This picture shows the HAPPEN program, that is the implementation strategy of the MedZEB approach in the Mediterranean retrofitting markets.



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HAPPEN KEY EXPLOITABLE RESULTS



This last picture illustrates how the main project outputs fit and empower the HAPPEN program in the market delivery of the MedZEB approach

Master document for the presentation of the main project outputs.

HAPPEN: Promoting the deep retrofit of residential buildings in the Mediterranean area



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PART C: DETAILED FACTSHEETS OF THE PROJECT OUTPUTS

In this section we describe the concrete added value of each HAPPEN output, both as parts of the general framework of the HAPPEN Program, or independently, according to specific innovation needs expressed by the interested stakeholders.



1. HAPPEN digital platform

Technical Description

The HAPPEN platform is a digital environment aimed at bringing into the Mediterranean retrofitting markets the innovative solutions developed by HAPPEN. To this purpose, these solutions have been developed into dedicated webtools hosted in the Platform, which acts as a reference framework for the implementation of the MedZEB approach. The HAPPEN platform is conceived as an *assisted digital marketplace* aimed at matching demand and offer sides of the retrofit markets, to defragment the value and supply chains, and to support renovation actors with the following services and tools:

- *for all groups*: an extensive knowledge base on deep renovation and a digital forum where actors of the retrofitting supply and value chain can get in touch with each other;
- *for clients*: basic training materials and a quick configurator allowing to estimate the renovation potential of a building;
- *for makers*: in-depth training materials and an expert calculator for producing customized and integrated renovation proposals (technical and financial);
- *for influencers*: a dedicated dashboard for monitoring trends and results of the retrofit market activities triggered by the platform.

The HAPPEN platform is accessible by creating a personal account, which allows each group to access different environments, such as: a knowledge base; a quick configurator allowing to estimate the renovation measures, the related costs and the energy savings achieved; a digital space where home owners, renovation experts, industry professionals and policy makers can get in touch with each other.



Key added value

The HAPPEN Platform is a reliable and transparent digital space aimed at facilitating the implementation of the MedZEB approach by connecting and supporting all the actors involved in the renovation process, and by enhancing trust and cooperation among them. It provides a single access point to a system of tools, services and knowledge that can be considered as a *digital one-stop-shop* easily accessible by all the target groups and from all the different contexts of the Med area. It supports all the actors of the renovation value chain with dedicated tools; it favours the match between demand and offer sides of retrofit markets; it enables the positive decision making from potential investors (small and large); it contributes towards harmonizing and upgrading the renovation markets of the Med area; it engages actors for sharing knowledge, best practices and success stories. For all these reasons, the HAPPEN Platform is aimed at becoming the reference portal for the deep energy renovation of the residential built stock in the Med zone.



1. HAPPEN digital platform

Detailed added values per target group

End users	Makers	Influencers
<p>The HAPPEN Platform acts as an awareness-raising instrument, which gives access to informative and training materials aimed at helping the end-users to get oriented in the deep renovation market. It provides dedicated tools and resources to support a positive decision making regarding deep renovation; among these, a set of successful renovation stories, and a "quick configurator" which allows to assess the potential energy savings of their home, and to visualize cost-optimal renovation advices, making it easier to discuss with experts about the best solutions to be chosen. Finally, through the Platform it is possible to get in touch with trained experts on the MedZEB approach (the "MedZEB experts"), and obtain their initial support.</p>	<p>The HAPPEN platform provides access to expert training on the MedZEB approach (the MedZEBinars), which enables professionals of the retrofiting market to make use of innovative design support tools developed by HAPPEN; among these, the "expert calculator", which allows to quickly prepare credible retrofiting layouts (both technical and financial) at preliminary level, based on a cost-optimal approach. Furthermore, the platform offers a digital service for the management of the overall deep renovation process, according to the MedZEB Protocol.</p> <p>The knowledge base available on the platform allows an in-depth learning about cost-optimal solutions (technical and financial).</p> <p>The digital space is aimed at stimulating discussions and cooperation among different Mediterranean markets.</p>	<p>The Policy makers' dashboard offers a clear representation of needs and trends emerged thanks to an automatic analysis of the HAPPEN Platform usage, with special regards to the implementation of the MedZEB approach in the local renovation markets (at urban, regional and national levels).</p>



