Holistic Energy and Architectural Retrofit Toolkit

HEART

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HEART Project General information

- **OFFICIAL TITLE: HEART** Holistic Energy and Architectural Retrofit Toolkit •
- **RELEVANT KEYWORDS**: Renovation, Energy efficient buildings, Internet of Things, Interoperability, Integrated design
- **DURATION:** 48 + 10 months (01/10/2017 30/07/2022) •
- **EU CONTRIBUTION:** 5,669,012.50 €
- **PROJECT COORDINATOR:** prof. Niccolò Aste, Politecnico Di Milano, niccolo.aste@polimi.it •
- WEBSITE: <u>www.heartproject.eu</u>
- LINKEDIN: www.linkedin.com/groups/8642064/profile
- **TWITTER:** twitter.com/HEARTProjectEU



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2

Consortium

N°	PARTICIPANT ORGANISATION NAME	SHORT NAME	С
1	Politecnico di Milano	POLIMI	
2	ENTPE Lyon	ENTPE	
3	University of Ljubljana	UL	S
4	Accademia Europea di Bolzano	EURAC	
5	Turbo Power Systems	TPS	
6	Heliotherm	HT	
7	ZH	ZH	
8	Useful Risks	UR	Lux
9	STILLE	ST	(
10	Revolve Water	RW	E
11	Quantis	QT	
12	GarciaRama	GR	
13	Housing Europe	HE	E
14	ACER RE	ACER	
15	Est Métropole Habitat	EMH	
16	CTIC Technology Centre	CTIC	







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- Italy
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- Austria
- Italy
- xembourg
- Croatia
- Belgium
- Swiss
- Spain
- Belgium
- Italy
- France
- Spain



University of Ljubljana Faculty of Mechanical Engineering



WATER

HOUSING

EUROPE

POLITECHICO DE HELANO

@ REVOLVE



eurac research → GarcíaRama

Quantis







Useful Risks







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3

Application context

The project's geographical focus is Central and Southern Europe, where the moderate climate building energy requires performance to relate as much as to heating, overheating and cooling.





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4

Application target

The application target are multistorey residential buildings of the second half of the last century. Within this category, the most common types are **4-5 floors linear** condominium buildings.





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Objectives (1)

OBJECTIVE 1 - To develop systemic and cost-optimal solutions for energy retrofit

The main objective of the project is to develop an holistic and multifunctional toolkit based on the synergistic interaction between building technologies and technical systems.

The solution has to **decrease** installation time by at least 30% compared with normal construction practices and to ensure **payback** periods lower than 15 years.

OBJECTIVE 2 - To develop, update and adapt innovative technologies for their systemic integration HEART toolkit will systemically integrate different types of subcomponents - envelope technologies, technical systems, renewable energy sources and building energy management systems - offering high levels of performance and communicating with each other.



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OBJECTIVE 3 - To foster building's smart upgrade

The developed solutions will enable to convert existing buildings into Smart Buildings, i.e. in interactive buildings characterized by dynamic and multidirectional flows of energy and information.

The control logic will learn about the building's behaviour and its end-user habits and preferences, identify and apply optimal operating profiles, allow real-time monitoring, allow active involvement of end-users and enable dynamic interfacing with the grid.



Objectives (2)

OBJECTIVE 4 - To support and improve the decision-making process

By means of an iterative simulation of various feasible solutions, **HEART selects and sizes the most** effective one, providing a detailed prediction of the achievable cost-performance-benefit ratio.

In addition to strengthening the economic and energy-related benefits HEART can support and facilitate decision-making, reducing the choices' processing time by at least 30% and decreasing final outcome uncertainty of the decision-making phase.



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OBJECTIVE 5 - To promote energy efficient financing

HEART reduces energy consumption, optimizes overall performance and, through a continuous monitoring and makes a building's operating transparent. This aspect translates into an effective conduct of a retrofit intervention and a constant documentation of its performance.

HEART will develop innovative business models to support energy efficiency financing, oriented both at private investments and at public incentives. It can be estimated that these tools, breaking down risks and uncertainties, will increase by 20% the attractiveness of energy retrofit investments.



HEART Toolkit

- 1) Retrofit components/techniques for existing windows;
- 2) Multifunctional external thermal insulation;
- 3) Universal PV tiles;
- 4) Cloud-platform;
- 5) DC Smart fan coils;
- 6) Thermal storage;
- 7) Battery pack;
- 8) DC heat pump;
- 9) Multi-Input/Multi-Output converter (MIMO);







Case-Studies Bagnolo in Piano - ITALY



Lyon- FRANCE





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Fleurent Architectes 46, rue Delandine 69002 Lyon





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Thanks for your attention







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