

## NEARLY ZERO ENERGY BUILDING AND PASSIVE HOUSE – SUSTAINABLE SOLUTIONS FOR RESIDENTIAL BUILDINGS

### Goal of the project

The main activities of the NEZ EBUILD research project are related to the design and detailing of technical solutions in order to achieve the nearly zero energy building standard. Further, the main goal of the project is to validate the selected solutions through extensive monitoring. Design and execution refer to construction elements, finishes and installations system.

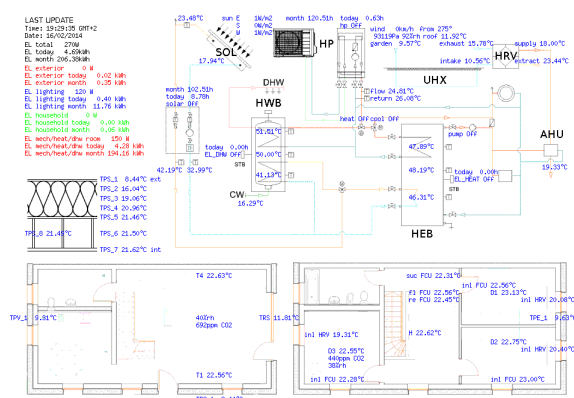
### Short description of the project

In Dumbravita (near Timisoara), a residential building was built as a duplex. Half of the duplex was conceived and equipped as a passive house (PH) and the other half as a nearly zero energy building (NZ EB). For the construction of the house were used common materials such as reinforced concrete, bricks, wood and polystyrene. Opaque elements of the envelope were insulated with polystyrene plates. By monitoring the house from Dumbravita, the energy consumption is measured and thermal comfort parameters are kept under observation. The monitoring system registers and collects data which is uploaded to a web server. The components of the monitoring system result from the need to make data available online and the physical measurements that had to be taken. Therefore the system contains a central unit and a number of ambient/energy sensors. The PH is being monitored for over a year and relevant conclusions can be drawn regarding energy efficiency of the building and the thermal comfort.



### Project implemented by

Project Partnership comprising Politehnica University of Timisoara - CCI Department and Arhitim.



### Main activities

- Design and detailing of NZ EB system including procurement of materials, equipment and elaboration of energy performance certificate for NZ EB.
- Elaboration of research reports and scientific papers.
- Energy performance assessment of the passive house using the recorded data from the monitoring system.
- Execution of finishes for the NZ EB, mounting of HVAC system and procurement of all the other necessary equipment.
- Design of the monitoring system and initiation of the monitoring activities for the NZ EB.
- Elaborating a comparative PH vs. NZ EB study on energy efficiency; optimization of global cost for NZ EB; lifecycle assessment of NZ EB.
- Dissemination of recommendations and general rules for implementing energy efficient residential houses in temperate climate.

### Research centre

Research Centre for Retrofitting of Constructions – RECO

### Implementation period

2012-2015

## Results

Expected final results of the NEZ EBUILD project consist in the elaboration of a recommendation design guide regarding NZ EB systems based on experimental research. Until this point of the project development, the most relevant results consist in:

- validation, verification and centralization of data obtained through the monitoring system installed in the passive house;
- interpretation and analysis of the monitoring data and energy certification based on actual measured energy consumption of PH;
- continuous monitoring of the interior hygrothermal parameters of the building;
- completion of the finishing and equipping works on the NZ EB;
- installation of the monitoring system and initiation of the monitoring for NZ EB.

## Applicability and transferability of the results

The topic of the project is closely related with the increasing concern of nowadays society on reducing the energy consumption in buildings. The targeted groups of the project are scientist, specialists in the energy efficiency field and stakeholders. The project deliverables will assure the transfer of knowledge, generating further „know-how” for scientific community and for practicing specialists (civil and environmental engineers, electrical and energy engineers, architects, technicians).

## Fields of interest

Energy efficiency;  
Nearly Zero Energy Building;  
Passive House;  
Sustainable design of residential houses;  
Environmentally and economically impacts of the energy efficient houses.



## Research team

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