



Team Penn State

The New American Home



The Pennsylvania State University
Suburban Single-Family Home

Project Summary

For this year's Race to Zero competition, Team Penn State is partnering with a local production home builder, S&A Homes, to create an affordable, easily replicable Zero Energy Ready Home. Our team will be working with one of S&A's existing home models and remaking it into a net zero energy home that S&A will realistically be able to offer to customers in the central Pennsylvania area.



*S&A's Dartmouth Model

Relevance of Project to the Goals of the Competition

We are going to work closely with a production builder, S&A, therefore maximizing the impact of the project and the competition. A major goal for Race to Zero is to develop able bodies in the work force for sustainable housing. We are given the opportunity to adapt and influence the building techniques of a production builder which can change the scheme of the industry in our area. Our team, along with the Race to Zero Competition, are set out to create a market shift towards efficient, long lasting housing. One of S&A's major requests is to have readily available materials and to use techniques familiar to their builders. Ease of construction is a key part of the Race to Zero competition because in order for true efficiency ratings to be met, the house must be constructed in the proper way to ensure a tight envelope. Our goals are based on our potential to make a legitimate impact on the industry and specifically on S&A.

Design Strategy and Key Points

Our design strategy starts with broadly defining the team's goals and conceptual ideas for what this home will ultimately be. Taking these concepts, we will analyze S&A's current home design and the strategies they are using while determining the reason these strategies are being used. We will then begin to modify and optimize the design of the home to transform it into a Zero Energy Ready Home. This will be accomplished through discussions with S&A, student's research, and the use of various building science and architectural programs such as BEopt, REM/Rate, REvit and SAM. Key areas of interest for both S&A and the team are improving the existing envelope's insulation and airtightness, bringing ducting inside the envelope, improving air quality, and simplifying construction details.

Project Data

- Ferguson Township, Pennsylvania
- IECC Climate Zone 5
- 4 bedrooms, 2.5 bathrooms, 2 stories
- 2,200 SF

Technical Specifications

- Wall Insulation: R-19 (S&A) | R-30 (Goal)
- Roof Insulation: R-38 (S&A) | R-60 (Goal)
- Foundation Insulation: R-10 minimum
- Electric Heat Pump