



CALL FOR EXPRESSION OF INTEREST FOR VIRTUAL PILOTS

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SUMMARY

The current call for expression of interest aims to collect applications for two virtual pilots in the context of the H2020 project **e-SAFE**. The project aims to develop a market-ready solution for integrated seismic and energy renovation of non-historic buildings (i.e. built around 1950-1990) with reinforced concrete (RC) frame. From a technological point of view, the **e-SAFE** system consists of the following components/solutions: **e-PANEL**, **e-CLT**, and **e-EXOS**, as well as **e-THERM** and **e-TANK**. In the context of the project, the system will be tested on a real pilot in Catania (Southern Italy) and two virtual pilots in Europe.

The choice of linking virtual pilots with a call for expression of interest is motivated by the need to match the design opportunities offered by **e-SAFE** with highly motivated early adopters, enhancing their capabilities and interests to act on deep renovation.

The building owners of the virtual pilots **will benefit from receiving a 3D survey of the building, 3D physical and digital models**, a survey of the energy consumption and the potential energy savings and **a detailed design of the energy-efficient and anti-seismic renovation solution**, which will be defined through a **co-design process** that will actively involve owners and occupants.

The demonstration activity at the virtual pilots will end with the production of a detailed **e-SAFE**-based design, including the suggestion of possible **viable financial schemes**, according to the needs of the requesting entity. The demonstration activity does not include the actual implementation of the renovation works.

Owners or managers of multi-storey, non-historic buildings located in earthquake-prone areas in Europe are eligible. However, priority will be given to EU countries other than Italy, where the real pilot is being renovated. The public or private entities which administer social/public housing or public buildings (e.g. schools) are highly encouraged to apply, as well as private actors such as building owners and real estate managers. The eligibility conditions and application method are detailed in the call.

1. Call for expression of interest for virtual pilots

1.1 e-SAFE Project

e-SAFE Project aims at combining energy-efficient and anti-seismic renovation solutions for non-historic buildings in earthquake-prone regions of Europe. The main scope of e-SAFE is to develop a market-ready, multi-purpose deep renovation system for buildings, encompassing technological, functional, aesthetic, financial, and economic aspects, while being easily adaptable to specific climatic conditions, seismicity levels, and other boundary conditions.

e-SAFE combines energy and seismic upgrades through innovative and integrated technological solutions, namely e-PANEL, e-CLT, e-EXOS, e-THERM, and e-TANK (for more details, see <http://esafe-buildings.eu/en/technologies-and-solutions/>). Hence, e-SAFE will contribute to the decarbonisation of the EU building stock, reducing the occurrence of natural hazards related to climate changes, and, at the same time, to the improvement of the social resilience against earthquakes. The e-SAFE system consists mostly of prefabricated elements, applied from the outside of the buildings employing cranes, thus offering a cost-effective, low-disruptive renovation experience for the residents.

