

Passive House Los Angeles (PHLA+)

by Christian Kienapfel / © 2021-03-31 17:28:07 / International / © 3678 / EN



New Construction

Primary energy need :

32 kWhpe/m².year

(Calculation method : Other)

Building Type : Isolated or semi-detached house

Construction Year : 2019

Delivery year :

Address 1 - street : LOS ANGELES, USA

Climate zone : [Csa] Interior Mediterranean - Mild with dry, hot summer.

Net Floor Area : 1 750 m² Other

Certifications :



Proposed by :



General informations

This single-family residence is a "PASSIVE HOUSE PLUS" certified building in West Los Angeles (Culver City) and one of the first Passive House buildings in Southern California. It is an all-electric home focusing on the reduction of energy consumption, reduction of operational carbon and providing most of the needed power via a small on-site photovoltaic system with onsite battery storage (14kWh). This is a Net Zero Energy Home, which turns out to be a "Plus Energy Home" with 16x solar PV panels. After the first year of operation the surplus power generated onsite is sufficient to drive an electric vehicle +/- 10,000 miles.

Passive House Los Angeles (PHLA+) is located on a duplex lot, an infill site and is comprised of 1,791 sq.ft. living area with an additional large 400 sq.ft. deck area over the carport. This home has four bedrooms and three baths. Large windows with automated exterior sun shades are providing sufficient natural daylight and a connection between indoor and outdoor living even with this home's limited footprint.

PHLA+'s energy performance was modeled using the by the Passive House Institute (PHI) developed Passive House Planning Package (PHPP) software and following the 5x basic Passive House principles:

(1) Climate specific continuous insulation. PHLA+ uses two Inches of rigid foam insulation below the slab on grade, 2x6 wood framing with net & blow insulation

and 1 ½" of exterior continuous basalt rock and recycled slag insulation.

(2) Minimizing thermal bridges.

(3) High-efficiency operable windows & exterior automated venetian blinds for shading which are reducing the cooling load significantly. At the same time providing daylight with views to the exterior during the day and privacy at night.

(4) The Airtight building envelope was achieved with a liquid applied air barrier. PHLA+ achieved 0.48 ACH50 which is well below the very demanding Passive House certification requirement of 0.6 air changes per hour for new construction.

(5) Continuous 24-hour filtered (MERV-13) fresh air ventilation with heat recovery (HRV). Fresh air is getting supplied to the living and bedrooms and is extracted from the bathrooms, kitchen and storage areas. Ventilation systems like this have gained more interest this year due to COVID-19 and local wild fires. No air is re-circulated in the building and always 100% fresh air is provided.

Labels/Awards:

11/2019 "North American Finalist" & "National Winner" of 5th CertainTeed Gypsum Trophy.

10/2019 AIA COTE MERIT AWARD, Passive House Los Angeles (PHLA+) receives the AIA Award.

9/2019 ENERGY EFFICIENCY AWARD – German Innovation in US Buildings. Partners: AIA San Francisco, USGBC Northern California, DGNB, AHK German American Chamber of Commerce.

10/2019 California Advanced Homes.

See more details about this project

https://passivehouse-database.org/index.php?lang=en#d_5769

Photo credit

Fraser Almeida

Stakeholders

Contractor

Name : Guillermo Delgadillo & team Julio & team

Construction Manager

Name : PARAVANT Architects

Contact : Christian Kienapfel

<https://paravantarchitects.com/>

Stakeholders

Function : Certification company

Certiphiers, Tad Everhart, Christina Snyder & team

Function : Others

Troyski Engineering

Function : Others

KNB Associates

Function : Others

Avery Colter, Fard Engineers Inc.

Function : Others

Dav Camras

Function : Others

Energy

Energy consumption

Primary energy need : 32,00 kWhpe/m².year

Calculation method : Other

Breakdown for energy consumption : Primary energy needs corresponds to Passivhaus PER value.

Envelope performance

More information :

Exterior wall 2x6 Wood Framing, Cavity Blow-in Insulation (KNAUF)

Continuous Exterior Insulation (ROCKWOOL)CAT-5

Basement floor / floor slab Slab on grade, Rigid Insulation Roof Wood Framing Frame Certified Passive House component

Zola , Aluminum Wood Clad Windows

Air Tightness Value : 0,48

More information

"Plus Energy Building" with 16x Solar PV Panel. Net Zero with 10x PV panel. 2,500 kWh surplus after 12x month of operation (=10K miles in a Tesla 3) Power wall Battery Backup system. EUI: 8.3 after first year of operation. 85% self-performing during the first 12x month of operation. Automated exterior sun shading to reduce cooling loads.

Renewables & systems

Systems

Heating system :

- Heat pump

Hot water system :

- Heat pump

Cooling system :

- Others

Ventilation system :

- Double flow heat exchanger

Renewable systems :

- Solar photovoltaic

Other information on HVAC :

Passive House LA (PHLA+) was designed to provide maximum comfort and healthy indoor air quality while at the same time reducing the energy consumption to the max: EUI 8,3 kBtu/sf./year compared to a standard EUI of +/- 38 kBtu/sf./year (per UCLA Energy Atlas for Culver City 2016 data, Los Angeles is EUI 40 kBtu/sf./year). This was achieved by a high performing Passive House building envelope, drastic reduction of energy consumption and then supplementing the remaining lower energy demand via a small photovoltaic system. PHLA+ is an all-electric building and beside the previously stated 5x Passive House principles uses also the following strategies: • Heat-pump for heating & cooling (one mini unit split only for the entire building, the smallest Mitsubishi unit available on the market at the time). • Heat-pump water heater with motion sensor activated recirculation pump (bathroom, power & kitchen) to reduce waste of water. • Heat-pump cloth dryer. • Induction cooktop. • LED light fixtures throughout. • Highly efficient appliances throughout. PPHLA+ will have very low utility bills for the entire live cycle of the building. In the past two years we never have paid more than the mandatory minimum +/- \$12.00 monthly Southern California Edison (SCE) power bill. Last year alone our bill shows a -\$596.00 credit for 2020. Passive House buildings are therefore less impacted by future increases in energy cost.

Environment

Urban environment

Single family residence infill project in rear portion of an existing residential property (Zoning R-3).

Reasons for participating in the competition(s)

Building to the International Passive House Standard is resulting in ultra-low energy buildings that require very little energy for space heating and cooling. This residence is a fossil fuel free all electric home minimizing it's carbon footprint even more.

The intent of this single-family residence is to create a Passive House showcase building in Los Angeles in order to demonstrate the comfort, high indoor air quality and exceptional performance of Passive House the leading international low energy building standard. So far more than 600 people have visited this building to experience the comfort in person.



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