



## Passive Witness House CLK

by [Laura Varisano](#) / 2018-06-15 11:06:36 / Luxembourg / 16789 / FR

Primary energy need :

## 27.8 kWhep/m<sup>2</sup>.an

(Calculation method : RGD du 30 novembre 2007 - bâtiment d'habitation )

**ENERGY CONSUMPTION**

*Economical 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

**A**

**Building Type** : Isolated or semi-detached house  
**Construction Year** : 2016  
**Delivery year** : 2017  
**Address 1 - street** : 8818 GREVELS, Luxembourg  
**Climate zone** : [Cfb] Marine Mild Winter, warm summer, no dry season.

**Net Floor Area** : 179 m<sup>2</sup>  
**Construction/refurbishment cost** : 525 000 €  
**Number of Dwelling** : 1 Dwelling  
**Cost/m<sup>2</sup>** : 2932.96 €/m<sup>2</sup>

**Certifications :**



**Proposed by :**



### General information

Being heavily involved in passive constructions, we wanted to create a thoughtful and sustainable building. We equipped our control house with a complete EnOcean wireless home automation system. This innovative technology works without any battery or wiring. The energy recovered during the manipulation is enough to emit a radio signal, which makes it possible, for example, to turn on the light. Products and systems with EnOcean technology are perfectly integrated into the usual home automation systems, regardless of whether these systems communicate via LON, KNX, BACnet, TCP / IP or Ethernet. This allows the implementation without much work of the concepts of sustainable energy management.

### Data reliability

## Stakeholders

### Contractor

**Name :** CLK Constructions  
**Contact :** Brigitte Brouwers - brigitte.brouwers@clk.lu - 888201  
<http://www.clk.lu>

### Construction Manager

**Name :** CLK Constructions  
**Contact :** Brigitte Brouwers - brigitte.brouwers@clk.lu - 888201  
<http://www.clk.lu>

### Stakeholders

**Function :** Designer  
Bureau d'Architecture Urbaine SARL

Radu Axinte

Realization of architectural plans

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**Function :** Company

rms.lu

Claude Goetz et Carlo Posing

<http://www.rms.lu>

Implementation of the home automation system

### Contracting method

General Contractor

### Owner approach of sustainability

The goal was to build an avant-garde house that reflects the philosophy of the company: our wish was to have an energy-efficient house, with efficient materials, photovoltaic panels, solar thermal panels, a powerful heat pump, all with an extremely well insulated energy envelope and a perfect airtightness ( $N_{50} = 0,26h^{-1}$ ). We also wanted this house to be sustainable, which is why we used EPFC certified materials and a rainwater recovery system.

### Architectural description

We wanted a very modern architecture by highlighting the assets of the house which has an exceptional view to the back. All living rooms have been oriented so you can enjoy this view. We have created the space in such a way that the intimacy of the occupants is respected while keeping passive requirements in mind. The house consists of large open spaces, beautiful ceiling heights, a skylight in the kitchen and large windows.

## Energy

### Energy consumption

**Primary energy need :** 27,80 kWh<sub>ep</sub>/m<sup>2</sup>.an  
**Primary energy need for standard building :** 45,00 kWh<sub>ep</sub>/m<sup>2</sup>.an  
**Calculation method :** RGD du 30 novembre 2007 - bâtiment d'habitation  
**Final Energy :** 35,00 kWh<sub>ef</sub>/m<sup>2</sup>.an  
**Breakdown for energy consumption :**  
Heating installation: 1071 kWh  
Domestic hot water preparation: 681 kWh

### Envelope performance

#### More information :

Insulating facade value U 0.12 W / m2K  
Slab against earth value U 0.08 W / m2K  
Ceiling attic height U 0.07 W / m2K  
Chassis: Ug 0.5 W / m2K; Uf 1,1 W / m2K

Indicator : EN 13829 - n50 » (en 1/h-1)

Air Tightness Value : 0,26

#### Users' control system opinion :

We chose this type of installation to match our ecological fiber and to limit electromagnetic waves as much as possible. By this system, we have much less electrical wiring, no batteries and radio waves propagate only during the fraction of a second during which we press the push button.

We can at any time on our Gsm by a very intuitive application to control the shutters, turn on the lights. We use it mainly to simulate our presence when we are traveling and returning later than expected. But we also use it for ease when we are in the couch.

Being able to check at all times that the windows and doors are closed is very reassuring as well.

The weather station also protects our house from overheating and lowers the blinds from the indoor temperature we choose. With indoor temperature and humidity probes and outdoor temperature and temperature sensors, we can regulate and control everything.

