E4 House

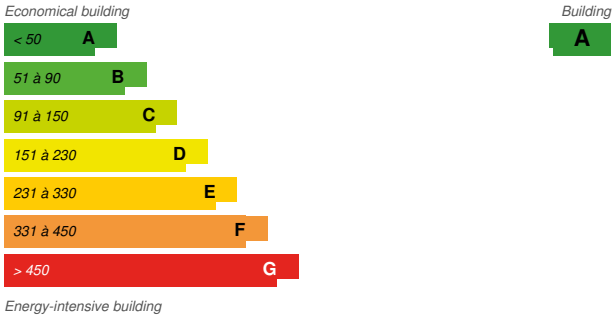
by Sergiu Petrea / 2016-06-28 13:46:45 / International / 11665 / EN

Primary energy need :

36 kWhpe/m².year

(Calculation method : Other)

ENERGY CONSUMPTION



Building Type : Isolated or semi-detached house
Construction Year : 2015
Delivery year : 2015
Address 1 - street : 077066 OSTRARU, Romania
Climate zone : [Dfb] Humid Continental Mild Summer, Wet All Year

Net Floor Area : 350 m²
Construction/refurbishment cost : 216 000 €
Cost/m2 : 617.14 €/m²

Certifications :

Proposed by :

General information

The challenge of designing an E4 House, coming up with personalised ideas and design to enhance the 4 main concepts: Energy efficiency, Environment, Emotion &health, Economy.

Energy efficiency refers to the minimization of energy consumption through design, seeking ways to use innovative heating and edge building technologies in order to become a referenced NZEB. Environment. Reduction of greenhouse gas emissions by the use of environmentally friendly renewable energy sources such as sun, geothermal heat or biomass. Emotion & health. The house seeks to achieve that unique quality of living and explores ways to ensure a healthy room climate using as much as possible the natural building material of clay products. Economy. Last but not least, we obtained an affordable house and maintenance costs in order to prove that it is possible to have an attractive and affordable NZEB.

The E4 House concept follows the subsequent development of the major energy efficient building design methods but at the same time pays attention to the cultural background and the regional adaptation of the layout to each context. In architectural terms, the main elements that are crucial to the building's energy-efficiency are also the most powerful visual characteristics - in particular the components of the buildings envelope. And these elements are also the main factors that bear the marks of tradition and

culture, represented by the urban rules and the site context. Based on this, the project focused on the contemporary approach of the pitched roof - covered with ceramic tiles, of the massive brick walls and terraces - possible to have ceramic finishes, of the windows typology and the balance of textures and colours, both for exterior and interior.

See more details about this project

http://tecto.ro/portfolio/e4-house-casa-e4/
http://casae4.ro/casa-e4-din-caramida/

Stakeholders

Stakeholders

Function : Designer

TECTO Arhitectura

office@tecto.ro

http://tecto.ro/
Architecture design

Contracting method

Other methods

photos by ANDREI MARGULESCU and ANDREI GANDAC

Energy

Energy consumption

Primary energy need : 36,00 kWhpe/m^2.year

Primary energy need for standard building : 126,00 kWhpe/m^2.year

Calculation method : Other

CEEB : 0.0004

Envelope performance

Envelope U-Value : 0,22 $W.m^{-2}.K^{-1}$

More information :
Exterior insulation to ambient air - 0.22W/(m^2K)
Exterior insulation underground - 0.18W/(m^2K)
Windows and external doors - 0.94W/(m^2K)

Building Compactness Coefficient : 0,20

Indicator :

Renewables & systems

Systems

Heating system :

- Heat pump
- Low temperature floor heating

Hot water system :

- Heat pump
- Solar Thermal

Cooling system :

- Reversible heat pump
- Others

Ventilation system :

- Natural ventilation

Renewable systems :

