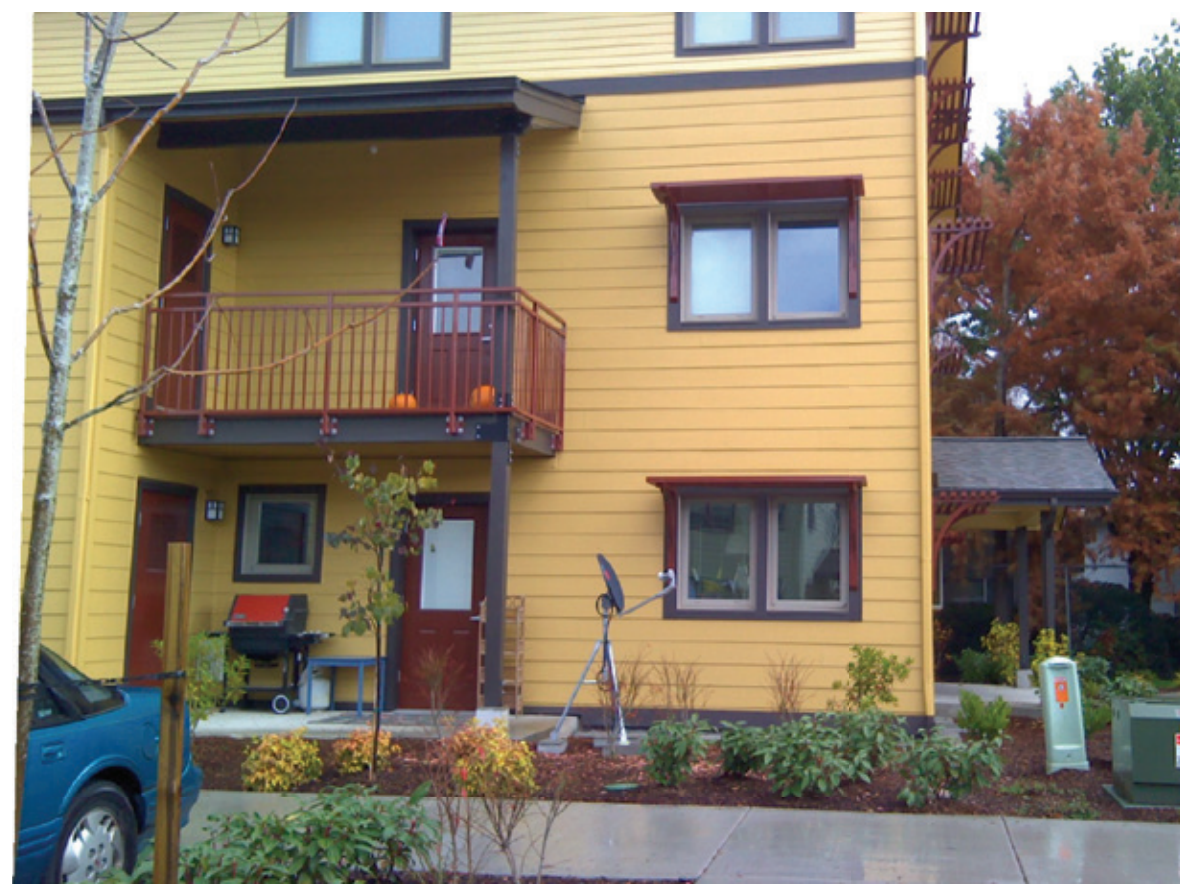


# The Stellar Apartments

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Faculty Advisor: Alison Kwok

The Stellar Apartments is a 54-building multi-family affordable housing development in west Eugene owned by St. Vincent De Paul Society of Lane County. Two buildings were built as a pilot to test Passive House against Earth Advantage. The two buildings are built side by side with the same amount of units and the same design in floor plans. The difference is in the construction of the building envelope. This difference in envelope creates an opportunity to analyze and compare the energy consumption between Passive House and Earth Advantage over the course of 2 years.



## PASSIVE HOUSE



7 adults (31-71 y.o.)



1 teenager (14 y.o.)  
1 toddler (3 y.o.)



+/- pets

**Occupancy: 9**

## EARTH ADVANTAGE



6 adults (21-64 y.o.)

1 child (10 y.o.)  
2 toddlers (1 & 3 y.o.)

