

# PASSIVE HOUSE CHE

by [Sergiu Petrea](#) / 2016-06-29 12:03:48 / International / 15430 / EN



Primary energy need :

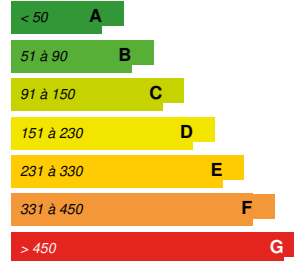
**89** kWhpe/m<sup>2</sup>.year

(Calculation method : Other )

## ENERGY CONSUMPTION

Economical building

Building



Energy-intensive building

**Building Type** : Isolated or semi-detached house

**Construction Year** : 2014

**Delivery year** : 2015

**Address 1 - street** : 720032 SUCEAVA, Romania

**Climate zone** : [Dfb] Humid Continental Mild Summer, Wet All Year

**Net Floor Area** : 190 m<sup>2</sup> Useful area (ro)

**Construction/refurbishment cost** : 400 000 €

**Number of Dwelling** : 1 Dwelling

**Cost/m<sup>2</sup>** : 2105.26 €/m<sup>2</sup>

**Certifications :**



**Proposed by :**



## General information

The challenge was to create a simple, sustainable, two-storey unit that would fit into a special site: a mature forest inside a northern Romanian city.

House Che subtly rises around the inner courtyard in a mesmerizing natural environment with whom the building communicates through wide openings and various inner-out passages.

The house was designed and built to reach the passive house standard in the harsh climate conditions of northern Romania (Suceava) and is in the passive evaluation process. The estimated energy demanded for heating and hot water is lower than 14 kWh/sqm/year (according to preliminary phpp calculations).

The natural day factor is four times bigger than the usual amount while the generous glazed surfaces also increase the solar passive energy gain. The iconic shape of the roof maximizes the solar input used for heating, offering in the meanwhile a contemporary dynamic expression.

To match the surroundings, exterior finishing is made out of natural cedar slats that preserve their physical-chemical properties even in the northern climate. The green roof recovers the vegetal surface displaced for the house construction.

The minimal need for heating is covered by a ground/water power heat pump. Photovoltaic panels will be installed on the roof at a later stage in order to provide the electric energy necessary for vital consumption and domestic hot water is obtained through solar thermal collectors and a heat buffer tank.

## See more details about this project

<http://tecto.ro/portfolio/passive-house-che-casa-pasiva-che/>

<http://www.home-review.com/2015/05/the-wild-child/>

<http://inhabitat.com/passive-house-che-in-romania-has-a-super-fun-indoor-net-canopy/>

<http://www.trendir.com/house-design/energy-efficient-forest-home-has-suspended-net-lounge.html>

<http://www.gizmag.com/passive-house-che/35469/>

## Stakeholders

### Stakeholders

Function : Designer

TECTO Arhitectura

office@tecto.ro

<http://tecto.ro/>

Architecture design

### Contracting method

Other methods

## Energy

### Energy consumption

Primary energy need : 89,00 kWhpe/m<sup>2</sup>.year

Primary energy need for standard building : 111,00 kWhpe/m<sup>2</sup>.year

Calculation method : Other

CEEB : 0.0001

### Envelope performance

Envelope U-Value : 0,11 W.m<sup>-2</sup>.K<sup>-1</sup>

More information :

Exterior insulation to ambient air - 0.11W/(m<sup>2</sup>K)

Exterior insulation underground - 0.12W/(m<sup>2</sup>K)

Windows - 0.63W/(m<sup>2</sup>K)

External doors - 0.10W/(m<sup>2</sup>K)

Building Compactness Coefficient : 0,32

Indicator : n50

Air Tightness Value : 0,40

## Renewables & systems

### Systems

Heating system :

- Condensing gas boiler
- Low temperature floor heating

Hot water system :

- Condensing gas boiler

Cooling system :

- No cooling system

#### Ventilation system :

- Natural ventilation
- Double flow heat exchanger

#### Renewable systems :

- Heat pump

## Environment

### Urban environment

The construction fits into a special site: a mature forest inside a northern romanian city. The building keeps all the existing trees on site and also recovers the existing lawn in the shape of the green roof.

