



# Team Appalachian [In]sight

## [In]visible House



## Appalachian State University Suburban Single-Family Housing

### Project Summary

The Appalachian [In]sight team was approached by Rare Earth Builders to design a Zero Energy Ready speculative home. The price point sits just \$265K for the Asheville, NC area and targets young professionals, retirees, and small families that desire a healthy, low-energy home. Construction of the project is planned to start in May 2017. The building concept, [In]visible, responds to competing realities: controlling the seen and unseen, interactions between indoors and outdoors, and price and performance while guiding the occupant toward intuitive interactions with building systems. The team has created its design through an integrated process engaging with design professionals, general contractors, systems experts, real estate agents, product manufacturers, and subcontractors from the outset of the project.



### Relevance of Project to the Goals of the Competition

The competition provides an opportunity for students in the building science field to grow and flourish, introducing aspiring architects, construction managers, and engineers to the skills and expertise necessary to develop high performance homes. Similarly, our project pushes the limits of the team by linking with a builder who intends to construct the design and use it as a model for future homes he plans to build. By evaluating a wide range of technologies and building methods, we can find the right solutions for the [In]visible house, leading to a durable, healthy, and low-energy home.

### Design Strategy and Key Points

Appalachian [In]sight is using a scientifically motivated, integrated design approach to develop a design that will be built in western NC. Our partner, Rare Earth Builders, has linked us with his professional connections that will be involved with the construction and testing of the home, providing us with unique access to the practices and preferences of the actual people involved with its construction.

### Project Data

- Haywood County, North Carolina
- Climate zone 4
- 1389 Conditioned Square feet
- 3 Bedroom, 2 Baths, 1 Story
- HERS score of 53 and 0 with 6.6 kW of PV
- Estimated monthly energy cost = \$77 or \$27 with PV system

### Technical Specifications

- Wall insulation = Nominal R-value of 22 + 9
- Foundation Insulation = 2" Continuous Neopor EPS Nominal R-value of 9
- Roof Insulation – Loose fill insulation with room for R-50
- Window Performance = Marvin Integrity Casement- U-Factor: 0.29, SHGC: 0.29, VT: 0.49
- HVAC specifications = Multi-zone heat pump, total capacity: 18kBTU/h, ERV, and makeup air range exhaust