Now that we have got used to it, it would be difficult for us to do without it.

## Renewables & systems

### Systems

#### Heating system :

- Heat pump
- Low temperature floor heating
- Solar thermal

#### Hot water system :

- Heat pump
- Solar Thermal

#### Cooling system :

- Others

#### Ventilation system :

- Double flow heat exchanger

#### Renewable systems :

- Solar photovoltaic
- Solar Thermal
- Heat pump

Renewable energy production : 100,00 %

### Smart Building

#### BMS :

Transverse energy optimization: automatic shutter closure

Recovery of free energies: recovery of rainwater

Home automation system: EnOcean, with a clean energy consumption of almost zero

Easy management of the temperature of the parts, control of the closing of the chassis, understanding and warning in case of water leakage.

Smart Grids planned to work with self-produced electrical energy storage systems

-relative energy

-power supply

-energy production

-etc.

#### Smartgrid :

Home automation allows the monitoring of the production and consumption of the whole installation: photovoltaic panels, technical, ventilation, production, rest of the house for electricity, as well as consumption of rainwater and city water . Possibility of making data available in the cloud.

## Environment

## GHG emissions

GHG in use : 5,60 KgCO<sub>2</sub>/m<sup>2</sup>/an

Methodology used :

CPE Energy Performance Certificate

## Life Cycle Analysis

Eco-design material :

Lifecycle and durability analyzes as well as deconstructability analyzes were calculated according to the Luxemburg Lenz reference system.

## Water management

No sufficient return on the building at the moment as it is our Witness House.

10 000 l cistern in operation.

## Products

### Product

Motiv340 swing door

DANA

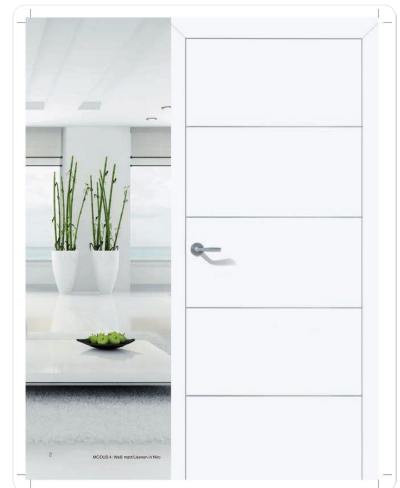
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<http://www.dana.at/>

**Product category :** Table 'c21\_china.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 = '11'

White lacquered wood door, honeycomb core with slightly rounded door frame and linear hollow pattern

It was important for us to work with quality materials, which is why we chose these eco-certified doors.



Oak Rome

HQ

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[-](#)

**Product category :** Table 'c21\_china.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 = '11'

oak engineered hardwood floor "eiche rom" rustic look

It was important for us to work with quality materials, which is why we chose this eco-certified parquet.



Sylitol® organic interior paint

Caparol

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<http://www.caparol.de>

**Product category :** Table 'c21\_china.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 = '12'

High quality interior silicate paint, solvent free. Suitable for use in spaces used by allergic patients.



The interior painting is one of the elements with which the occupant is in direct contact and the non-harmful character is very important in this respect.

NodOn

NodOn

contact@nodon.fr

<https://nodon.fr/>

**Product category :** Table 'c21\_china.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 = '31'

The combination of miniature energy harvesting modules and ultra-low power radio technology makes it possible to offer innovative sensors that require no maintenance. These self-powered switches and sensors therefore operate wirelessly and offer unparalleled flexibility of use as well as increased time and energy efficiency. All while limiting investment and operating costs. Wireless, self-powered sensors and switches using the EnOcean wireless standard are an ideal solution for sustainable building applications. This power supply by movement, light or temperature makes cables and batteries for switches unnecessary, as well as for collecting information from sensors such as: Temperature, water or presence sensors. The sensors and actuators can communicate directly with each other and / or can be controlled by a controller / gateway placed in the room via a cloud interface for applications requiring remote management and control via a computer or smartphone.