2. MedZEBinars and other training resources

Technical Description

The HAPPEN consortium has developed a set of training and awareness raising materials, aimed at disseminating knowledge about deep retrofitting and in particular, about the MedZEB approach.

At a basic level such materials include: general training, addressing the wider public and providing an overview on the state-of-the-art knowledge on deep retrofitting; lessons learned and best practices from the HAPPEN project; short videos (e-pills) on deep retrofitting; tips & tricks for energy saving; other links to external resources. At specialist level, HAPPEN developed the so-called “MedZEBinars”, online training courses accessible through the HAPPEN platform, and aimed at increasing technical knowledge on the MedZEB approach. The MedZEBinars are aimed at upgrading deep retrofitting projects designers (professionals or technicians) to “MedZEB experts”. This is a new figure entitled for the overall management of the renovation process according to the MedZEB approach, and empowered to use the innovative support tools hosted in the platform. The MedZEBinars are composed by five e-learning modules, each one addressing one aspect of the MedZEB approach. In total, 11 webinars have been recorded by the experts of the HAPPEN consortium, for about 15 hours of training. Every module and webinar is preceded by a short video-summary. Each module is then concluded by a dedicated test and, for some of them, the submission of an assignment, which allows to build up progressively the full certification as “MedZEB expert”. A simplified version of the course is also offered to all interested actors, which does not lead to the “MedZEB expert” certification.



Key added value

The training and awareness raising materials developed by HAPPEN allow to gather in one spot (the HAPPEN platform) an array of resources aimed at disseminating to all the actors of the retrofit value chain relevant knowledge on deep retrofitting and on the MedZEB approach, so to harmonize and enable them to fully exploit the opportunities offered by the deep renovation market. To this end, the following materials are available: *general training materials* (in English or National languages), aimed at providing to all target groups both theoretical and practical information on deep retrofitting and energy saving; *basic MedZEB course* (in National languages), aimed at providing to all target groups an introduction to the MedZEB approach, and at attracting interested actors to advanced training level; *expert MedZEB course* (in English), aimed at providing to professionals and technicians specific knowledge on the MedZEB approach, so to self-develop into “MedZEB experts” with full understanding and access to the innovative support tools hosted in the HAPPEN Platform.



2. MedZEBinars and other training resources

Detailed added values per target group

End users	Makers	Influencers
<p>The HAPPEN platform offers a wide set of training and awareness raising materials on energy saving and deep renovation, including best practices, e-pills and tips & tricks. Thanks to these resources it is possible to easily gain knowledge and to improve energy behaviour in order to immediately start saving energy. They also allow to sensitize on the feasibility of deep renovation, and to get oriented in the renovation markets.</p> <p>Furthermore, a basic training course is also offered, which allows to get a first insight in the features and opportunities of the MedZEB approach, by providing an overview of the different actions that can be carried out to renovate a building according to a cost-optimal approach. Finally, the advanced MedZEB course (the «MedZEBinars») dedicated to professionals will allow Clients to find reliable and qualified experts for the deep renovation of their home.</p>	<p>The MedZEBinars are aimed at empowering building professionals and technicians, allowing them to become "MedZEB experts", that are certified professionals entitled to develop retrofitting project and to manage the overall renovation process according to the MedZEB approach. Experts can also play the role of "MedZEB Auditors", that are certifiers of the final achievement of the quality targets set in the MedZEB Protocol. MedZEBinars are offered in two levels: a basic course (in National languages), providing an introduction on the MedZEB approach, and an advanced course (in English), providing deep technical training on the MedZEB approach and tools. Only professionals who have followed the advanced course become "MedZEB experts", and can get full access to the innovative design support tools hosted in the HAPPEN Platform for their daily work. These tools will allow them to increase their operational capacity and their credibility on the market.</p>	<p>The training materials, best practices and lessons learned allow to increase the knowledge and awareness of influencers about the deep retrofitting markets and opportunities. They also help planning wider retrofitting programs, by providing information and references about the relevance of the urban settings on energy consumption (e.g. heat islands), on the real energy performances of buildings, as well as on the possibility of activating Living Labs (also at Urban level) for the inclusion of tenants, small owners and other relevant actors in co-design and joint decision making processes.</p>



