PhilaU Powered to Zero

The New Affordable Zero Homes

Project Data

Location: 900 Block North Taney Street, Philadelphia, PA 19130
IECC Climate Zone: 4
HERS Score Target: 45 w/o PV; 0 w/ PV
Estimated Monthly Energy Cost: $50-$60
Square Footage: Unit A1: 1,414 and Unit A2: 1,060
Unit A1: 3 Bedrooms, 2.5 Bathrooms, 3 Stories + Unfinished Bsmt.
Unit A2: 3 Bedrooms, 2 Bathrooms, 2 Stories + Unfinished Bsmt.

Project Summary

The New Affordable Zero Homes are intended to provide an alternate to similar housing options offered by non-profit home building organizations including Habitat for Humanity, Project Home, Help USA, and Make It Right Foundation. These performance driven duplexes strive to offer the next level of affordable housing by exceeding the baseline standards necessary to meet Zero Energy Ready certification levels.

Relevance of Project to the Goals of the Competition

The New Affordable Zero Homes incorporate a super insulated exterior envelope, the introduction of natural daylight, and the consolidation of mechanical and plumbing systems. The combination of these will lessen the energy demands on mechanical and plumbing equipment, reduce the estimated monthly energy costs, improve the interior air quality, and lower the additional expenses required to incorporate photovoltaic and solar hot water systems necessary to reach the DOE net-zero performance requirements.

Design Strategy and Key Points

Architectural: The New Affordable Zero Homes are designed in a contemporary style with characteristics from a typical Philadelphia rowhome. The homes combine the use of brick facades and HardiePlank Lap siding in order to keep construction costs to a minimum.
Envelope: The exterior walls are made with SIPS panels to increase the R-value of the walls while reducing the possibility of thermal bridging.
Natural Daylight Analysis: An analysis was performed to ensure the maximum amount of daylight at 9AM and 3PM, with a target goal of 70% and 60% respectively. The increased use of natural daylight will reduce the need for artificial lighting during the day, keeping operational costs to a minimum.

Target Technical Specifications

Wall Insulation = R-40
Foundation Insulation = R-20
Roof Insulation = R-60
Window Performance = R-5 (U-Value: 0.3) minimum
HVAC specifications = Air Source Heat Pump w/ 2 Stage Compressor and HRV = target values equal to or better than AFUE: 90%, SEER: 15, HSPF: 9