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03

PASSIVE HOUSE PROJECTS

Project reports – the 2014 Passive House Award winners

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The Award

A celebration of architecture, the 2014 Passive House Award demonstrates the great potential and versatility offered by Passive House solutions. Its purpose: to acknowledge Certified Passive House Buildings distinguished by outstanding architectural design.

Over 100 projects were submitted for the 2014 award, which was carried out under the patronage of the German Federal Ministry for Economic Affairs and Energy. Additional support came from the European Union in the framework of the PassREg project. A total of 21 finalists were initially selected by the award jury, each deserving of an award in their own right. From these, seven winners spread over six categories, five for individual buildings projects and one for Passive House regions, were finally chosen.

The Categories

- Regions (through PassREg)
- Office and special use buildings
- Educational buildings
- Apartment buildings
- Single family homes
- Retrofits

Coming from a total of 21 different countries, the submissions to the 2014 Passive House Award were clearly international. This internationality is also reflected in the variety of winning projects, presented on 25 April 2014 at the International Passive House Conference 2014 in Aachen, Germany. The six individual buildings project winners are detailed in the following pages.

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Passive House Institute

PassREg

IG PASSIVHAUS Informations-Gemeinschaft Passivhaus Deutschland

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Passive House Award 2014

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The Winners

Numerous examples of excellent architecture, underpinned by the Passive House Standard, can be seen worldwide. The winners of the 2014 Passive House Award illustrate just how beautiful extremely energy efficient buildings can be. A pre-requisite for all project submissions was Passive House certification (or EnerPHit certification for retrofits), according to the internationally recognised criteria set out by the Passive House Institute. This solid basis allowed the jury to focus solely on architectural design during their assessment.

In the award-winning buildings featured on the following pages, energy efficiency and high-level architecture go hand in hand. The first art museum built to the Passive House Standard is already a major attraction in the midst of the historical centre of German Ravensburg. In South Korea, a new seminar and apartment building blends beautifully into the surrounding mountain landscape while a seven-storey apartment complex in Berlin, completed by a multi-generation community, boasts its zero-emission credentials. In Philadelphia, a terraced social housing development shows just how cost-effective Passive House buildings can be while another social housing project, emerging as an ensemble of single family homes, reaches the Passive House Standard despite Finnland's harsh climate. Finally, a 114 year-old inner-city brownstone undergoes a surprising transformation to Passive House level in a New York energy retrofit.

These winners are a mere sampling of what is possible with Passive House.

The Jury

The members of the 2014 Passive House Award jury (photo below, from left to right):

Mark Elton
Sustainable By Design | UK

Raimund Rainer
Architect Raimund Rainer | Austria

Ludwig Rongen
Rongen Architekten | Germany

Robert Hastings
Architecture, Energy & Environment (AEU) | Switzerland

Wolfgang Feist
Passive House Institute | Germany and Austria

Zdravko Genchev
Eneffect | Bulgaria

Helmut Krapmeier
Energieinstitut Vorarlberg | Austria

Jeroen Poppe
Passiefhuis-Platform (php) | Belgium

Burkhard Fröhlich
DBZ Deutsche BauZeitschrift | Germany

www.passivehouse-award.org

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Single family homes | terraced

Belfield Homes | Philadelphia | United States

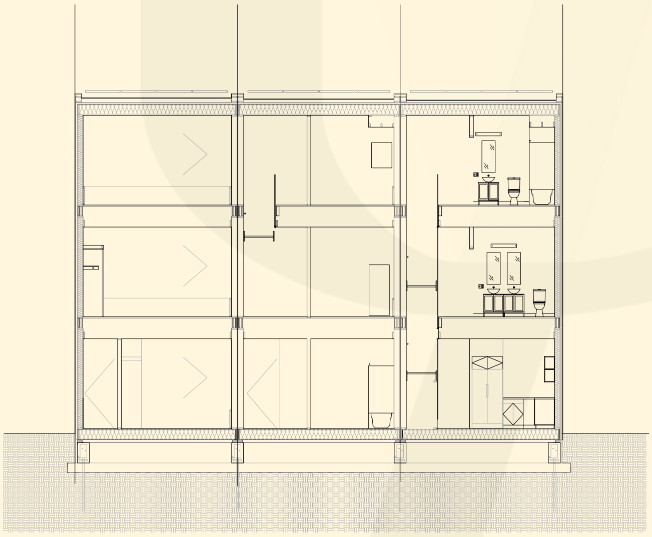
The Belfield Townhomes development was a unique opportunity to challenge the standards by which architects, urban planners, and municipal housing authorities conceptualise subsidised or social housing in the US.

