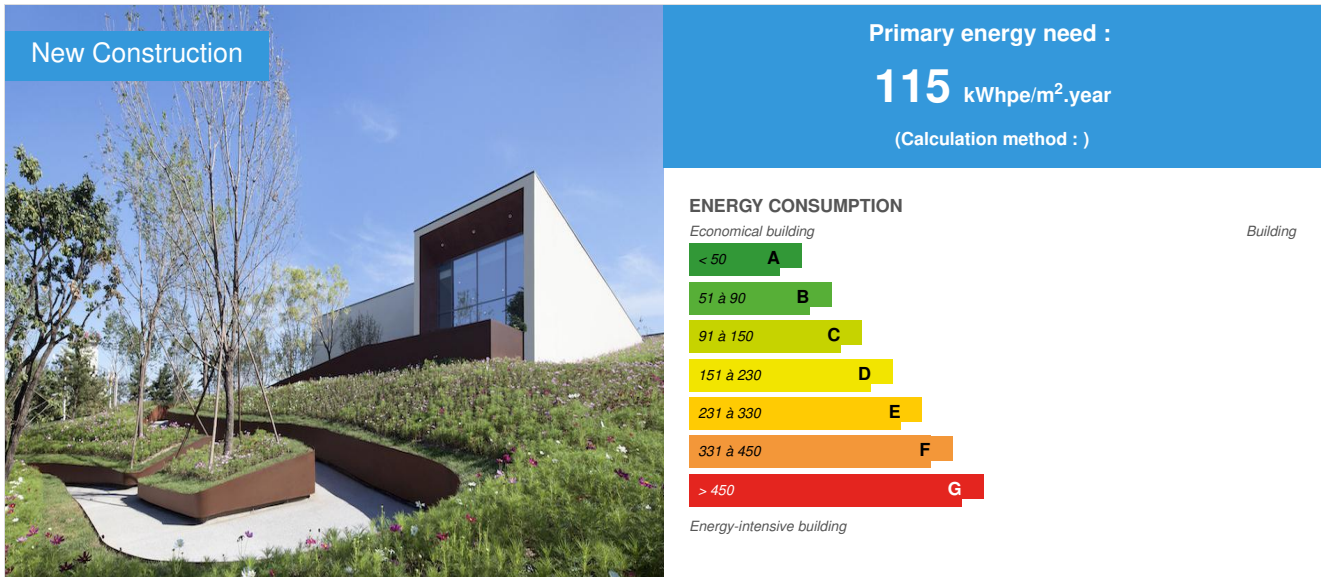


## Museum Lonfor Sunda

by Mingzhe Lu / 2019-06-07 15:18:50 / International / 4442 / EN



**Building Type :** Museum  
**Construction Year :** 2017  
**Delivery year :** 2017  
**Address 1 - street :** Gaobeidian City 07400 GAOBEIDIAN, China  
**Climate zone :** [Dwb] Humid Continental Mild Summer, Dry Winter

**Net Floor Area :** 1 350 m<sup>2</sup>  
**Construction/refurbishment cost :** 2 800 000 €  
**Number of Visitor :** 1 Visitor  
**Cost/m<sup>2</sup> :** 2074.07 €/m<sup>2</sup>

**Certifications :**



**Proposed by :**



### General information

The Passive House Technology Museum in Gaobeidian (Hebei Province) is the world's first Passive House Museum to showcase Passive House technology developed in Germany. The reference project is a testimony to successful cooperation between German and Chinese specialist engineers, manufacturers and construction companies. The German service company LUTHER Design headed the energetic and technical consulting for sustainable building of the project and was responsible for the Passive House and DGNB certification of the building.

The property is located in a newly planned low-energy development area, which acts as a national demonstration area for sustainable buildings. A new Ecopark has also been created there.

The architectural form of the museum is based on the energy-saving passive house construction and has some special features. For example, the building has various levels and passages that connect the interior spaces with the garden design. The exterior structure of the museum building enables the extremely low

energy consumption of the building and contributes to its environmental friendliness by following the four design elements of the Passive House standard:

- The museum has a compact building form which minimizes the body shape coefficient and reduces the heat loss of the external structure of the building;
- Pollution during the construction process is reduced due to the use of prefabricated modules;
- The object has an all-glass wooden facade on the south side in combination with a fully movable, adjustable, intelligent exterior shading system. According to the recorded indoor and outdoor temperature and humidity, the heat is maximized in winter and the building is protected from excess solar radiation in the summer;
- The roofing on the north side improves the insulation performance of the outer protective structure.

