


## PopUp dorms

by Markus Lang / 2019-06-17 21:47:09 / International / 8413 / EN



New Construction

Grand Prize  
International  
Mention  
**AWARDS**  
2019

Primary energy need :

# 119 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** : Student residence  
**Construction Year** : 2015  
**Delivery year** : 2015  
**Address 1 - street** : Sonnenallee 28-30 1220 VIENNA, Austria  
**Climate zone** : [Dfb] Humid Continental Mild Summer, Wet All Year

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**Net Floor Area** : 2 028 m<sup>2</sup>  
**Construction/refurbishment cost** : 3 250 000 €  
**Cost/m2** : 1602.56 €/m<sup>2</sup>

**Certifications :**



**Proposed by :**



**LANG consulting**

### General information

PopUp Dorms won the Sustainable Construction Grand Prize of the 2019 Green Solutions Awards at the national level + a mention for the international Sustainable Construction Grand Prize.

#### The PopUp dorms – affordable and sustainable housing for students

The PopUp dorms are highly energy efficient student dormitories. But they are much more, than just built to most energy efficient and sustainable building standard. Made of pre-fabricated sustainable timber construction, the PopUp dorms were built extremely quickly. The project shows how quickly and inexpensively passive house buildings can be constructed. In addition, this pioneer project saves a lot of the expensive property costs. A reaction to the discussion about affordable housing over the past several years, the idea was to take advantage of currently unused property for temporary, affordable housing – temporary

student dorms. When the final use of the property is nearing, the dorms can be easily moved to a new location.

The first section for 40 students was built in Vienna's Seestadt Aspern district. The basic plan for this section called "GreenFlexStudios" – with ten residential groups surrounding a large, attractive two-storey atrium courtyard– was highly convincing and raised expectations for quality. The project shows that temporary housing and design can be well combined. Like the high-quality architecture and structural engineering, the compact concept for energy and building services also features many innovations. Each of the ten dwellings has a completely independent design, is self-sustaining and can be moved multiple times, including the interior facilities.

The basic layout of the PopUp dorms – 10 accommodation sections around the large, attractive, 2-storey atrium courtyards – was convincing and promises high quality standards. It proves that temporary accommodation and design can easily be linked. The covered courtyard of 250 m<sup>2</sup> is both an opening and a central community area of the house. It is lit by cupolas in the roof. It is also the heart of the building and provides the residents with spaciousness. Despite the very limited budget, this multi-functional meeting area is very important. A lounge area in the center of the 2-level, spacious room is the communication center. Moreover, a communal kitchen and a cleaning and laundry room are in a reconstructed shipping container and are part of the courtyard.

Each accommodation section with its 4 room units can be accessed via the courtyard. The 4 rooms are equipped with 2 bathrooms and an additional small common room with a mini-kitchen. Although this intimate communal area is separated from the courtyard, visual connections are still possible. A small loggia on the upper floor offers an additional communal area. Apart from the high quality in architecture and construction technology, the compact energy and technology concept exhibits many innovations. Each of the ten accommodation sections is completely self-sufficient and functional, and can be relocated to various properties five times within 40 years including their furniture.

#### **Built and ready for occupation in no time**

After the submission of building plans in January 2015 and a 2-month fabrication period, the PopUp dorms were assembled as of 18 August 2015. After only one month, they were ready for occupation and handed over to the developers on 16 September 2015. The setup time (to the topping-out ceremony) including the assembly of all delivered parts took only six working days.

#### **Low costs of property, construction and operation**

This project perfectly implements "affordable living". Apart from the low property costs, the private housing pioneer project has minimal construction costs of only € 1,270/m<sup>2</sup> gross floor area (ÖNORM B 1801-1) which is about 10% lower than the usual Viennese construction costs. Therefore, the project is exemplary for the fact that energy-efficient construction is not contradictory to social and affordable housing. Even though the project is implemented without housing subsidies, the students pay no more than 350 EUR per unit per month including all running costs.

#### **High standard of comfort and design**

Nevertheless, the best energetic standard – the passive house standard – could be realized for this project. Thus, energy efficiency is not a cost driver but rather ensures that residents benefit from constantly high living comforts due to ideal air quality and very low running costs – from the first day on. Moreover, the passive house standard including exterior sun shades guarantees comfortable temperatures even in summer.

