House at Carrickmines

by Lisa Wynne / 2019-06-16 21:35:29 / International / 4275 / EN

Primary energy need :

70.94 kWhpe/m².year

(Calculation method : Other)

ENERGY CONSUMPTION

Economical building — *Building*

< 50	A	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 : 2018
Delivery year : 2019
Address 1 - street : 13B Glenamuck Cottages D18 ET3R CARRICKMINES, Ireland
Climate zone : [Cfb] Marine Mild Winter, warm summer, no dry season.

Net Floor Area : 198 m²
Construction/refurbishment cost : 450 000 €
Number of Dwelling : 1 Dwelling
Cost/m2 : 2272.73 €/m²

General information

The Project was to construct a c.200sqm single storey detached 3/4-bedroom house in Carrickmines. We started on site in mid July 2018 and the house was PC certified in February 2019.

Sustainability

The site is in a beautiful serene location and we wanted to take full advantage of the Southerly aspect. My main focus was on creating a light airy space with plenty of connection to the outside. The site is an infill site since was a back garden of a cottage which was not really used and therefore takes advantage of existing services etc. which is a more sustainable approach than your standard greenfield site. Its lovely to have the opportunity to inhabit this space. We decided to try for a Passive House rating quite late in the process and some last-minute adjustments to the frame, insulation etc. were required. We used the Kore Insulation Foundation System provided an innovate means of providing both thermal bridge free foundation with semi raft nature to the foundation which avoided differential settlement of the soil. We chose to use the Glavloc timber frame system which is an Irish owned and operated company using locally sourced materials. Their innovative design allowed the house to be constructed without the use of articulated truck delivery which could not get onto the site or use of a crane. Alltimber frame components of the system were delivered to site by van and assembled on site. This build system effortlessly provided a thermal bridge free Passive House designed for insulation to connect to Kore foundation and wrap wall and roof. Together with Glavloc we developed a detail for an applied rafter system which was used to create an overhanging eaves, this allowed us to achieve a full envelope of insulation and gave us our air gap for ventilation of the roof.

Glavloc Build Systems is a technology company that has developed a unique, world patented, rapid building system that is breaking new ground and changing the way we build. Based in County Cork, Glavloc develops, designs and manufactures high-performance residential and commercial buildings. Projects that use the Glavloc system can be completed a building in a quarter of the time used in traditional masonry and half the time involved in building an offsite timber-framed structure.The build system consists of 9 standardised timber components that are manufactured from FSC Certified timber. Components interlock to form most building shapes and sizes. This is the first off-site manufacturing, modern method of construction system that has zero (cold) thermal bridging, with industry leading insulation properties. The manufacturing of Glavloc components is carried out in a fully operational facility, using an automated process which enables mass production in volumes of over 1000 units a year. The Glavloc G-loc wall system is made up of certified FSC Timber components (OSB 3, glulam & birch ply) and EPS insulation. All components are interchangeable & can be used for most building sizes. The Glavloc System is compliant with the Nearly Zero Energy Buildings (nZEB) Directive. We used a Nilan ventilation heat recovery hot water system combined with underfloor heating run from a Nilan heat pump which is state of the art providing a constant internal temperature with fresh air. Having always lived in draughty uninsulated houses it's amazing to have such a comfortable constant inside temperature and no indication of external temperature (its sometimes a bit of a shock to the system to leave the house though). The ventilation system is very efficient and the heat pump has to date rarely been used, I believe we will have more of a demand for cooling than heating in the long term. We also have plenty of openable windows to provide cross ventilation in the warmer weather. The house uses only electricity and the bills average out under €100 per month. At finishing stage due to our proximity to an excellent recycling facility we recycled as many materials and packaging as possible.

Innovation

The timber frame system (Glavloc) and the ventilation/ heating systems (Nilan) described above are both innovative and sustainable. To complement the forward-thinking passive house design a Crestron lighting and Control system was designed to manage the Audio Visual and Lighting in the house. The lighting is controlled by Crestron InfinetEX lighting switches - wired via traditional electrical wiring - that not only have local load switching / dimming capability but have the ability to connect wirelessly (via the InfiniteEX network) to the Crestron Control system which is housed in a central equipment rack. This enables any lighting switch to control any light in the system via buttons on the local switch that are designated as 'remote buttons'. This opened up a world of possibility and options once the lighting switches had been added to the InfinetEX wireless network, so for example the front door entrance lighting switch has a button that can turn on or off all of the house lighting globally as you enter / exit, another example is based on an astronomical clock which will switch the Outdoor lighting on at night time and off in daylight automatically or can will turn on at night time automatically and off at a pre-determined time later in the night which is set programmatically. Also the use of PIR / Occupancy Sensors aid in the automation process to automatically turn on hallway lights based on occupancy to safely facilitate sleepy late night pass through traffic etc. Crestron also controls the TV Room surround sound cinema sound system and multi room audio, and integrates with the CCTV system with further possibility inbuilt for the future. The lighting keypads are part of the greater Crestron Control system and have the ability to control / trigger events for the surround sound system / CCTV.

