Old Holloway straw passivhaus

by Juraj Mikurcik / 2021-03-29 20:46:23 / International / 4707 / EN

Primary energy need :

89 kWhpe/m².year

(Calculation method : Primary energy needs)

ENERGY CONSUMPTION

Economical building *Building*

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

Energy-intensive building

Building Type : Isolated or semi-detached house
Construction Year : 2016
Delivery year : 2017
Address 1 - street : Old Holloway Cottage HR2 8BA LITTLE BIRCH, United Kingdom
Climate zone : [Cfb] Marine Mild Winter, warm summer, no dry season.

Net Floor Area : 95 m² Other
Construction/refurbishment cost : 150 000 €
Cost/m2 : 1578.95 €/m²

Certifications :

Proposed by :

General informations

Old Holloway is a private single family house in rural Herefordshire. It's a simple, modest, single storey dwelling with pitched roof and south facing verandah, sympathetic to local vernacular architecture.

Old Holloway was the first UK application of Ecococon timber/ straw prefabricated panel system (also a passivhaus certified component). Prefabrication allowed for rapid and accurate construction (example: external walls were erected in three days and the whole house watertight in four weeks). Simple and robust detailing and airtightness strategies, suitable for self-build construction, were adopted. Ecococon system provides a healthy, high performing construction system, with very low environmental impact.

Old Holloway was the Small Projects winner at 2018 Passivhaus Trust Awards and runner-up at 2019 ASBP Awards

See more details about this project

https://oldholloway.wordpress.com
https://passivehouseplus.ie/magazine/new-build/deep-green-passive-house-defies-all-weather
https://www.treehugger.com/old-holloway-passive-house-all-about-comfort-and-luxury-4855053
https://www.passivhaustrust.org.uk/projects/detail/?cId=88

Photo credit

Juraj Mikurcik

Stakeholders

Contractor

Name : Mike Whitfield Construction Ltd
Contact : Mike Whitfield
http://www.mwconstruct.co.uk

Construction Manager

Name : Juraj Mikurcik
Contact : Juraj Mikurcik

Stakeholders

Function : Designer

Juraj Mikurcik

Contracting method

Other methods

If you had to do it again?

If we did the project again, we would give further consideration to the choice of material for foundations. The embodied carbon in concrete is high and there are some good alternatives available. We would also probably not install the wood stove, as we don't really use it very often, the capital could instead be spent on renewable technologies such as PV panels.

Building users opinion

The house has been a delight to live in since it was completed nearly 4 years ago. It it really easy to live with and a contrast to the previous home, which was uninsulated stone cottage. Being a passivhaus the energy demand for heating is very small. At the same time, the quality of internal air is excellent all year round thanks to the central ventilation system with heat recovery (there's automatic summer bypass). CO2 levels generally stay below 800ppm and air 'feels' fresh due to minimum amount of VOCs in the interior. Temperature is very stable, during winter it goes down to about 18C and never goes above 25C in summer, even during the heatwaves. Internal relative humidity is between 40-60%. The house is well daylit, generally there is no need to put the lights on during the day. Acoustics are excellent, will low levels of reverberation thanks to hit & miss batten ceiling in the main living space. Textured clay plasters on walls also help reduce the echo effect.

Energy

Energy consumption

Primary energy need : 89,00 kWhpe/m^2.year

Primary energy need for standard building : 89,00 kWhpe/m^2.year

Calculation method : Primary energy needs

Breakdown for energy consumption : Primary energy needs corresponds to Passivhaus PE value. heating approximately 1200kWh/a hot water approximately 2400kWh/ acooling: zeroventilation: approximately 200kWh/ alighting & other small power: approximately 900kWh/a

Envelope performance

Envelope U-Value : 0,13 $W.m^{-2}.K^{-1}$

More information :

External walls consist of 400mm thick Ecococon prefabricated straw/ timber panels, externally clad with 60mm woodfibre board and ventilated timber rainscreen cladding. Internally the walls are plastered with 25mm clay plasters, adding useful thermal mass. Floor is exposed concrete slab, fully insulated under. This also adds useful thermal mass helping to slow the daily temperature swings. Floor u-value 0.135W/m2K. Roof is 400mm timber I-beams fully insulated with blown recycled cellulose insulation, u-value 0.093W/m2K. Corrugated steel roofing finish. Windows are triple glazed timber/ aluminium composite, passivhaus certified u-value 0.83W/m2K

Building Compactness Coefficient : 4,60

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

Air Tightness Value : 0,40

Blower door test

Users' control system opinion :

The heating system consists of two towel rails running off the ASHP hot water cylinder, and a standalone wood stove. Towel rails are running off a pump with three modes (off, auto and 100%).