At the same time, LUTHER Design developed real-time data acquisition devices for environmental monitoring inside and outside the building. Among other things, this measure allows the measurement of indoor and outdoor temperature, humidity, particulate matter (PM 2.5), the angle of incidence of sunlight and the energy consumption of fresh air devices. The collected data can then be viewed in real time on a display for the visitors of the museum and give a good impression of the comfort, the achieved energy saving and the considerable economic advantages of the passive house.

The project is the result of successful international cooperation between Germany and China. In addition, the museum is one of the first Chinese-built buildings of this quality with such a high energy standard. Overall, the reference object offers new perspectives for the client and the Chinese government. It makes clear that the future of the construction sector is sustainable and that the Passive House - with its high energy efficiency and environmental friendliness, as well as its healthy and comfortable indoor climate - makes a fundamental contribution to this development.

## See more details about this project

[https://passivehouse-database.org/#d\\_5423](https://passivehouse-database.org/#d_5423)

## Photo credit

Luther Design

## Stakeholders

### Contractor

**Name :** Luther Design Freie Architekten  
**Contact :** Frankfurt am Main  
<http://www.luther-design.com>

### Construction Manager

**Name :** Beijing Tsinghua Tongheng Urban Planning & Design Institute  
**Contact :** Beijing

### Stakeholders

**Function :** Designer  
Prof. Yehao Song

### Contracting method

Other methods

## Energy

### Energy consumption

**Primary energy need :** 115,00 kWhpe/m<sup>2</sup>.year

**Calculation method :**

**Breakdown for energy consumption :** Annual heating demand : 12 kWh/m<sup>2</sup>a  
Heating load : 8 W/m<sup>2</sup>

Cooling & dehum. demand: 14 kWh/(m<sup>2</sup>a)  
Cooling load: 7 W/m<sup>2</sup>

### Envelope performance

#### More information :

Exterior wall : U-value = 0.101 W/(m<sup>2</sup>K)

Basement floor / floor slab : U-value = 0.13 W/(m<sup>2</sup>K)

Roof : U-value = 0.126 W/(m<sup>2</sup>K)

Frame : U w-value = 0.89 W/(m<sup>2</sup>K)

#### Thermal envelope information:

- Coating 15mm
- Expanded clay aggregate 250mm
- EPS 032 250mm
- EPS 032 50mm

#### Basement floor / floor slab:

- Coating: 15 mm
- Reinforced concrete: 450 mm
- XPS 250mm
- brick: 120 mm

#### Roof:

- Earth: 80mm
- Mortar: 50 mm
- EPS 032: 250 mm
- Concrete: 120 mm

#### Frame:

- RAICO, THERM+ 56 H-i - SW
- Wooden façade

#### Glazing

- Window glazing: Saint Gobain
- Glazing north and south façades: Taibo Group
- Glazed skylight: Hengeda

#### Entrance door:

- RAICO wooden façade
- THERM+ 56 H-i SWISSP. V

Indicator : n50

Air Tightness Value : 0,20

## More information

Calculated according to PHPP

## Real final energy consumption

Final Energy : 115,00 kWh/m<sup>2</sup>.year

## Renewables & systems

### Systems

#### Heating system :

- Heat pump

#### Hot water system :

- Heat pump

#### Cooling system :

- Geothermal heat pump

#### Ventilation system :

- humidity sensitive Air Handling Unit (hygro A)

#### Renewable systems :

- Heat pump

#### Other information on HVAC :

Centralized air ventilation system with heating and cooling function and heat exchanger.  
80% heat recovery

## Environment

### Urban environment

The property is located in a newly planned low-energy development area, which acts as a national demonstration area for sustainable buildings. A new Ecopark has also been created there.

## Products

### Product

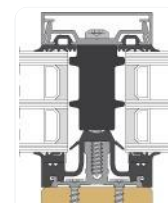
THERM+ H-I

Raico

<https://www.raico.de>

Product category : Gros œuvre / Structure, maçonnerie, façade

<https://www.raico.de/en/Products/THERM.php>



## Costs

### Construction and exploitation costs

Additional information on costs :

3000 €/m2 Treated Floor Area according to PHPP (Costs of group 200-700)

## Contest

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

The architectural form of the museum is based on the energy-saving passive house construction and has some special features. For example, the building has various levels and passages that connect the interior spaces with the garden design. The exterior structure of the museum building enables the extremely low energy consumption of the building and contributes to its environmental friendliness by following the four design elements of the Passive House standard:

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### Building candidate in the category



Energy & Hot Climates





Low Carbon



Health & Comfort



Users' Choice