#### **Ecologic passive house**

All modules are noggling piece constructions without chemical wood preservation. The entire insulation is made of mineral insulants. The totality of embodied energy could be reduced to a minimum for the entire building, as even the foundation is comprised only of reusable deep foundations which are again topped with a noggling piece construction rather than a concrete floor plate.

#### **Minimum construction site logistics**

In spite of the unique and spectacular ten special transports of the 5.5 meter wide and 16.8 meter long accommodation units, the entire project exhibits only minimal construction site transportation. Almost all companies and workers involved in the assembly of the accommodation units were from around Schwanenstadt, where the high-quality accommodation units were constructed "ready for occupation" in the construction hall of the renowned woodwork company Obermayr Holzkonstruktionen.

The Wohnbauvereinigung für Privatangestellte (WBV-GPA) in cooperation with the accommodation operators OeAD-Wohnraumverwaltungs GmbH and home4students - Österreichische Studentenförderungsstiftung are the developers of this project. The team of the PopUp dorms is including F2 Architekten ZT GmbH, Obermayr Holzkonstruktionen GmbH as well as Grünraum planen und bauen GmbH from Schwanenstadt, S&P climadesign GmbH from Ohlsdorf and LANG consulting from Vienna, impresses with competences regarding sustainable, energy-efficient building. Moreover, the latest innovation by J. Pichler Gesellschaft m.b.H. from Klagenfurt, energy-efficient and economical ventilation units for passive houses, provides coziness for interior rooms. The comfortably warm outer shell of the building was supplied by Saint-Gobain Isover.

## See more details about this project

[https://passivehouse-database.org/#d\\_4509](https://passivehouse-database.org/#d_4509)

[https://passivehouse-database.org/#d\\_5195](https://passivehouse-database.org/#d_5195)

## Photo credit

home4students, LANG consulting

## Stakeholders

## Contractor

Name : WBV-GPA

Contact : Michael Gehbauer

<http://www.wbv-gpa.at/>

## Construction Manager

Name : Obermayr Holzkonstruktionen GmbH

Contact : Hans-Christian Obermayr

<http://www.obermayr.at>

## Stakeholders

Function : Environmental consultancy

LANG consulting

Günter Lang

<http://www.langconsulting.at>

Passive house consulting

Function : Designer

F2 Architekten

Markus Fischer

<https://www.f2-architekten.at/>

Wooden modular construction

Function : Others

OeAD Housing Office

Günther Jdeliczka

<https://housing.oead.at>

Operator

Function : Others

home4students

Sabine Straßer

<https://www.home4students.at/>

Operator

## Energy

### Energy consumption

Primary energy need : 119,00 kWhpe/m<sup>2</sup>.year

Primary energy need for standard building : 240,00 kWhpe/m<sup>2</sup>.year

Calculation method : Other

### Real final energy consumption

Final Energy : 42,50 kWhfe/m<sup>2</sup>.year

## Renewables & systems

### Systems

Heating system :

- Heat pump

Hot water system :

- Heat pump

Cooling system :

- No cooling system

#### Ventilation system :

- Double flow heat exchanger

#### Renewable systems :

- Solar photovoltaic
- Heat pump

## Environment

### Urban environment

The Landscaping is simple but fits the students needs. Permanent garden furniture out of wood are placed in the lawn, offering the students the possibility to chill on beautiful days. At the landscaping it was paid attention, that everything can be taken with at the resettlement. This counts for the floor plates for the access ways, the bicycle racks and the garden furnitures as well as for the plant boxes.

A bonus of the location is, that the lake of the Seestadt Aspern is very close, where students can relax in a big park and at the beach.

## Products

### Product

System Ventech PKOM4classic

J. Pichler Gesellschaft m.b.H

<http://www.pichlerluft.at/>

**Product category :** Génie climatique, électricité / Ventilation, rafraîchissement

Each of the twenty-two accommodation sections is completely self-sufficient and functional, and can be relocated to various properties five times within 40 years including their furniture. The ventilation system (one per box) can supply a whole module of 75m<sup>2</sup> independent of the use, whether if it is used for accommodating a group of 4 students or a family or even using it as an office.

Thanks to the intelligent low-tech-concept the whole HVACR of the building is using only 0.5 percent of the floor space. The new from Passive House Institute certified "all in one" heat pump multi-unit "System Ventech PKOM4classic" handles the functions ventilation, heating, cooling and hot water on an area of 0.75m<sup>2</sup>. This reduction of space helped to keep the costs low.