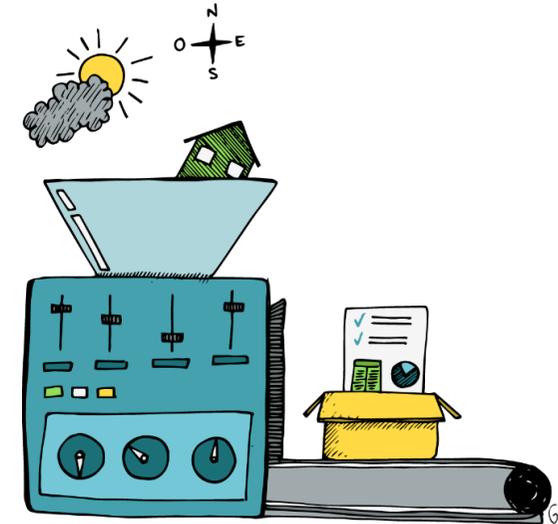
3. Packages of Optimal technical Solutions (POS)

Technical Description

The Packages of Optimal Solutions (POS) are sets of deep renovation measures developed by the HAPPEN consortium, and tailored for the Med area. They were calculated according to a cost-optimal approach, by basing on a database of climates, building types and renovation measures, homogeneous for the whole Mediterranean area. In particular, 13 main climate zones were introduced, by taking into consideration both winter and summer severity indexes, and 42 reference building were selected. A large abacus of integrated renovation measures was also created, including both innovative and traditional ones, associated to each building component to be renovated. In total, 546 POS were evaluated by HAPPEN (42 reference buildings x 13 reference climates), according both to a “one-step” and a “step-by-step” renovation approach.

A dedicated module on the platform allows the user to retrieve the most suitable POS for each real renovation case study, e.g. by introducing the building type and location.

The HAPPEN POS have been further developed into an “expert calculator”, hosted on the platform, which allows the designer to quickly customize an array of technical parameters of the pre-calculated POS, (e.g. real costs, orientation, system types, etc.), so to specialize the POS into tailored and credible preliminary renovation layouts.



Key added value

The Packages of Optimal Solutions (POS) provide an extensive range of pre-calculated holistic deep renovation measures tailored for the Med markets. These solutions were developed according to a cost-optimal approach based on the minimization of the Life-Cycle-Cost (LCC) at 30 years, and on sets of climatic zones, reference building typologies and technical solutions which were made homogeneous for all the Med countries for the first time.

The POS have been further developed into an expert calculator tool hosted on the platform, which allows to retrieve the most effective POS for each real renovation case study, and to further customize it in order to quickly obtain tailored and cost-optimal preliminary renovation layouts; to this extent, POS are an effective tool for supporting market actors during the most risky and time-consuming phase of the renovation process, that is the initial decision making. Moreover, the HAPPEN POS are fully integrated with the VEL financial solution, and this allows to generate integrated technical and financial renovation advices.



