Development of Core Systems

Overview
The EEHR group presented the problem of creating a group of systems, named the Kit-of-Parts, to build energy efficient low income housing. These KoP homes would be constructed in a modular configuration, meaning it would be constructed off site and brought to location. This presented spatial constraints on the homes, but also reduced the cost of the homes overall.

Objectives
The team’s goal for this project was to design a modular home with a Home Energy Rating Score (HERS) of under 50. The team also ensured that air quality and safety of the home was not compromised in order to make the home as energy efficient as possible. Lastly our team was to create a cost/benefit analysis of energy efficiency measures in respect to their HERS influence.

Approach
- Weekly meetings with our sponsor and advisors ensured that our team working in the right direction throughout the semester and continuously provided feedback on our work
- Dividing the team into individual systems allowed the team to work more efficiently
  - Each team member became a specialist in their respective systems
- Design requirements for a residential home were made as follows
  - To Code: House meets the bare minimum to be allowed in a residential home
  - Energy Star: House meets Energy Star standards
  - Passivehaus: House meets strict German standards
- Each system was tiered in regards to efficiency as: Average, Above Average, Top-of-the-Line
- The cost of each tier of the KoP was accounted for
- By analysing the blueprints provided by the sponsors, spatial assumptions could be made
- Using REM/RATE we were able to provide HERS for various floor plans, orientation, system tiers

Outcomes
The work of the Development of Core systems team will aid the EEHR in the following ways
- Inform Architects in design traits for residential homes
- Inform Architects on requirements necessary to meet different standards
- Inform Architects on systems and their efficiency gains
  - Costs associated with systems
- Costs required to meet standards
- Standards available with capital limits