The maximum heating capacity for air is 1300W, the maximum heating capacity for hot water is 1600W. Each ventilation unit delivers a total of 240m<sup>3</sup>/h, which is split in 120m<sup>3</sup>/h to the student rooms and 120m<sup>3</sup>/h to the atrium. The heat pump multi-unit supplies 1.2kW heat load per module, which is split in 800W heating through the air and 400W through convectors. Per module a hot water tank of 212 liters is included, in combination with water saving water taps.

The students and stakeholders are satisfied. Fresh and healthy indoor air quality is guaranteed 24 hours a day.

## Costs

### Construction and exploitation costs

**Total cost of the building :** 3 760 000 €

#### Additional information on costs :

This project perfectly implements "affordable living". Apart from the low property costs, the private housing pioneer project has minimal construction costs of only EUR 1,345 per m<sup>2</sup> gross floor area (ÖNORM B 1801-1) which is about 25% lower than the usual Viennese construction costs. Therefore, the project is exemplary for the fact that energy-efficient construction is not contradictory to social and affordable housing. Even though the project is implemented without housing subsidies, the students pay no more than EUR 350 per unit and month including all running costs even cleaning the apartments.

The costs for the resettlement if the buildings (indexed to inflation, without infrastructure costs) about EUR 455,000.

The life cycle costs show that PopUp dorms have 24 percent lower cost compared to conventional buildings over 40 years.

## Health and comfort

### Life Cycle Analysis

**Eco-design material :** Eco-balancing of CO2 emissions on gray energy of construction:

Through the optimization of the fundament, the complete building envelope innogging piece construction and the mostly use of recycle and renewable materials the PopUp dorms have a neutral CO2 balance on gray energy (based on the balancing according OI3 index from IBO – Austrian Institute for Healthy and Ecological Building). Global Warming Potential over 100 years (GWP 100) is minus 33.4 kg CO2eq/m²GFA  
Both PopUp dorms buildings with in summary 2,416 m² GFA have a global warming impact from the whole construction of minus 81 tons CO2.

## Water management

The tap water is one of the best in the world. The quality is approved by the city.  
The rain water is collected completely in a soakaway on the property and doesn't strain the canalization.

## Indoor Air quality

There is no direct air pollution because of the passive house standard which reduces the heat demand to a minimum. This is provided by the own photovoltaic and electrical network.  
Because of the controlled ventilation system also a healthy indoor air quality is guaranteed, which keeps the CO2 concentration always below 1,000ppm in the rooms.

## Comfort

**Health & comfort :** There is no direct air pollution because of the passive house standard which reduces the heat demand to a minimum. This is provided by the own photovoltaic and electrical network.  
Because of the controlled ventilation system also a healthy indoor air quality is guaranteed, which keeps the CO2 concentration always below 1,000ppm in the rooms.

**Calculated indoor CO2 concentration :**  
<1,000ppm

**Acoustic comfort :** Because of the short construction phase and high prefabrication, noise emission could be kept to a minimum during construction.  
Thanks to the ventilation system there is no need to open the windows (even it's possible) to let street noise inside the room. The triple glazed windows keep the noise outside. There is also a very good sonic insulation to the atrium and between the floors.

## Carbon

### GHG emissions

**GHG in use :** 11,00 KgCO<sub>2</sub>/m<sup>2</sup>/year

**Methodology used :**  
balancing according OI3 index from IBO – Austrian Institute for Healthy and Ecological Building

**GHG before use :** -0,03 KgCO<sub>2</sub> /m<sup>2</sup>

**Building lifetime :** 40,00 year(s)

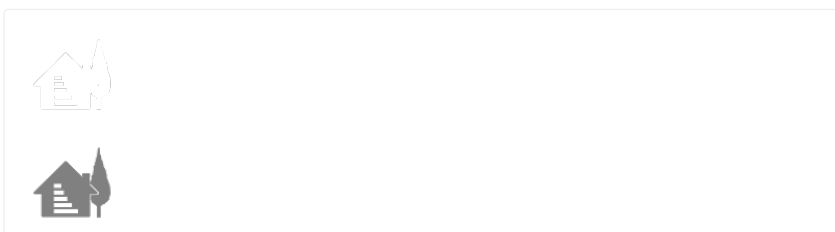
**, ie xx in use years :** -0

## Contest

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

- Affordable and sustainable housing for students
- High standard of comfort and design
- Ecologic passive house
- Minimum construction site logistics

### Building candidate in the category



Energy & Temperate Climates



Low Carbon



Health & Comfort



Users' Choice