+/- pets

**Occupancy: 9**

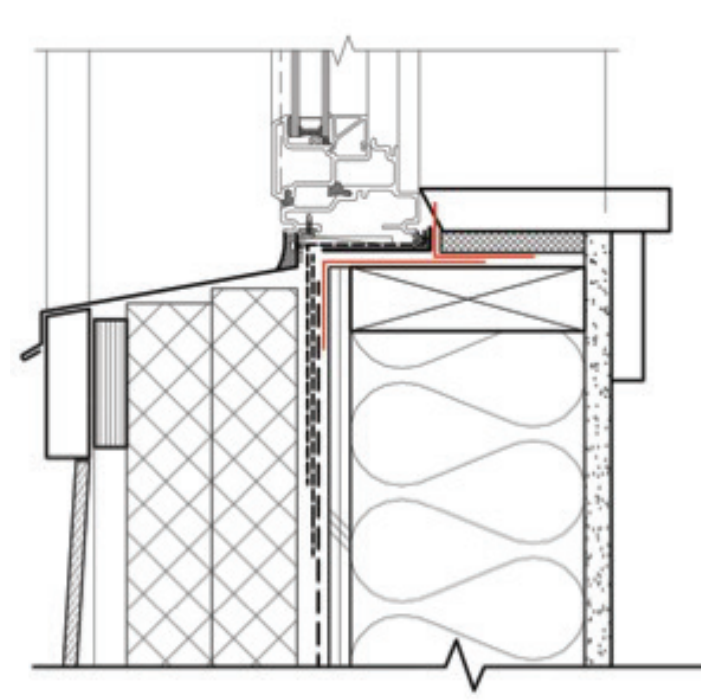
## Methodology:

Each unit in the PH and EA buildings has a monitoring system at the panel box by PowerWise Systems called Site Sage, measuring end-use energy: space heating, ERV (PH only), water heater, washer, dryer, refrigerator, range, interior temperature, relative humidity, and outdoor weather conditions. We verified the SiteSage monitoring system data with handheld sensors for temperature, humidity, and VOCs. We also installed CO2 monitors to verify correlation of VOCs to ventilation effectiveness. Each month's data are downloaded from SiteSage to an Excel file for the various analyses.