Vitocal 242-S compact heat pump unit

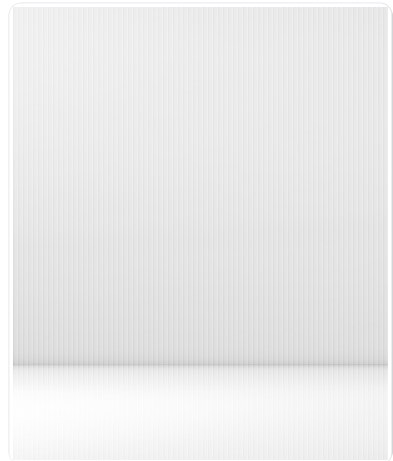
Viessmann

Christian Haus - hauc@viessmann.com

<http://www.viessmann.lu>

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Split version System combination with Vitovent 300-F home ventilation system with central control unit for heating, hot water, solar system and ventilation



Solar flat plate Vitosol 200-FM

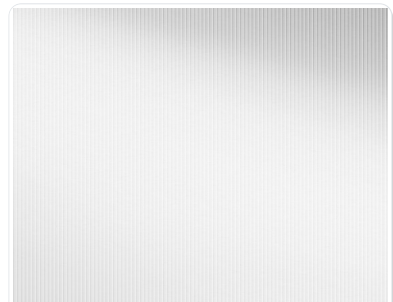
Viessmann

Christian Haus - hauc@viessmann.com

<http://www.viessmann.lu>

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for DHW heating, with overheating protection ThermProtect



## Costs

### Construction and exploitation costs

Renewable energy systems cost : 46 764,80 €

Subsidies : 20 468 €

### Urban environment

Our house is located in Grevels, part of the municipality of Wahl in the canton of Redange.

### Land plot area

Land plot area : 934,00 m<sup>2</sup>

### Built-up area

Built-up area : 18,00 %

## Parking spaces

A garage (2 cars) + outside parking

## Building Environmental Quality

### Building Environmental Quality

- indoor air quality and health
- water management
- energy efficiency
- renewable energies
- products and materials

## Contest

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

EnOcean technology enables a smart connected home. This intelligence is invisible, it warns and also allows to control the data, this by spending no energy and emanating less waves. This technology requires less raw materials (no batteries, less cables) and allows a great modularity, that is to say that the house evolves according to the needs of its inhabitants. Finally, the smart home allows great energy savings thanks to the management of overheating and automatic shutter closing or the management of room temperatures and control of the closure of the chassis. On the other hand, the smart home also allows for a better understanding of lifestyle habits via data.

#### Here are the features that have been integrated into the sample house:

- *energy saving*
- temperature control
- Control of consumptions / productions
- Smart shading
- Consistent lowering of blinds
- Systematically turn off the lights
- *security*
- turn off everything
- Control of window openings and doors
- Simulation of presence
- Alarm
- *Comfort*
- Central visualization and control of the entire electrical installation
- Timed lighting control
- Automatic shading
- scene control
- Programmable positions for blinds and shutters
- *Surgery*
- PC with / without Touchscreen
- Tablet Apps
- Smartphone Apps
- Remote control
- Voice command

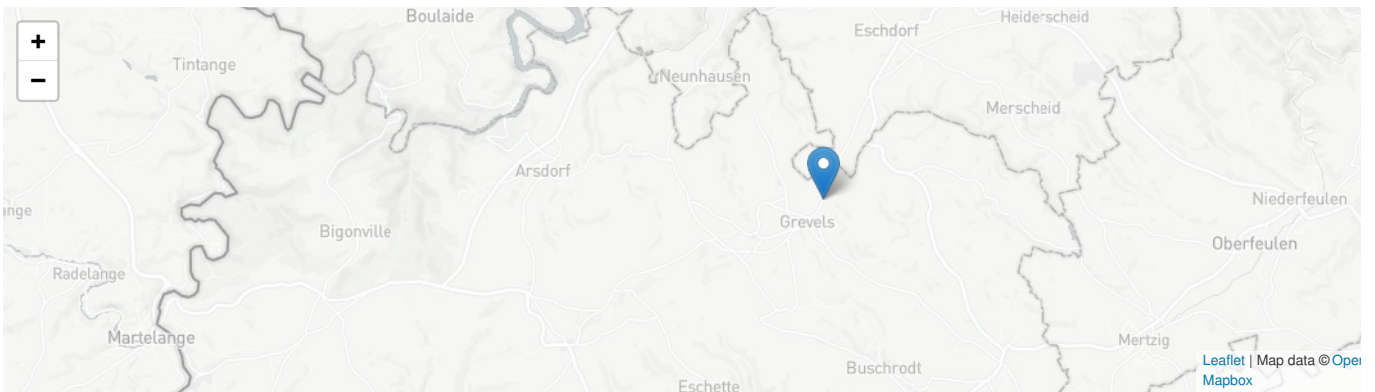
## Building candidate in the category



Smart Building



Coup de Cœur des Internautes



Date Export : 20230703102038