3. Packages of Optimal technical Solutions (POS)

Detailed added values per target group

End users	Makers	Influencers
<p>The Packages of Optimal Solutions (POS) are tailored for the specific needs of Mediterranean area, and address all the most relevant aspects of the renovation design, including inner comfort and wellbeing, and the integration with Renewable Energy Sources.</p> <p>They are conceived in order to optimize the investment in retrofitting, by pursuing the highest energy savings and indoor well-being at the minimum cost.</p> <p>A «quick configurator» is available on the platform, which provides an overview of the available solutions for each building typology and climate zoning of the different Med areas; furthermore, these POS can be arranged according to both a one-step and also a step-by-step renovation approach, which can foster the economic sustainability of the retrofitting process.</p>	<p>The Packages of Optimal Solutions (POS) are tailored for the specific needs of Mediterranean climates & building typologies.</p> <p>They are holistic in the sense that they address all the themes of the renovation design. They are based on a cost-optimal approach according to the EU regulations, aimed at minimizing the Life-Cycle Cost of renovation over 30 years. They are calculated in order to reach deep renovation standards (that is, above 60% of energy savings).</p> <p>The POS library stored in the Platform constitutes a relevant reference database for nurturing a cost-optimal design approach.</p> <p>The expert calculator allows to customize the pre-calculated POS according to specific design parameters. Thanks to this, professionals shall receive a consistent support for speeding up the production of effective and accurate advices on preliminary design choices.</p>	<p>The Packages of Optimal Solutions (POS) are tailored for the specific needs of Mediterranean markets. They allow to raise awareness on all the factors that influence energy consumption of a building (e.g. orientation, choice of materials, climates, human behaviours), on the specificities of the Mediterranean area when it comes to buildings renovation, and on the best strategies to follow in order to boost the sustainability of the interventions. They also could be useful to identify the constructive elements that could be object of subsidies.</p> <p>The Macro-climatic zoning is a useful tool for policy makers, as it helps them to shape policies and raise awareness on the influence of climate on urban planning and on the effectiveness of renovation. The climatic zones map can also be useful for improving building technical codes.</p>



4. Versatile Energy Loan financial solution (VEL)

Technical Description

The Versatile Energy Loan is the innovative financial solution developed by HAPPEN for completing the holistic framework of the MedZEB approach. The VEL solution is intended as a monitor of the financial sustainability of the retrofitting interventions, in the sense that it is shaped for enabling the repayment of the renovation works through the energy savings achieved; in this way, the solution aims at supporting an easier access to convenient financial sources (alto traditional ones) by potential investors.

The solution is fully integrated with the Packages of Optimal Solutions, according to both a one-step and a step-by-step renovation approach.

In the step-by-step layout, the VEL proposes a multiple disbursement plan, with an initial mortgage calibrated on the initial investment of the first step, thus compressing financial costs compared to a one-step investment. The next disbursements needed for funding the next renovation steps are arranged in a way that the second step is activated after that at least 50% of the first step is reimbursed, and so on. This way, the overall mortgage threshold is never exceeded.

Such reimbursement timing can be set on the basis of the energy savings achieved, or also by including incentives or further outlays from the investors. The investment plan can be stopped after each step, thus allowing the highest flexibility to the investor in case of unexpected events.

In the one-step layout, the VEL solution can be used to measure the financial sustainability of the interventions, that is the extra disbursement from the investors beyond the energy savings achieved, which are necessary to extinguish the loan within a given time span (e.g. 30 years).

The VEL solution has been developed into a digital tool hosted in the platform, and fully integrated with the “expert calculator”, allowing to post-process both the pre-calculated and the customized POS, and to get a simulation.



Key added value

The Versatile Energy Loan (VEL) solution is conceived in order to flexibly accompany deep renovation process of both public and private residential building owners, with the aim of boosting the self-sustainability of the renovation, where retrofitting costs can be covered mostly by relying on the energy savings achieved. It allows users to have evidence of the financial benefits of the application of the MedZEB approach and, moreover, to leverage it in order to facilitate access to traditional financing forms to support the deep retrofit intervention.



