Assessing the Performance of Energy Efficient Housing

Overview
Penn State’s Department of Architecture partnered with the Union Country Housing Authority (UCHA) to create the Energy Efficient Housing Program (EEHP). A duplex was constructed and two homes were remodelled using energy efficient technologies and sustainable materials. UCHA’s goal was to design a public interface that allowed researchers, occupants, and the general public to access information about the four homes that were constructed and efficient housing in general. The secondary goal was to analyze energy use data from the occupied homes to optimize the performance of the energy efficient homes.

Objectives
The team designed a website that:
- Simplified technical descriptions of energy efficient devices and sustainable materials for the general public
- Connected the homes’ occupants to the online dashboard of the energy monitoring TED device
- Provided energy use data to researchers for further study

Approach
- The team visited the four homes and met with UCHA representatives to learn about EEHP
- Conducted literature searches on energy efficient technologies and materials and modular construction
- Calibrated the energy measurement and electricity rate structure of the TED devices
- Attended meetings with the architect, contractor, energy auditor, and UCHA representatives to discuss the process of and lessons learned during energy efficient remodelling
- Analyzed different methods to display the information on a public interface
- Designed several website layouts to determine which layout most effectively conveyed the information to the public

Outcomes
- A website was created that could be linked to or integrated in UCHA’s existing website
- Future Work: Questions were created to analyze the data in order to determine
  - Performance of energy efficient houses compared to non-energy efficient ones
  - Psychological effects of energy efficient housing on occupants and community