## Initial Findings:

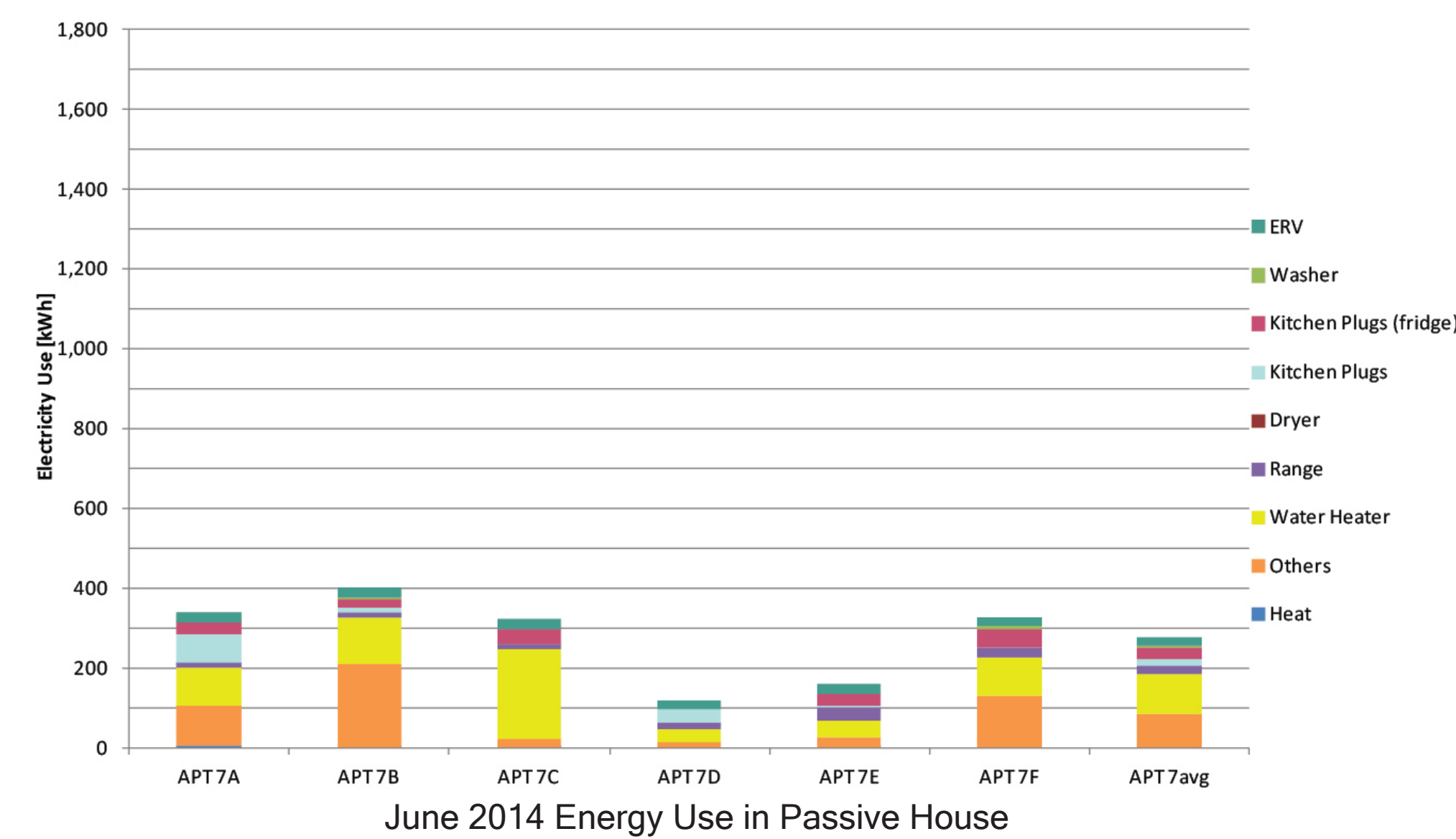
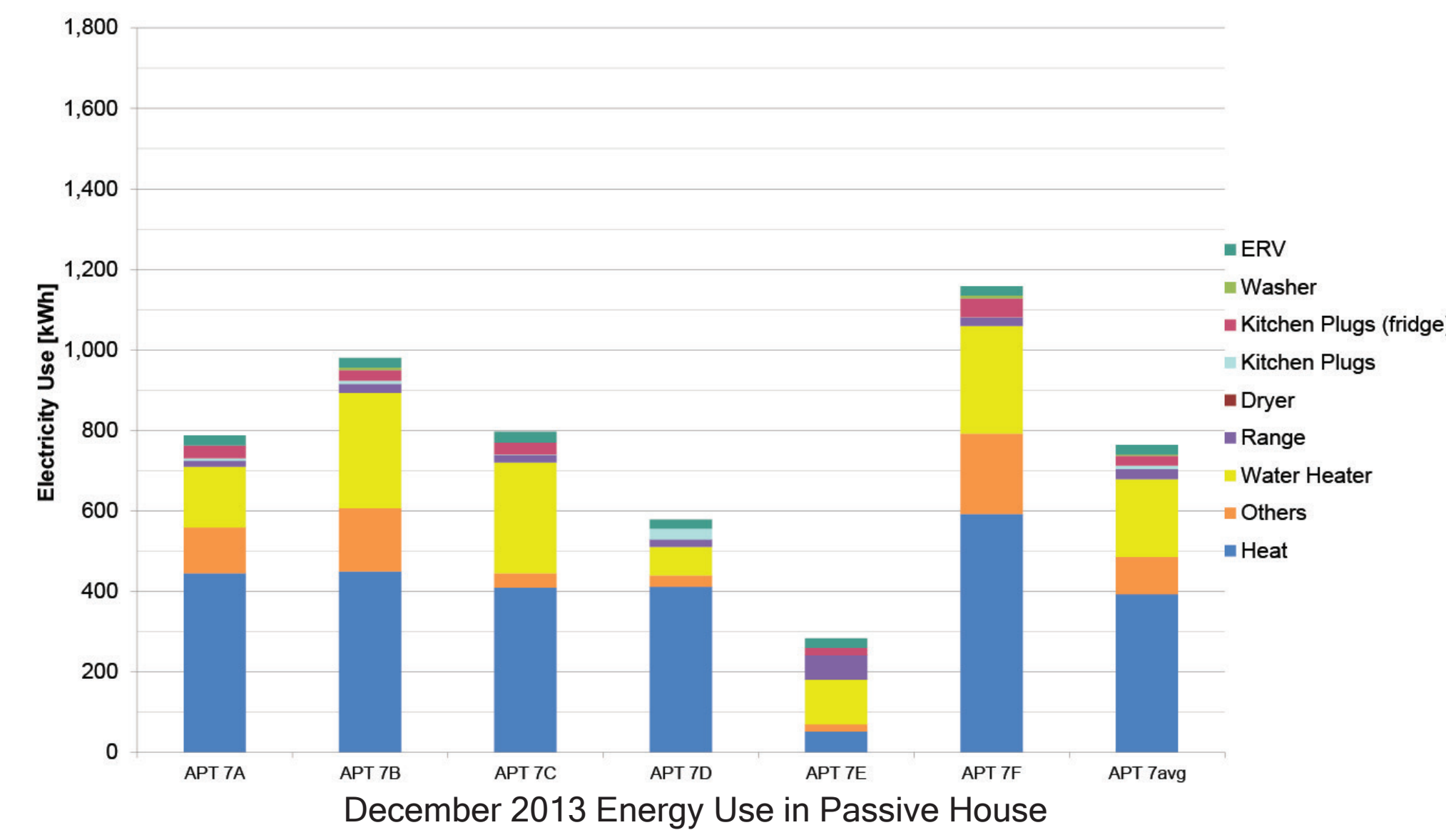
Over the first year, findings show that occupants of the PH units are using approximately 59% less space heating energy than occupants in the EA units and in the transitional season (September/October) there was a lag time of about a week or so before the PH occupants turned on their space heating. The overall energy use "pie" averages are similar between PH and EA except for space heating and plug loads, however occupant behavior indicates strong potential for savings. Early measurements of carbon dioxide levels in both buildings show good ventilation effectiveness.