Challenges

We had some constraints for instance site is relatively steep and accessed from a narrow cul de sac, articulated trucks could not access the site, we wanted a rapid build solution to minimise construction time and the ground conditions meant that a lightweight building would be the most suitable solution. The system we used provided an innovative lightweight, user friendly solution giving excellent structural properties, u-values and rapid build time. There were some issues in the construction process that led to a few compromises on materials. We were on a tight budget and therefore another challenge was to deliver the house we wanted in terms of finishes for the budget we were working with. I spent a lot of time sourcing finishes that would give the look and feel of a high-end interior but at an affordable cost.

See more details about this project

https://www.glavloc.ie/

Photo credit

Lisa Wynne

Stakeholders

Contractor

Name : Pat Doran Construction

Construction Manager

Name : Paul Doran

Contracting method

Maximum Guaranteed Price

If you had to do it again?

we had a few challenges, in particular I wasn't happy with the finish on the slab, its a fibre reinforced slab so it wasn't power floated, I wouldn't repeat this method.

Building users opinion

I am very happy in general with the results

Energy

Energy consumption

Primary energy need : 70,94 kWhpe/m^2.year

Primary energy need for standard building : 125,00 kWhpe/m^2.year

Calculation method : Other

CEEB : 0.0001

Breakdown for energy consumption : Space heating demand (state calculation tool, eg PHPP): 14.44 kWh/m2/yr. (preliminary values)
Heat load (state calculation tool, eg PHPP):8.69 W/m2 (preliminary values)
Energy consumption is 47.25 kWh/m2/yr.

Envelope performance

Envelope U-Value : 0,15 $W.m^{-2}.K^{-1}$

More information :
Ground floor: U-value: 0.09 W/m2K Walls: U-value: 0.15 W/m2K
Roof: pitched sloped roof U-value: 0.11 W/m2K
Windows: Munster Joinery Passiv Aluclad triple glazed windows. U Value: 0.7W/m2K Ultra Tech tripled glazed doors. U Value: 1.4W/m2K

Air Tightness Value : 0,34

More information

not available

Renewables & systems

Systems

Heating system :
- Combined Heat and Power

Hot water system :
- Heat pump

Cooling system :
- Reversible heat pump

Ventilation system :
- Double flow heat exchanger

Renewable systems :
- Heat pump

Environment

Urban environment

The house is located in the back garden of a cottage, a previously unused area close to public transport and 14km from Dublin city centre

Land plot area : 600,00 m^2

Built-up area : 30,00 %

Green space : 300,00

Products

Product

nilan compact p

Nilan

https://www.nilan.dk/en-gb/frontpage/solutions/domestic-solutions/compact-solutions/compact-p-air-9

Product category : Génie climatique, électricité / Ventilation, rafraîchissement

Agreed that it was a suitable product

Kore Insulated raft foundation slab

Kore

Product category :

Well received

Glavloc Timber Frame

Glavloc

https://www.glavloc.ie/

Product category : Gros œuvre / Structure, maçonnerie, façade

Very successful

Costs

Construction and exploitation costs

Total cost of the building : 450 000 €

Energy bill

Forecasted energy bill/year : 1 200,00 €

Real energy cost/m2 : 6.06

Real energy cost/Dwelling : 1200

Carbon

GHG emissions

GHG in use : 9,29 $KgCO_2/m^2/year$

Contest

Reasons for participating in the competition(s)

- low primary energy needs
- provide a bright spacious family home connected to the outside visually but with a controlled internal environment
- bio-based local materials

Building candidate in the category

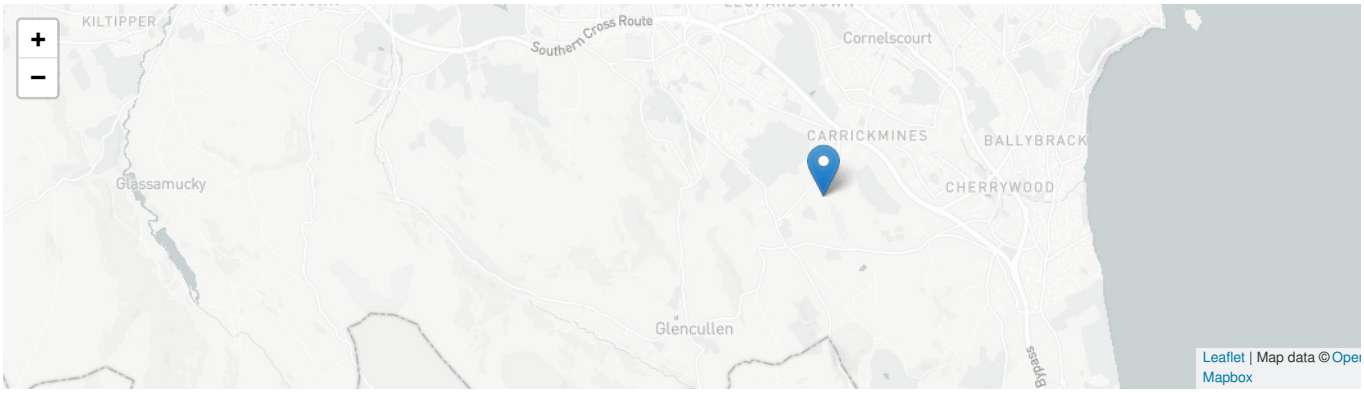
Green Solutions

Energy & Temperate Climates

Low Carbon

Health & Comfort

Users' Choice



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