


## Butterfly House

by PIMPUN JIROJWONG / 2016-06-16 09:25:34 / Internacional / 9618 / EN

**New Construction**



**Primary energy need :**

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

(Calculation method : Other )

**ENERGY CONSUMPTION**

*Economical building* *Building*

< 50	<b>A</b>
51 à 90	<b>B</b>
91 à 150	<b>C</b>
151 à 230	<b>D</b>
231 à 330	<b>E</b>
331 à 450	<b>F</b>
> 450	<b>G</b>

*Energy-intensive building*

**Building Type** : Isolated or semi-detached house  
**Construction Year** : 2005  
**Delivery year** : 2006  
**Address 1 - street** : 34190 UBON RATCHATHANI, Thailand  
**Climate zone** : [Aw] Tropical Wet & Dry with dry winter.

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**Net Floor Area** : 120 m<sup>2</sup> Superficie útil  
**Construction/refurbishment cost** : 38 000 €  
**Number of Dwelling** : 1 Dwelling  
**Cost/m2** : 316.67 €/m<sup>2</sup>

Proposed by :



### General information

This is an energy efficient house that was built by the University of Ubonratchathani in 2005 as part of a research project funded by the Ministry of Energy of Thailand. 2-storey house with 2 bedrooms on the second floor and living space downstairs is made of concrete structure. Upper floor plate is bigger to act as shading for lower one. The distinct feature is a chimney aligned at center of the house to ventilate during the daytime. The roofs are break into 2 pieces and tilted like butterfly wings shape into the chimney to create the pressure different for venturi effect under the roof and gain benefit from night radiation. Moreover, all main functions are categorized as service zone and living zone, oriented and break them by the chimney.

### Stakeholders

## Stakeholders

Function : Designer

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Green building advisor

## Contracting method

Public Private Partnership

## Energy

### Energy consumption

Primary energy need : 82,50 kWhpe/m<sup>2</sup>.year

Primary energy need for standard building : 86,58 kWhpe/m<sup>2</sup>.year

Calculation method : Other

CEEB : 0.0001

Breakdown for energy consumption : Lighting 2%

Air condition 86%

Ceiling fan 1%

Equipment 9%

Misc 2%

### Envelope performance

Envelope U-Value : 0,43 W.m<sup>-2</sup>.K<sup>-1</sup>

More information :

Typical material for wall is composed of lightweight concrete block with cellulose fiber cement outside and 1" polyurethane foam in between to block external heat gain and moisture. For fenestration area, ocean green float glass is utilized due to the low shading coefficient property (SC=0.59) while the visible ray transmittance is high (VT = 0.72) to maximize the benefit from daylight. Roof has double layers to create venturi effect for attic ventilation.

### Real final energy consumption

Final Energy : 75,00 kWhfe/m<sup>2</sup>.year

## Renewables & systems

### Systems

Heating system :

- No heating system

Hot water system :

- No domestic hot water system

Cooling system :

- Fan coil

Ventilation system :

- Natural ventilation
- Nocturnal ventilation

Renewable systems :

- No renewable energy systems

Other information on HVAC :

High-efficient air-conditioners (EER > 12)

## Environment

### Urban environment

Located on a large open space area with prevailing wind most from the south

Land plot area : 224,00 m<sup>2</sup>

Built-up area : 40,00 %

Green space : 80,00

## Products

### Product

Chimney

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Product category : Table 'c21\_spain.innov\_category' doesn't exist SELECT one.innov\_category AS current,two.innov\_category AS parentFROM innov\_category AS oneINNER JOIN innov\_category AS two ON one.parent\_id = two.idWHERE one.state=1AND one.id = '8'

Vertical cavity for ventilation, most effectively in the daytime

Temperature inside the house is reduced.



## Costs

### Construction and exploitation costs

Cost of studies : 3 850 €

Total cost of the building : 38 500 €

## Contest

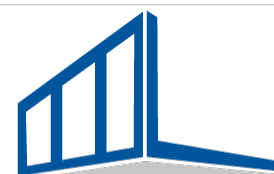
### Reasons for participating in the competition(s)

Since the project is selected to be in a final round of energy saving house design competition by Energy Policy & Planning Office of Thailand, intended to be a model for design technique study, the project is constructed. This house is composed of various passive design technique such as stack ventilation, night radiation, venturi effect, self-shading and building orientation. The building is equipped with thermocouple to study on an effect of these design technique.

### Building candidate in the category

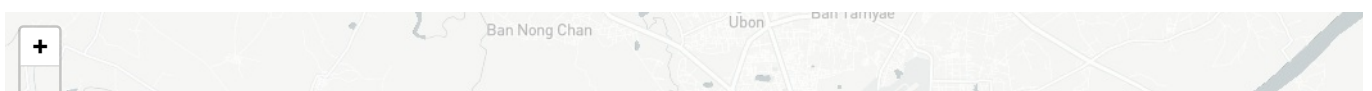


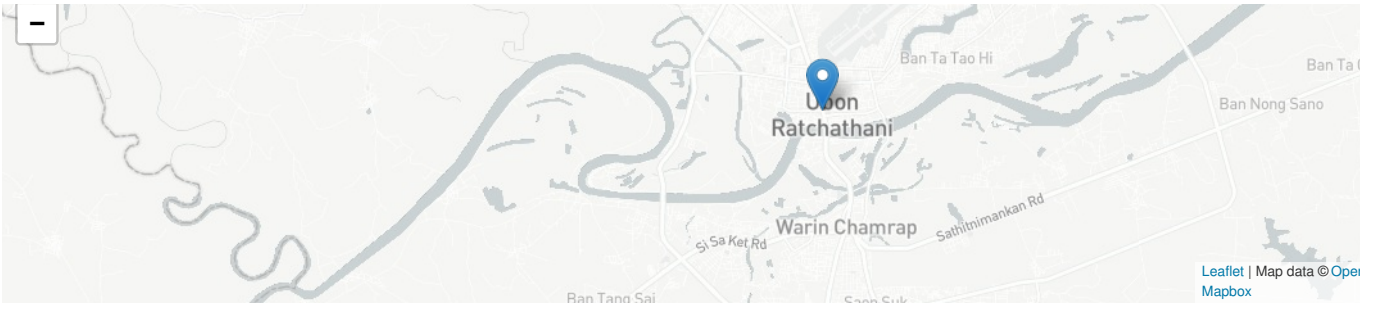
Energy & Hot Climates



**Green Building  
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