4. Versatile Energy Loan financial solution (VEL)

Detailed key-added value per target group

End users	Makers	Influencers
<p>The Versatile Energy Loan (VEL) solution is aimed at minimizing the financial exposure of households and at maximizing the loans flexibility, so to reassure and create trust among owners, and to encourage them in undertaking the renovation works.</p> <p>It enables households with limited financial resources to carry out retrofitting interventions by pursuing the self-sustainability of the renovation process, basing on the energy savings effectively achieved. Furthermore, by supporting both one-step and step-by step interventions, it enables public owners (e.g. social housing companies) to integrate deep energy renovation actions with their maintenance programs on the built stock, thus improving their investment plans. The solution provides also a viable alternative in markets with low or null incentivizing systems.</p>	<p>The Versatile Energy Loan (VEL) solution is conceived to be fully integrated with the POS, allowing to flexibly fund the renovation process both in a one-step and a step-by-step approach.</p> <p>For professionals, the VEL is a powerful tool for evaluating the self-sustainability of a deep retrofitting project, and thus, to compare different design options in order to accompany the client to take aware decisions. In particular, the VEL simulator on the platform is integrated with the expert POS calculator: this enables professionals to quickly simulate financial solutions associated to their customized retrofitting designs, thus supporting their dialogue with the clients and the banks, empowering their role of project managers.</p> <p>For renovation companies, the VEL solution is useful for convincing the clients to undertake deep energy retrofit interventions.</p> <p>For financial institutions, it is a trustworthy instrument to reassure the bank about the sustainability of the issued loans.</p>	<p>The Versatile Energy Loan (VEL) solution can be used as a measure for evaluating the self-sustainability of the interventions, that is their capacity to be self-repaid thanks to the energy savings effectively achieved. This can be valid for both a one-step and a step-by-step approach to reach deep renovation standards.</p> <p>Furthermore, it empowers mid-to-low income homeowners to effectively and sustainably carry out deep retrofit projects, even in the absence of direct incentives.</p>



5. MedZEB Protocol & Voluntary Certification Scheme

Technical Description

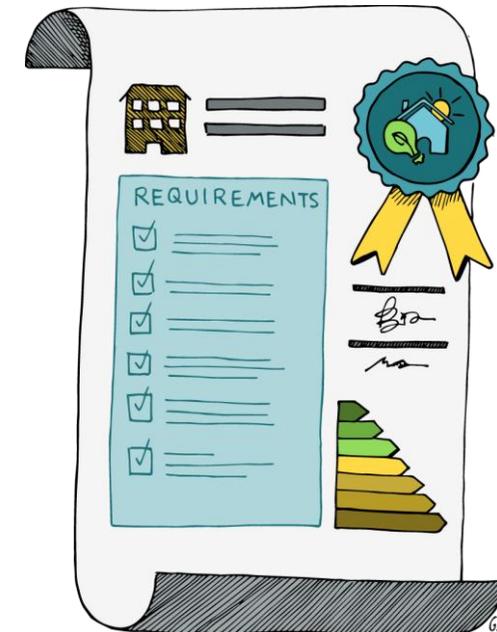
The MedZEB Protocol is a guarantee scheme which sets the quality conditions for the good execution of the retrofit process along the whole value chain; it pursues the following objectives:

- *defragmenting the retrofitting supply chain*, by involving all the relevant actors, from the homeowners to building companies, in the guarantee framework;
- *implementing a holistic approach* for deep retrofitting, by addressing all the relevant aspects of renovation (energy, environmental, well-being related, etc.);
- *covering all the phases of the renovation process*, from clients' engagement to the design, from construction works to post-occupancy monitoring and evaluation.

The Protocol includes tools such as the Building Renovation Roadmap, based on the HAPPEN step-by-step approach, and the Business Plan, based on the VEL financial solution, which allow to manage both short and long-term renovation plans, according to a pre-given and coherent design framework.

