

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

Goal of the project

The idea of this project arose from the need to develop energy efficient solutions that reduce the energy consumption in the Romanian residential building sector. The main goal of the NEZEBUILD research project is related to the design and detailing of technical solutions in order to achieve the nearly zero energy building standard, resulting in the validation of such designs through extensive monitoring. Design, detailing and execution include the construction elements, finishes and installations system.

Short description of the project

The research project deals with a topic of great importance regarding the design and execution of energy efficient buildings in the Romanian climatic and economic conditions. A pilot project was developed consisting in a residential building composed of two detached houses. The two houses were designed and built so that one house will achieve the passive house (PH) standard and the other house the nearly zero energy building standard (NZEB). Building such types of houses implies the necessity to implement a monitoring system with a good quality - price balance, necessary in order to validate the theoretical design. The PH and NZEB are equipped with monitoring systems. Through the monitoring process of the two houses, the energy consumption is measured and thermal comfort parameters are kept under observation. The data registered by the monitoring system is uploaded to a web server making the data available on the internet. All project activities aim at developing a recommendation design guide regarding PH an NZEB based on experimental research.

Project implemented by

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

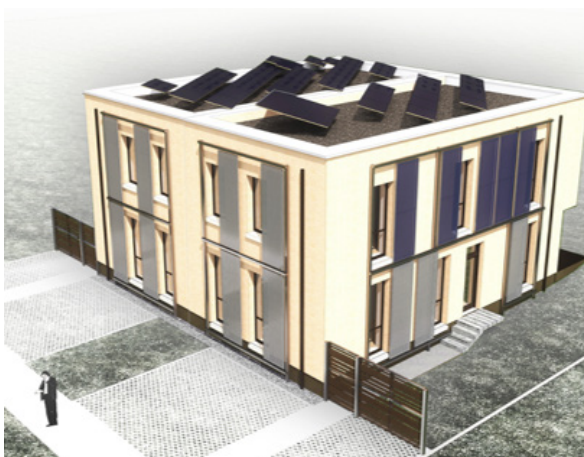


Fig. 1 General view of house

Implementation period

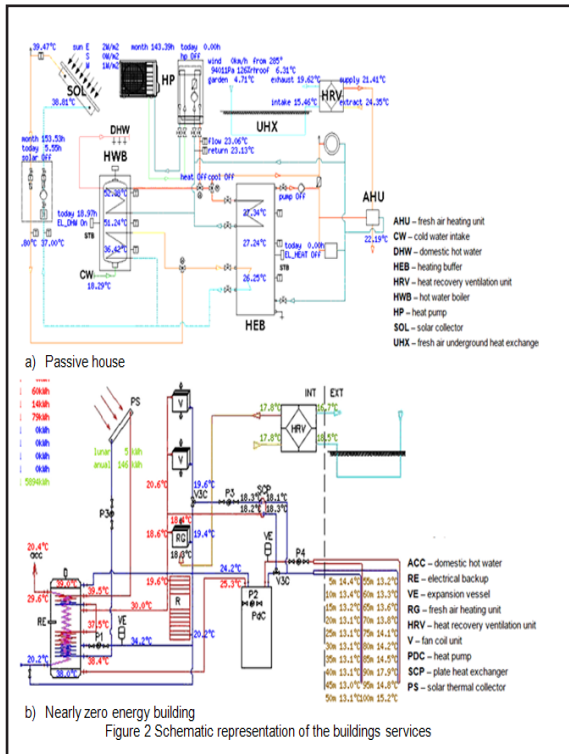
2012 – 2016

Main activities

- Design and detailing of NZEB system including procurement of materials, equipment and elaboration of energy performance certificate for NZEB.
- Design of the monitoring system and set-up of equipment and accessories for NZEB.
- Evaluation of monthly energy consumption for the two houses. Evaluation of main consumption, energy produced and consumed from renewable sources.
- Overall investment cost assessment and lifetime of the building. Analysis of the overall cost of the investment, cost benefit analysis damping coefficient for NZEB investment, optimized investment payback.
- Evaluation of elements with significant impact in terms of environmental protection.
- Lifecycle assessment using specialized software SimaPro - LCA with different scenarios Simapro program, materials recovery and waste management.
- Elaborating a comparative PH vs. NZEB study on energy efficiency.
- Dissemination of recommendations and general rules for implementing energy efficient residential houses in the Romanian temperate climate.

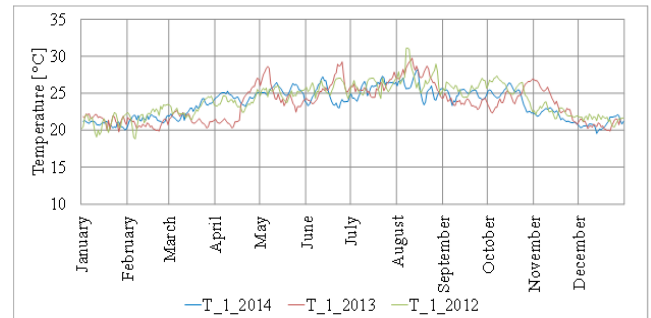
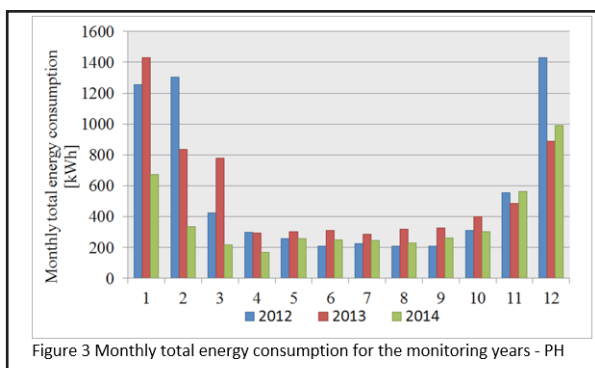
Results

The actual status of the project consist in the continuous processing and interpretation of the data obtained through the monitoring activity of the two houses. The passive house is monitored for more than three years and so far we have collected the registered data and established a strategy for processing. The amount of data is considerable taking in consideration that the measurements were taken at every minute. The monitoring process for NZEB started in 2014 but since the house is inhabited only from the beginning of 2015, relevant registered data is starting with 2015. Throughout the year, the results are published in scientific papers. The monitoring process of the two houses along with real time monitoring graphs can be viewed online at the address <http://www.sdac.ro/site/archives/category/monitoring>



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).



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Research Centre

- Research Centre for Retrofitting of Constructions – RECO
- CCI Department

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