Land plot area : 1 285,00 m<sup>2</sup>

Built-up area : 15,00 %

Green space : 1 000,00

## Products

### Product

Proclima Membranes

Proclima

info@proclima.com

<http://de.proclima.com/>

Product category : Structural work / Carpentry, cover, tightness

High performance vapour retarding and airproofing system for maximum protection from structural damage and mould. Highly permeable, roof lining and sarking membranes that actively manage moisture, 3-4 ply, suitable for temporary covers.

Both designers and workers.



## Costs

## Contest

### Reasons for participating in the competition(s)

THE CHALLENGE WAS TO CREATE A SIMPLE, SUSTAINABLE, TWO-STOREY UNIT THAT WOULD FIT INTO A SPECIAL SITE: A MATURE FOREST INSIDE A NORTHERN ROMANIAN CITY.

HOUSE CHE SUBTLY RISES AROUND THE INNER COURTYARD IN A MESMERIZING NATURAL ENVIRONMENT WITH WHOM THE BUILDING COMMUNICATES THROUGH WIDE OPENINGS AND VARIOUS INNER-OUT PASSAGES.

THE HOUSE WAS DESIGNED AND BUILT TO REACH THE PASSIVE HOUSE STANDARD IN THE HARSH CLIMATE CONDITIONS OF NORTHERN ROMANIA (SUCEAVA) AND IS IN THE PASSIVE EVALUATION PROCESS. THE ESTIMATED ENERGY DEMANDED FOR HEATING AND HOT WATER IS LOWER THAN 14 KWH/SQM/YEAR (ACCORDING TO PRELIMINARY PHPP CALCULATIONS).

THE MAIN PRINCIPLES AND GOALS OF SUSTAINABILITY AND ENERGY EFFICIENCY ARE PURSUED BY THE USE OF WOODEN STRUCTURES, ALL NATURAL INSULATION MATERIALS, GREEN ROOF, HIGH PERFORMANCE WINDOWS AND THE ENCOMPASSMENT OF A RESOURCE MANAGEMENT SYSTEM FOR HEATING AND ELECTRICITY SUPPLY.

THE NATURAL DAY FACTOR IS FOUR TIMES BIGGER THAN THE USUAL AMOUNT WHILE THE GENEROUS GLAZED SURFACES ALSO INCREASE THE SOLAR PASSIVE ENERGY GAIN. THE ICONIC SHAPE OF THE ROOF MAXIMIZES THE SOLAR INPUT USED FOR HEATING, OFFERING IN THE MEANWHILE A CONTEMPORARY DYNAMIC EXPRESSION.

TO MATCH THE SURROUNDINGS, EXTERIOR FINISHING IS MADE OUT OF NATURAL CEDAR SLATS THAT PRESERVE THEIR PHYSICAL-CHEMICAL PROPERTIES EVEN IN THE NORTHERN CLIMATE. THE GREEN ROOF RECOVERS THE VEGETAL SURFACE DISPLACED FOR THE HOUSE CONSTRUCTION.

THE MINIMAL NEED FOR HEATING IS COVERED BY A GROUND/WATER POWER HEAT PUMP. PHOTOVOLTAIC PANELS WILL BE INSTALLED ON THE ROOF AT A LATER STAGE IN ORDER TO PROVIDE THE ELECTRIC ENERGY NECESSARY FOR VITAL CONSUMPTION AND DOMESTIC HOT WATER IS OBTAINED THROUGH SOLAR THERMAL COLLECTORS AND A HEAT BUFFER TANK.

### Building candidate in the category





Energy & Temperate Climates



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