More information

monthly average electricity bill approximately 80 Euro (this covers everything)

Real final energy consumption

Final Energy : 89,00 kWhfe/m^2.year

Real final energy consumption/functional unit : 47,00 kWhfe/m^2.year

Year of the real energy consumption : 2 020

Renewables & systems

Systems

Heating system :

- Heat pump
- Wood boiler

Hot water system :

- Heat pump

Cooling system :

- No cooling system

Ventilation system :

- Double flow heat exchanger

Renewable systems :

- No renewable energy systems

Renewable energy production : 75,00 %

Solutions enhancing nature free gains :

High performance triple glazing allow solar gains whilst keeping the heat in during winter. In summer, the glazing is mainly shaded with roof overhang and external blinds, preventing unwanted solar gains and overheating.

Environment

Urban environment

Plot is at the end of existing village. There is a bus stop nearby, connecting the village to the nearest town of Hereford. Plot is also within cycling distance to place of work and the nearest town.

Land plot area : 1 350,00 m^2

Built-up area : 8,00 %

Green space : 1 000,00

Products

Product

EcoCocon

Ecococon

info@ecococon.eu

https://ecococon.eu

Product category : Structural work / Structure - Masonry - Facade

Prefabricated straw/ timber panel system. Highly efficient, it is a certified passivhaus component, also has Cradle to Cradle certification. Approximate cost 150 Euro/m2 of wall

Very enthusiastic about the product, it was the first application of the system in UK

Costs

Construction and exploitation costs

Cost of studies : 3 000 €

Total cost of the building : 150 000 €

Energy bill

Forecasted energy bill/year : 960,00 €

Real energy cost/m2 : 10.11

Real energy cost/Dwelling : 960

Health and comfort

Water management

Consumption from water network : 110,00 m^3

Water Consumption/m2 : 1.16

Water Consumption/Dwelling : 110

Indoor Air quality

Generally building materials and product with low VOCs have been used: timber and straw wall panels, self-finished clay plasters, low VOC paints and stains. Central ventilation system ensures the air is changed at the rate of 0.4 per hour.

Comfort

Measured indoor CO2 concentration :
between 450 and 800ppm CO2

Measured thermal comfort : indoor temperatures vary between 18C (coldest point in winter) and 25C (peak summer heatwave)

Carbon

GHG emissions

GHG in use : 16,50 $KgCO_2/m^2$/year

Methodology used :
PHPP

Building lifetime : 100,00 year(s)

Contest

Reasons for participating in the competition(s)

Health & Comfort: the building uses materials which are predominantly biobased, such as timber, straw and clay plasters. Most of internal walls are unpainted self finished clay plaster. Low VOC paints have been used for some ceilings. Mechanical ventilation with heat recovery maintains an excellent indoor air quality whilst minimising heat loss in winter.

Energy & Temperate climates: passivhaus certification means the house has very small heating demand, monitoring over the last 4 years confirmed average space heating demand of approximately 12kWh/m2.a. Overall annual electricity consumption is approximately 4500kWh

Low carbon: the house is built predominantly with low carbon materials such as timber, straw, recycled cellulose and clay. Ecococon prefabricated straw panel system is Cradle to Cradle certified.

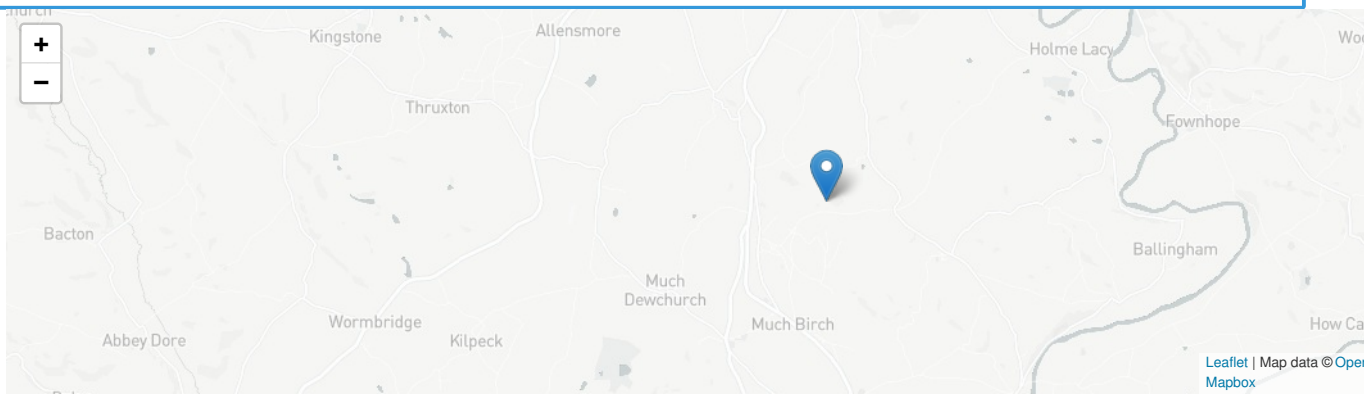
Building candidate in the category

Energy & Temperate Climates

Low Carbon

Health & Comfort

PDF



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