REINTEREST

Renewable **E**nergy-and Cleantech-based Multifunctional & **INT**elligent **E**nvelope **R**etrofitting **S**ystems' **T**oolbox

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RESEARCH INFORMATION

KEYWORDS

Retrofit, compact, multifunctional, intelligent, sustainable, buildings, energy, efficiency.

INTRODUCTION / CONTEXT

In the EU, the building sector is responsible for about 40% of the energy consumed and 36% of the CO2 emissions to the atmosphere [1-2]. Most of the energy is consumed by existing buildings while the replacement rate of existing buildings by the new build is only around 1 % per annum [1]. The European Commission established a long-term objective of decreasing the CO2-emissions for the building sector by 88%-91% in 2050, compared to 1990 levels, by retrofitting existing buildings. Energy retrofits require, at a reasonable investment, the improvement of the thermal insulation of building envelopes, the optimal use of exposed areas to light, to convert solar energy into electricity and heat, and to store these energies. In addition, Building Information Modelling (BIM) may be implemented in retrofit processes to improve the energy efficiency of buildings. Several research projects in Belgium and Europe have developed guidance and technologies to assist designers and owners significantly to reduce the energy consumption of buildings. Table 1 presents some of these projects. REINTEREST integrates different technologies.

QUESTION / GOAL

- Minimise the cost of energy retrofits in urban area to make them affordable, profitable and financeable in relatively few years;
- Integration of existing elements into a single compact solution to get a low cost and low energy impact buildings by using a modern Eco-Design (Fig 1).

HYPOTHESIS / METHODOLOGY

In order to optimize the use of building envelopes, from both a technical and budgetary standpoint, REINTEREST aims to design multi-functional (PV, batteries, insulating and intelligent) products (materials and/ or constructive systems) to:

- Reduce heating, cooling, and lighting loads through climate-responsive design.
- Employ renewable energy sources
- Optimize building performance by employing energy modelling programs and optimize system control strategies
- Monitor project performance.

The project will be achieved through 8 work packages (WP):

- WP1: Definition of building specifications and requirements
- WP2: Energy and energy efficiency of buildings (including the storage of electricity and heat)
- WP3: Architecture and building (Including building materials and manufacturing techniques)
- WP4: Home automation and monitoring (and adequate software)
- WP5: Energy integration and economic feasibility
- WP 6: Demonstrator
- WP 7: Tool validation (by assembly, installation and monitoring)
- WP 8: Dissemination and Valorization.

RESULTS (EXPECTED)

Design of products to broaden energy savings with attractive returns through integrative design, right-timing, bundled energy efficiency measures.

CONCLUSION

Balanced energy consumption and production, and reduced cost, through improved thermal efficiency, renewable energy sources and storage, and intelligent home automation services management

Subject	• Projects names
Elements of insulating roofs and facades	• AIM-ES, Brussels Retrofit XL (Innoviris) • E2Rebuild (UE) • TES Energy Facade (UE)
Building Integrated photovoltaics (BIPV)	• BFIRST (UE) • Issol (Fonds propres) (Sponsorship of REINTEREST
Storage and network flexibility	• MESB, Brussels Retrofit XL (Innoviris) • HYB2HYB, Energinsère (DGO4) • BatWal (DGO6) • InduStore (SPW)
IoT (internet of things) and sensors networks	• SAVE (Plan Marshall) • IDEES (FEDER)
Insulation	• Homeskin (UE) • Innov-ETICS, Brussels Retrofit XL (Innoviris)
Building with multi skin envelopes	• SIMBA (FEDER)

Tab. 1: Current and previous projects related to Building Energy Retrofitst

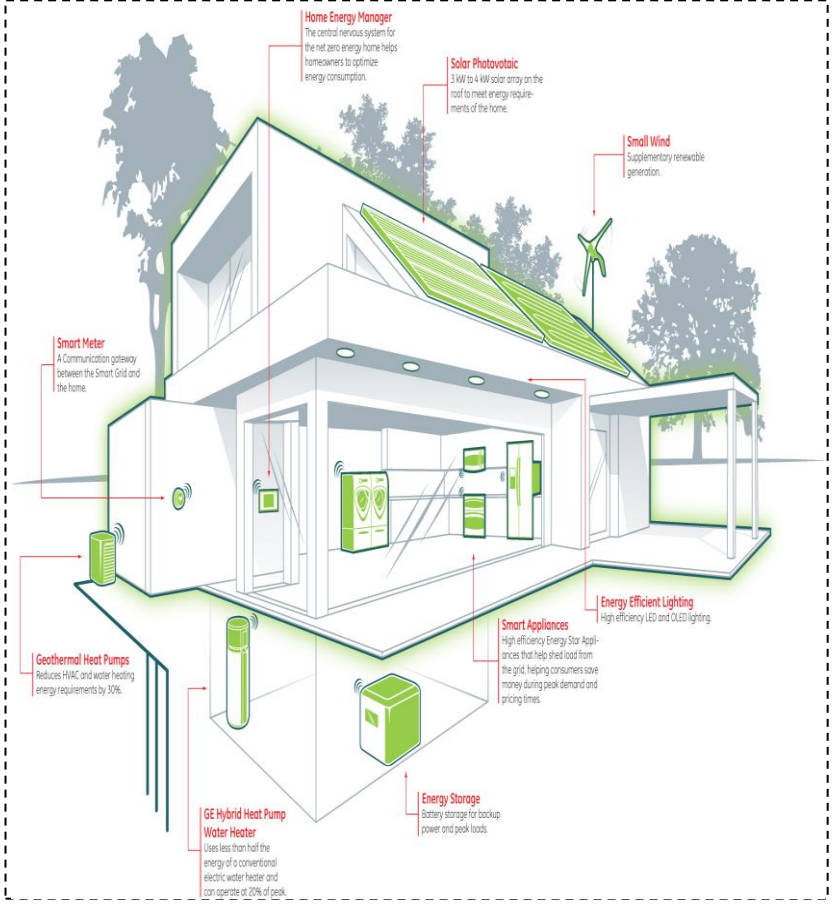

Fig. 1: Energy efficiency retrofit (source http://www.climatetechwiki.org)

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[1] European Parliament and of the Council, Directive 2002/91/EC of the European Parliament and of the Council of 16 December on the energy performance of buildings. DOUE 1, pp. 65-71, 2003.

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