Self Sufficient Energy House in Rédange (Luxembourg)

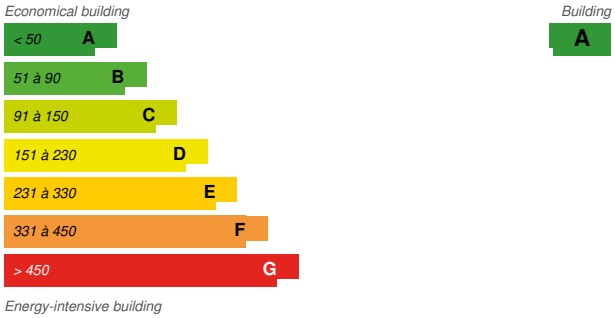
by Leslie vandenbussche / 2015-06-29 20:36:35 / Luxembourg / 12656 / FR

Primary energy need :

35.1 kWhep/m².an

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

ENERGY CONSUMPTION



Building Type : Isolated or semi-detached house
Construction Year : 2015
Delivery year : 2015
Address 1 - street : 36 rue de Nagem 8509 RéDANGE SUR ATTERT, Luxembourg
Climate zone : [Cfb] Marine Mild Winter, warm summer, no dry season.

Net Floor Area : 225 m²
Construction/refurbishment cost : 530 000 €
Number of Dwelling : 1 Dwelling
Cost/m2 : 2355.56 €/m²

Proposed by :

General information

Construction of a new passive house which uses solar panels to generate all of its own electricity to meet its heating and lighting requirements and which also produces its own water for daily use by collecting rainwater and treating it with UV light. In addition, the house also produces electricity for an electric vehicle which travels +/-25000km a year.
Heating is supplied using a ground-water heat pump and the air is renewed by a dual-flow CMV.

See more details about this project

http://lc.cx/ZAFJ

Data reliability

Self-declared

Stakeholders

Stakeholders

Function : Designer

aiplus

Vandenbussche Leslie

http://www.aiplus.lu

Function : Contractor

Mr et Mme Boon-Bellinaso / Vandenbussche

Owner approach of sustainability

As both the client and contractor on this project, we wanted to make a self-sufficient home in terms of energy and water and we opted for a 100% electric car which will be powered by our own electricity generated by the solar panels. All energy-consuming devices have been chosen for their low electricity consumption (e.g. LED lighting).

Architectural description

Massive passive house, using: 1) the ground to power a ground-water heat pump which heats the house, 2) rain to supply all water outlets, 3) the sun to generate the electricity required for heating and for domestic electricity as well as for "fuelling" an electric car which travels +/-25,000km/year.

Energy

Energy consumption

Primary energy need : 35,10 kWhep/m^2.an

Primary energy need for standard building : 95,00 kWhep/m^2.an

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

CEEB : 0.0001

Final Energy : 32,91 kWhef/m^2.an

Breakdown for energy consumption :
heating: 4.14kwh/m2/year
domestic hot water: 4.71kwh/m2/year
secondary heating and ventilation + cooling: 4.96kwh/m2/year
lighting and domestic appliances + office for freelance professional: 19.1kwh/m2/year

More information :
the house is fitted with solar panels which meet all of the annual electricity requirements.
In addition, the panels meet the requirements of an electric car which travels +/25,000km/year.

Envelope performance

Envelope U-Value : 0,23 $W.m^{-2}.K^{-1}$

More information :
Concrete-structure house. Expanded polystyrene insulation on the sides, polyurethane on the floor and roof. Triple-glazed window frames.

Building Compactness Coefficient : 0,54

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

Air Tightness Value : 0,54

Renewables & systems

Systems

Heating system :

- Geothermal heat pump
- Low temperature floor heating

Hot water system :
- Heat pump

Cooling system :
- Geothermal heat pump
- Floor cooling

Ventilation system :
- Free-cooling
- Double flow heat exchanger

Renewable systems :
- Solar photovoltaic
- Heat Pump on geothermal probes

Renewable energy production : 200,00 %

Environment

GHG emissions

GHG in use : 8,60 $KgCO_2/m^2/an$

Water management

Consumption from water network : 6,00 m^3

Consumption of harvested rainwater : 70,00 m^3

Water Self Sufficiency Index : 0.92
Water Consumption/m2 : 0.03
Water Consumption/Dwelling : 6
Provision on the network for future integration into a system for recovering domestic waste water.

Products

Product

Stiebel Eltron WPF5cool heat pump

Stiebel Eltron

http://www.stiebel-eltron.fr/

http://www.stiebel-eltron.fr/

Product category : Génie climatique, électricité / Chauffage, eau chaude

Power 5.92KW, performance coefficient (COP) 4.46

selected jointly by the various stakeholders for this plot

Costs

Urban environment

Semi-detached house in a residential street of detached houses

Land plot area

Land plot area : 640,00 m^2

Built-up area

Built-up area : 122,00 %

Building Environnemental Quality

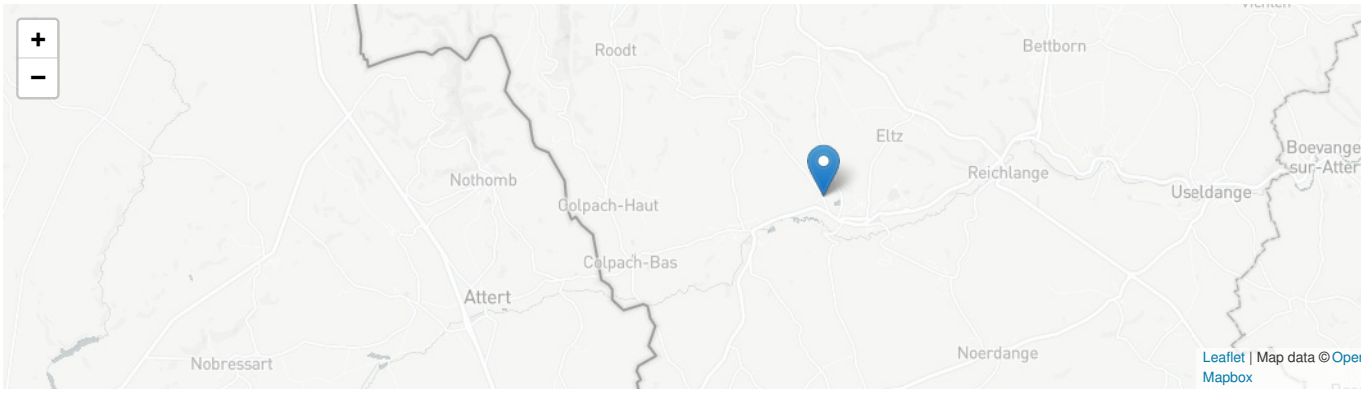
Building Environmental Quality

- water management
- energy efficiency
- renewable energies

Contest

Building candidate in the category

Bâtiment zéro énergie



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