## What is Passive House?

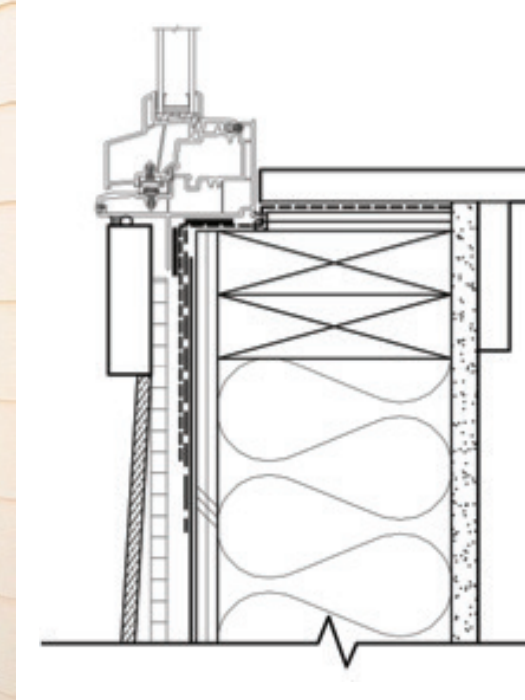
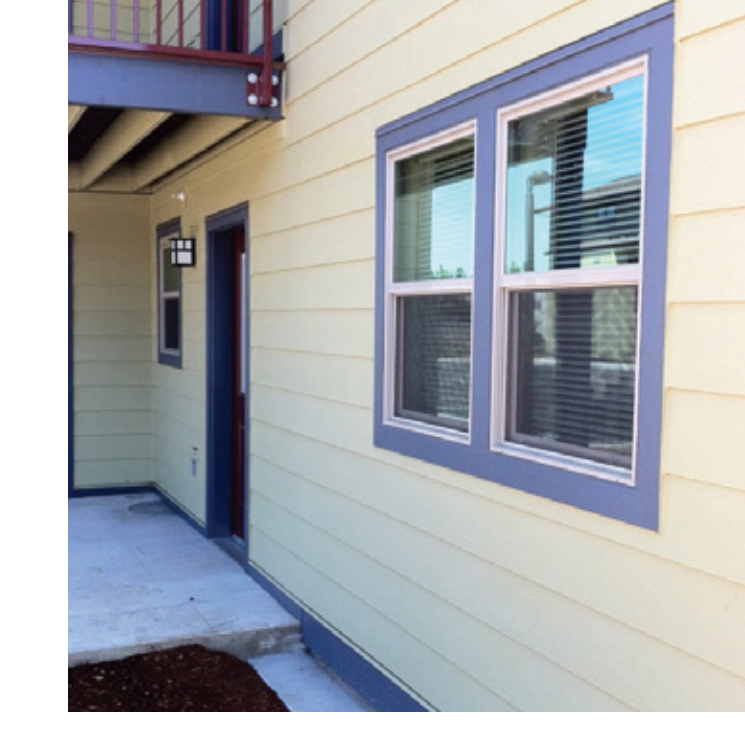


