The Project

Heat4Cool proposes an innovative, efficient and cost-effective solution to optimize the integration of a set of rehabilitation systems at building and district level in order to meet the net-zero energy standards.

This retrofitting solution together with a closer interaction between building monitoring, demand/respond supply match, weather forecast and HVAC activation/control through a Self-Correcting Intelligent Building Energy Management Systems (SCI-BEMS) aims to demonstrate saving of at least 20% of energy consumption.

The project will be implemented in three buildings and one district area in four different European climates, with an expected return on investment lower than ten years.

Building demonstrations

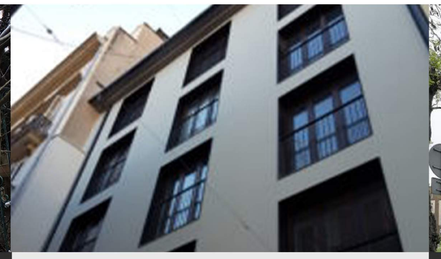
The Heat4Cool testing will be performed both, at building and district level. The first step of the testing will include the integration of the system in a testing facility (KUBIK) designed especially for the testing of new energy efficiency solutions. Its main characteristic is the capability to build realistic scenarios to analyse the energy efficiency.

Sofia, Bulgaria

Building structure & living area
Residential building

Climate
Humid subtropical climate with continental influence

Current heating system
Natural gas and electric boilers



Valencia, Spain

Building structure & living area
Residential building

Climate
Humid continental

Current heating system
Natural gas boiler

Chorzów, Poland

Building structure & living area
Residential building

Climate
Humid continental

Current heating system
Natural gas boiler

Budapest, Hungary

Building structure & living area
District

Climate
Humid continental

Current heating system
Natural gas boiler

Targets

Heat4Cool key performance targets are :

1. Reduction of energy consumption by 30 % in retrofitting residential buildings.

2. Payback period of below 10 years.

3. Best practice examples for the construction sector based on innovation and competitiveness.

The integrated Heat4Cool solution will provide:

1. Space heating, cooling and domestic hot water :

The two main heating & cooling solutions will be a solar assisted Adsorption Heat Pump (AdHP), which will be easily integrated to the existing natural gas building installation, and an advanced DC Heat Pump powered by photovoltaic panels (PV) and coupled with a modular advanced Phase Change Materials (PCM) heat and cold storage.

A high performance heat exchanger utilising sewage water will be developed in order to connect low temperature heat streams to Heat4Cool solutions.

2. Renewable energy :

The solar thermal and PV system are important components of the retrofitting solution due to the active energy production and their high integration ability to Heat4Cool heating and cooling solutions (AdHP and DC Heat Pump).

3. Smart control :

As the brain of the heating and cooling energy system, the smart control will continuously monitor performance and environmental conditions in order to identify the optimal, in terms of energy efficiency, control strategy for the end user, whilst respecting his/her personalised comfort boundaries.

4. Scale up to district and building installations :

The AdHP and DC Heat Pump coupled with a heat storage system assisted by RES are proper solutions for individual building, while the sewage and smart control systems enable wider implementation and aggregate the benefits from larger scale application.

OUR STRUCTURE

WP1
Project Management & Coordination

WP2
Retrofitting design planner tool

WP3
Integration of Heating & Cooling Solution

WP5
Self-Correcting Intelligent Building Energy Management System (SCI-BEMS)

WP4
Simulation at building / district level

WP7
Business model, replication potential. market analysis

WP6
Demonstation, validation & LCA

WP8
Dissemination & exploitation

PARTNERS

AES Solar
Balkanika ENERGY
ehpa european heat pump association
FAHRENHEIT
Lucerne University of Applied Sciences and Arts HOCHSCHULE LUZERN
HYPERTECH energy labs
IZNAB Sp. z o.o. "Innovation Oriented To Business"
POLITECNICO MILANO 1863
Symelec ENERGIAS RENOVABLES
Sunamp Heat Batteries™
Solintel
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THERMOWATT

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The Heat4Cool Project

Integrating advanced technologies for heating and cooling at building and district level

HEAT4COOL