The requirements for the homes were simple: design and build three much-needed homes for this struggling community that would house large, formerly homeless families, with a handicap accessible ground floor. No sustainable requirements were specified for the project, only a fixed budget and schedule: once designed and permitted, the project had to be completed in less than six months while the hard-cost construction budget for the project was limited to $130.00 per square foot.

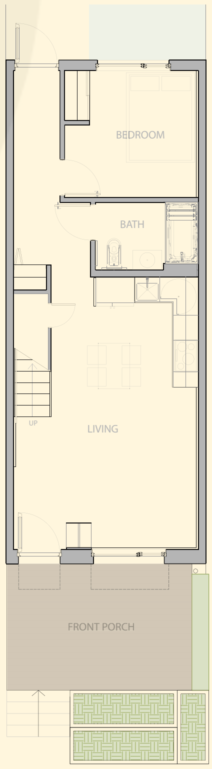
After reviewing the project requirements, Onion Flats, a small development, design, build collective, determined that these homes could be built for the specified budget while also becoming the first Passive House certified and Net-Zero-Energy-Capable homes in Pennsylvania. The broader goal in building this project was to demonstrate that Net-Zero-Energy-Capable buildings can be built within the typical US public housing budgets. To achieve this goal, an efficient building system design was needed – one that was replicable, scalable, and capable of enabling radical reduction in building energy consumption.

A modular building system based on conventional framing techniques was used, making it cost-effective and easily transferrable to the building trades. The system was designed to meet Passive House requirements and can be configured to meet varying site conditions and programmatic needs. Modular construction also allows for tighter construction tolerances than traditional onsite construction while minimising waste, and cutting construction time in half.

The Belfield Townhomes were designed as a traditional row house, matching the context of the surrounding neighbourhood. The orientation of the building, following the urban grid, was challenging as it was not ideally oriented for maximum southern exposure. Shading devices on the south and west provide shade in the summer and allow for maximum heat gains in the winter. Completed in 2012, this project demonstrated that Net-Zero-Energy-Capable buildings, using Passive House as a tool, could and should be standard in the United States at virtually no cost premium.



cross section



first floor plan

Project information

Certified Passive House | Terraced housing
New build | Philadelphia | United States
Treated floor area according to PHPP: 413 m²
Year of construction: 2012
Project database: ID 3795

Architects

Plumbob LLC.
www.onionflats.com

Photos

Sam Oberter Photography

Build-ups | Timber construction

External wall [U-value: 0.17 W/(m²K)]
Gypsum board | 14 cm dense packed cellulose with studs (timber frame modular construction) | gypsum board | oriented strand board | 5.1 cm Polyiso AP foil

Roof [U-value: 0.11 W/(m²K)]
Gypsum board | 30.5 cm dense packed cellulose with studs (timber frame) | oriented strand board | 5.1 cm Polyiso AP foil | roofing

Floor slab [U-value: 0.10 W/(m²K)]
10.2 cm XPS insulation | 1.3 cm zip panel sheeting | 28.6 cm dense packed cellulose with studs (timber frame floor) | ply sub floor

Airtightness of building

n_{50} = 0.48/h

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Windows

Frames [U-value, $_{installed}$ = 0. 83 W/(m²K)]
Vinyl profiles | partly fixed
Glazing [U-value = 0.55 W/(m²K) | g-value = 61%]
Triple glazing with low-e-coating and argon filling

Mechanical systems

Ventilation and frost protection
Rotary wheel (heat and humidity, centralised) | rotary wheel heat exchanger
Heating
Compact heat pump unit
Domestic hot water
Heat pump
Cooling and dehumidification
Air to air split unit

Heating demand (according to PHPP)
14 kWh/(m²a)

Heating load (according to PHPP)
12 W/m²

Cooling demand (according to PHPP)
12 kWh/(m²a)

Cooling load (according to PHPP)
10 W/m²

Primary energy demand
(according to PHPP, including total electricity demand)
113 kWh/(m²a)