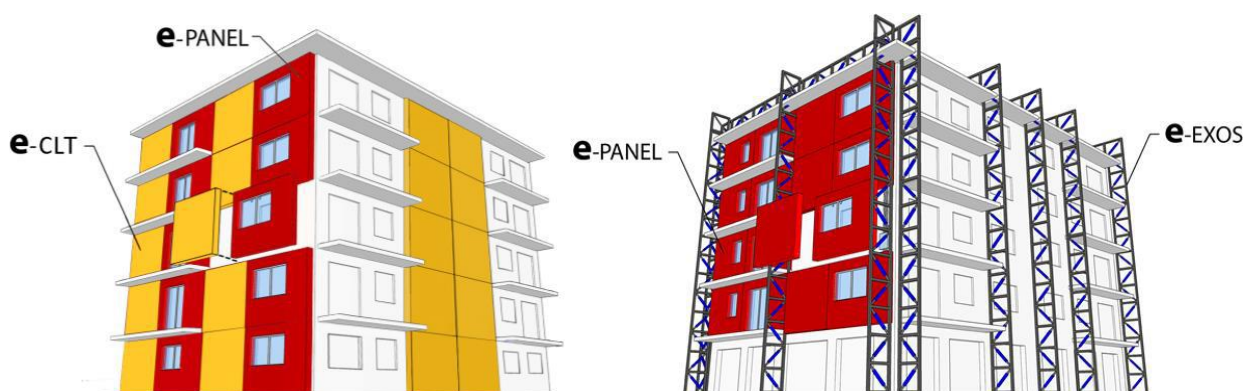


Figure 1. Technological solutions of the e-SAFE system – BUILDING ENVELOPE

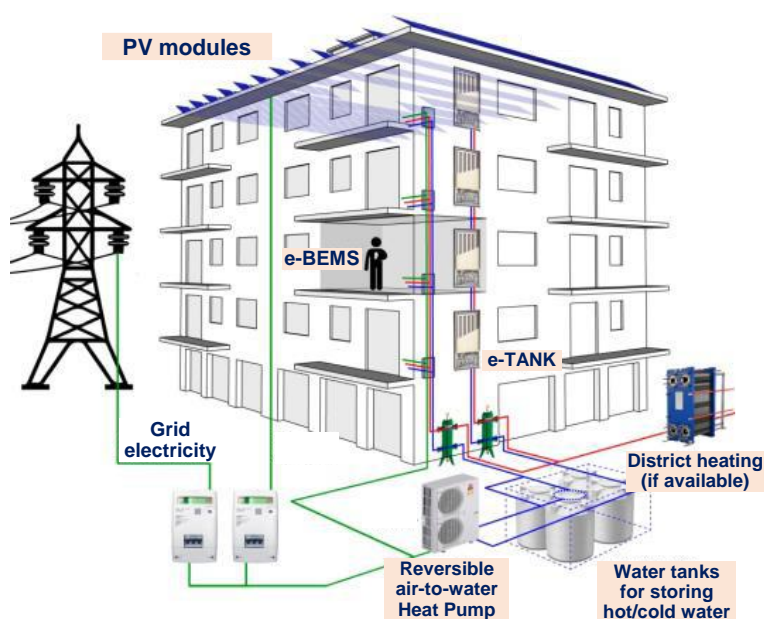


Figure 2. Technological solutions of the e-SAFE system – TECHNICAL SYSTEMS

1.2 Advantages of participating as a virtual pilot

The virtual pilots will be used as case studies for the virtual implementation of the **e-SAFE** system, including its technical, co-design, engagement, and financial protocols.

The building owners of the virtual pilots will benefit from receiving:

- 3D survey of the building;
- 3D physical and digital models of the building;
- an energy audit, energy analysis, and structural simulations of the building;
- a detailed design of the architectural, energy-efficient and anti-seismic renovation solutions obtained through a co-design process that will actively involve residents;
- a suggestion of attractive and viable financial schemes according to the needs of the requesting entity and the specific socio-economic context;
- strengthening of relationships with residents through co-design;
- strengthening of relationships with local stakeholders of the building sector through the establishment of a [local platform](#);
- increased visibility at the local and European levels.

The demonstration activity in the virtual pilots thus ends with the production of the detailed **e-SAFE**-based design and the suggestion of viable financial schemes, without actual implementation of the renovation works in the pilot.

Property owners will be able to use the detailed design offered by **e-SAFE** for future actual renovation to be implemented with their funding.

The following **benefits** are expected from the implementation of the **e-SAFE** renovation system:

- **primary energy savings** and **reduction of the CO₂ emissions** of **at least 70-80%** compared to the current energy performance;
- **significant reduction of the energy bills** for space heating, cooling and domestic hot water;
- **decrease of the renovation cost by at least 20%** in comparison with traditional renovation solutions;
- **reduction of time needed on-site for renovation works by at least 45%** in comparison with traditional renovation solutions;
- **increase of the seismic resistance** up to levels comparable to those required by current standards.

1.3 Services provided by e-SAFE in a virtual pilot

As a first step, **e-SAFE** experts will perform preliminary data collection and co-analysis. They will collect spatial data on the building geometry, through laser scan technologies, if necessary assisted by drones, with the goal to develop physical and digital 3D models of the building.

The second phase will consist of co-design activities with residents. The co-design activities will be assisted by a Decision Support System software tool (called **e-DSS**), developed by the **e-SAFE** experts, which will allow the residents to be aware of the benefits ensured by renovating their building with the **e-SAFE** solution, in terms of energy savings, reduction in the energy bill and decarbonisation potential, as well as the time and costs needed for the renovation works.