- Solar photovoltaic
- Solar Thermal
- Heat pump

A major innovative energy system considered in the proposed E4-house design consists in an optimized Trombe wall, known to provide heat by a combination of thermal mass and greenhouse effects. In the original Trombe wall solution, the southern wall of the building – usually made of materials with heat storage properties (thermal mass: bricks, concrete, stones) – is painted in dark colors and has a glass panel placed in front of its surface, at a certain distance to create an air cavity. By greenhouse effect, the wall is heated by convection from the warm upward airflow that is generated through the gap. The present design attempts to optimize the Trombe wall by combining its effects with ventilation. The Trombe wall is placed on the Southern surface of the living room, where the overnight temperature may be lower than the temperature needed for comfort during the day.

Smart Building

BMS :

-Centralized automation systems SPS System (BMF) free programming, from Hanazeder. The central home automation technology enables homeowners to control heat, window coverings, lighting, security sensors and cameras, as well as to track comfort parameters

Environment

Urban environment

The house is located near the city, in a low density residentioal area that provides the best environment for the construction of a nearly zero energy building.

Land plot area : 944,00 m^2

Built-up area : 37,00 %

Green space : 524,00

Products

Product

Porotherm Clay Blocks

Wienerberger

office@wienerberger.co.uk

http://wienerberger.co.uk/

Product category : Gros œuvre / Structure, maçonnerie, façade

Porotherm is a precision clay block walling system - a modern method of construction with reassuringly traditional values.

Both designers and workers.

Costs

CONTEST

Reasons for participating in the competition(s)

E4 starts with the development of advanced energy concepts as a prerequisite for 2010/31/EU Directive, which asserts that starting with 2020 all the new buildings will have ZERO ENERGY BALANCE. Thus, the so called E4 program - E for Energy, Economy, Ecology and Emotion – was developed as a possible future house model.

The architectural took into account the localization of building into the site and orientation facing the cardinal points and the predominant wind. These decisions contributed to the shape of the building geometry, as well as to the distribution and properties of transparent and opaque elements of the façades.

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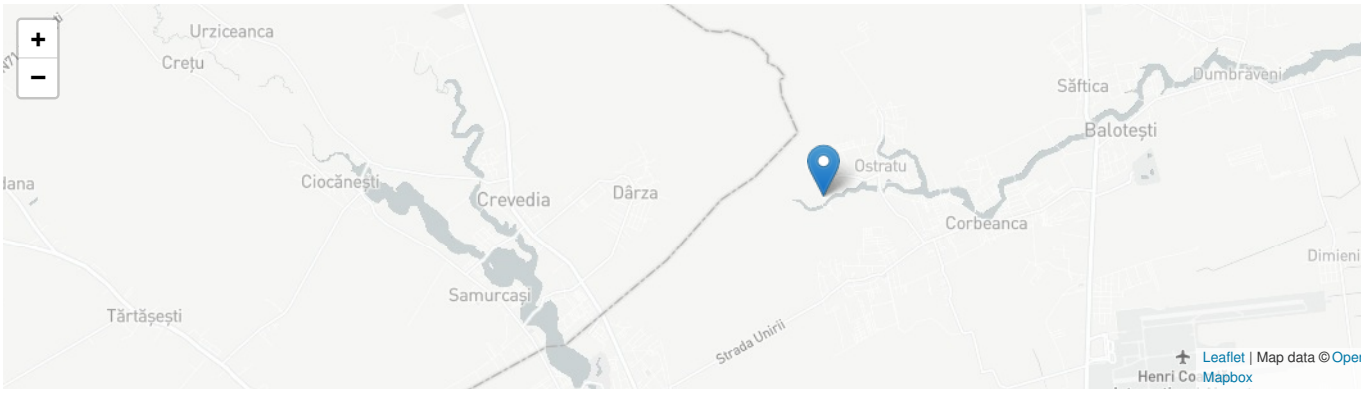
Building candidate in the category

Energy & Temperate Climates

Green Building Solutions Awards 2016
powered by Construction21.org

Users' Choice Award



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