Three Rivers Builders

The Three Rivers House

Project Summary

The Confluence House, located in Pittsburgh, PA, is a super-insulated, Passive House style home located with easy access to public transportation and located within walking distance of numerous amenities. Even without the rooftop PV panels, the home achieves an impressive HERS score of 35, an important attribute in Pittsburgh's cloudy and cold climate.

Relevance of Project to the Goals of the Competition

This design attempts to find cost-effective solutions for all energy efficiency and IEQ aspects of through the design of an integrated system. Intelligent, integrated design can bring down the cost of ZEB's to be affordable to almost anyone who wants one.

Design Strategy and Key Points

The Confluence House is designed for a cold climate with little sun. High insulation and minimal thermal bridging take precedence in this climate, and the long periods of rain and dampness make air sealing and moisture management high priorities. Ease of construction and cost effectiveness are addressed through the design of an integrated construction system utilizing prefabricated materials for fast construction times. High air sealing and minimal envelope penetrations are complemented by an ERV, and all heating and cooling is provided by a small ground source heat pump.

Project Data

1424 Fallowfield Ave., Pittsburgh, PA

- IECC Climate Zone 5A
- 1640 Square feet
- 3 Bedrooms, 3 bathrooms, 2 stories
- HERS Score: **35** without PV; **-5** with PV
- Monthly energy costs: $53 without PV, -$1.50 with PV

Technical Specifications

- Wall Insulation = **R-37**
- Foundation Insulation = **R-41**
- Roof Insulation = **R-50**
- Window Performance = **U-factor: 0.18 – 0.22, SHGC: 0.24 – 0.39**
- Ground Source Heat Pump - **COP 5.1, EER: 15.7**
- Energy Recovery Ventilator - **Effectiveness: 83% sensible, 77% total**
- Instantaneous Gas Water Heater EF: **0.95**