The Protocol describes the results to be achieved (e.g. reduction of energy consumption and comfort standards) and the relevant KPIs for assessing the overall quality of the process; it can be activated on the basis of three different levels of analysis, allowing flexibility to suit every situation.

Finally, the Protocol is completed by the MedZEB Voluntary Certification Scheme (VCS), which is a dynamic tool aimed at assessing the compliance of the achieved results with the requirements established in the Protocol. The VCS is based on real performance, rather than theoretical modelling, and is issued after the completion of each renovation step, and proper monitoring and evaluation. The creation of a dedicated and independent figure, the MedZEB Auditor, guarantees the impartiality and clarity of the overall certification process. The management of the MedZEB Protocol and VCS are supported by a dedicated tool on the HAPPEN Platform.



Key added value

The MedZEB Protocol covers all the stages of the energy renovation process. In addition to energy performances, it also addresses aspects such as comfort, environmental and economic impacts. It guarantees the quality of retrofitting measures, and ensures transparency and flexibility throughout the process, allowing to bridge the gap between the expected and the real energy performance. The MedZEB Protocol fosters a stronger integration of all the actors of the building retrofitting market, thus enhancing the whole retrofitting value chain. The Voluntary Certification Scheme included in the Protocol is a strong guarantee about energy savings and comfort levels effectively achieved.



5. MedZEB Protocol & Voluntary Certification Scheme

Detailed added value per target group

End users	Makers	Influencers
<p>The MedZEB Protocol is a fruitful opportunity for guaranteeing the overall quality of the renovation process, from the beginning up to its very end, and thus, the effective achievements of the energy savings, comfort levels and sustainability goals defined as targets in the retrofitting design. Such achievement is a crucial aspect for guaranteeing the economic sustainability of the intervention through the VEL solution. To this end, the Protocol features an accurate analysis of the actual energy demand of a home, a control system for the quality of retrofitting design and works, and a reliable monitoring of the targets achieved after the works are completed.</p> <p>Three possible levels of commitment are proposed, from the most accessible to the most demanding, so to offer effective and sustainable guarantees to all the client groups.</p> <p>The Protocol is concluded with the issue of the MedZEB Certification, which states the full achievement of the design targets; such Certificate can be issued both for a one-step as well as for a step-by-step intervention.</p>	<p>The MedZEB Protocol is a powerful tool for the quality management of the overall renovation process, from the very beginning (client engagement) up to the very end (post-occupancy evaluation), and it is reserved only to professionals trained as MedZEB Experts.</p> <p>The Protocol enables the MedZEB Expert to engage all the actors of the renovation supply chain within a unique guarantee framework, enhancing their defragmentation and cooperation. It generates a higher value proposition for clients about the renovation works, based on the continuous follow-up of the renovation process by the Expert, and on the final certification of the achievement of design targets. In particular, the certification is carried out thanks to a new and dynamic tool, the MedZEB Voluntary Certification Scheme, which is meant to integrate with, and not to take over, existing Energy Performance Certificates schemes. The MedZEB Voluntary Certification Scheme applies not only to the energy effectively saved (which is basic for the economic sustainability of the renovation according to the VEL solution), but also to comfort and well-being performances, as well as to environmental sustainability parameters. The Protocol can be offered to clients in three different levels of commitment, and can be used for both one-step and step-by-step interventions, allowing to maximize its market potentialities.</p>	<p>The MedZEB Protocol, with the associated Voluntary Certification Scheme, is a strong policy instrument that can foster the progressive upgrade of all the renovation market actors and the defragmentation of local renovation supply chains. It allows to effectively manage the whole renovation process according to a standardized framework based on clear quality standards, thus increasing trust and transparency of the renovation market. It allows to progressively build a case history of success stories based on a homogeneous and thus comparable approach, increasing the attractiveness and credibility of the market. Finally, it allows to effectively monitor the achievement of policy targets set for deep retrofitting, both at local and at national level.</p>



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