Then, based on the outcomes of the co-design activities, **e-SAFE** experts will work on:

- preliminary simulations of the energy performance of the renovated building;

- preliminary simulations of the seismic resistance of the renovated building;
- detailed co-design of the e-SAFE building envelope components needed for renovation;
- detailed co-design of the e-SAFE technical systems, with the sizing of all the necessary components and a suggested piping distribution;
- 3D renders of the building after renovation;
- support in stakeholder engagement and creation of a local platform
- a suggestion of the most attractive and viable financial schemes;
- identification of possible shortcomings and the corresponding necessary adjustments.

2. THE PROCEDURE OF THE CALL

2.1 The procedure and important dates

The present call is a two-round process: the first round is a request for an expression of interest. Applications will then be examined to select a reduced number of potential buildings. The owners of the selected buildings will then be asked for more information, allowing a more thorough final selection of the two virtual pilots on September 10th, 2022.

Stages of the call

- Phase 1: Expression of interest;
- Phase 2: Presentation of more detailed documentation.

Timeline

15th July 2022 deadline of Phase 1, submission of expression of interest, by filling in the [form](#)

1st August 2022 announcement of the shortlisted candidates

10th September 2022 deadline of Phase 2, submission of documentation

25th September 2022 final selection of two virtual pilots

2.2 Eligibility criteria

Location

The buildings must be located in European countries with **medium-to-high seismic hazards**, such as Romania, Bulgaria, Croatia, Cyprus, Greece, Portugal, Slovenia, and Spain, as well as countries that do not belong to the EU-28 group, such as Turkey, Ukraine, Albania, Kosovo, Serbia, Montenegro, Macedonia, Bosnia-Herzegovina, and Iceland.

Applications from Italy are possible, but they will be considered only in case the applications from other countries are not eligible since a pilot building is already being renovated in Southern Italy.

Typology and technical requirements of the building

Private and public buildings are eligible, with any type of use. However, public and private entities administrating multifamily **social/public housing**, or public buildings, such as **schools**, are strongly encouraged to apply and will be given priority.

We require **non-historic buildings** (i.e. built around 1950-1990) that are **not listed** under heritage protection and **with a reinforced concrete structural frame**. The building must be highly

representative of the building features in the same district/city/country in order to increase the potential replication of the **e-SAFE** renovation system.

Detached buildings are better suitable since the prefabricated panels proposed by **e-SAFE** (i.e. **e-PANEL** and **e-CLT**, Figure 1) can be externally added to each front. These panels are applied by means of cranes, hence sufficient space for crane operation around the building is needed.

Specific technical requirements will be checked by **e-SAFE** experts to verify the applicability of the two **e-SAFE** anti-seismic solutions, as specified below.

Seismic strengthening by e-EXOS

Detached buildings are mandatory, with at least 3 m of free space around the whole building envelope, which is necessary for the installation of the external vertical trusses (metal exoskeleton, Figure 1).

Seismic strengthening by e-CLT

The target buildings must have regular openings on façades, vertically aligned, which allows to uniformly apply the structural **e-CLT** panels to each building storey.

Garages located at the ground floor of the building or commercial premises with many and large shop windows preclude the **e-CLT** application unless the surface of the openings will be reduced during the renovation works. Moreover, also a large use of bow-windows limits the application of the **e-CLT** panels, which in this case cannot be connected directly to the beams of the RC structure, reducing considerably the effectiveness of this solution.

Another limitation to the effective use of the **e-CLT** regards the number of floors. The solution is less efficient for high-rise buildings and specific simulations are ongoing to adequately investigate in this regard. Hence, **buildings with more than 6 floors are not eligible**.

Other selection criteria

Preference will be given to buildings that:

- are located in climates other than the Mediterranean (e.g. continental climate);
- provide the opportunity for testing **e-EXOS** or **e-EXOS** and **e-CLT** for structural strengthening;
- offer the possibility for designing the **e-SAFE** system in relation to different building typologies and functions;
- are connected to district heating networks.

Logistics requirements

Applicants will be requested to support **e-SAFE** experts in contacting local residents and interacting with them (with translation from and to English) and providing a working space/room on-site.

2.3 How to apply

To apply as a virtual pilot within the **e-SAFE** Project, please fill in the following [form](#).

For further inquiries, visit the [e-SAFE page](#) and do not hesitate to contact Giuseppe Margani (margani@unict.it) from UNICT or Victoria Taranu (victoria.taranu@bpie.eu) from BPIE.

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