Passive House is a certification that boasts 70% better than code for overall energy performance. From the wall section on the left, the Passive House building has a much thicker wall that consists of more exterior insulation than the Earth Advantage building.

## How did December compare to June?

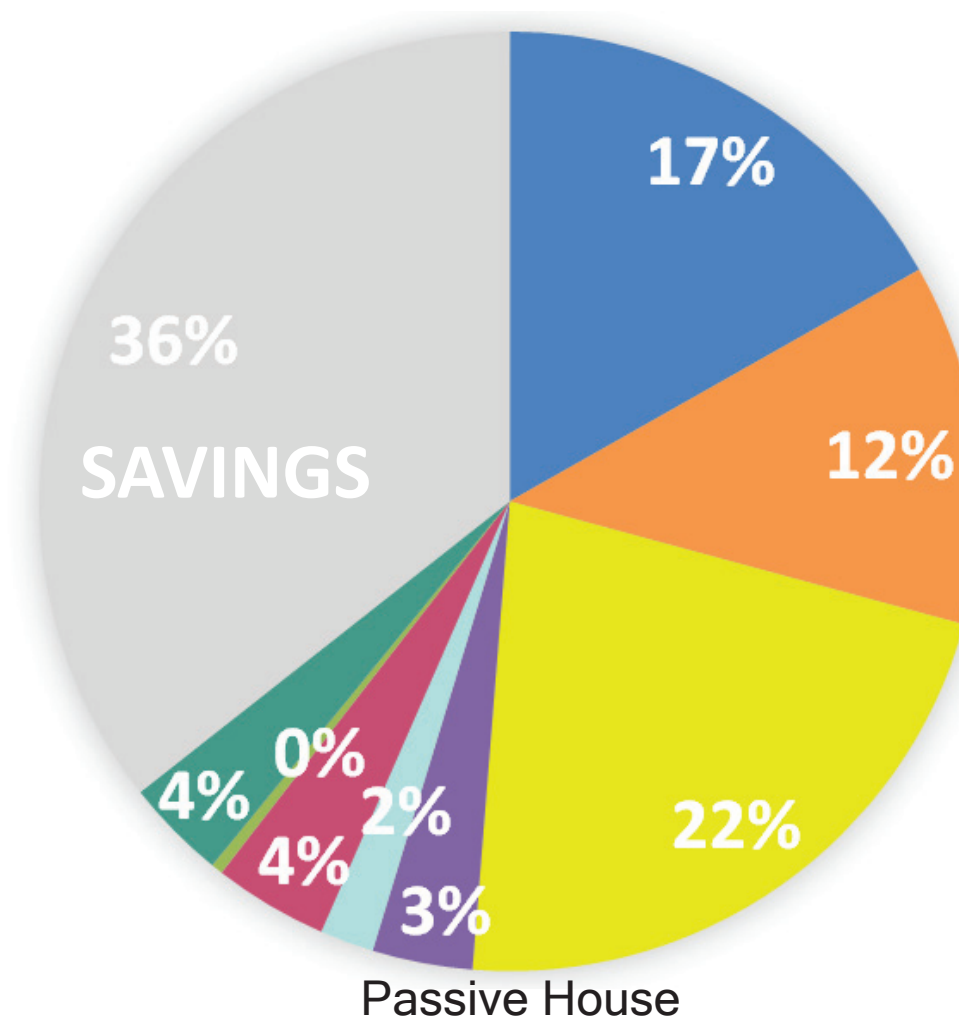
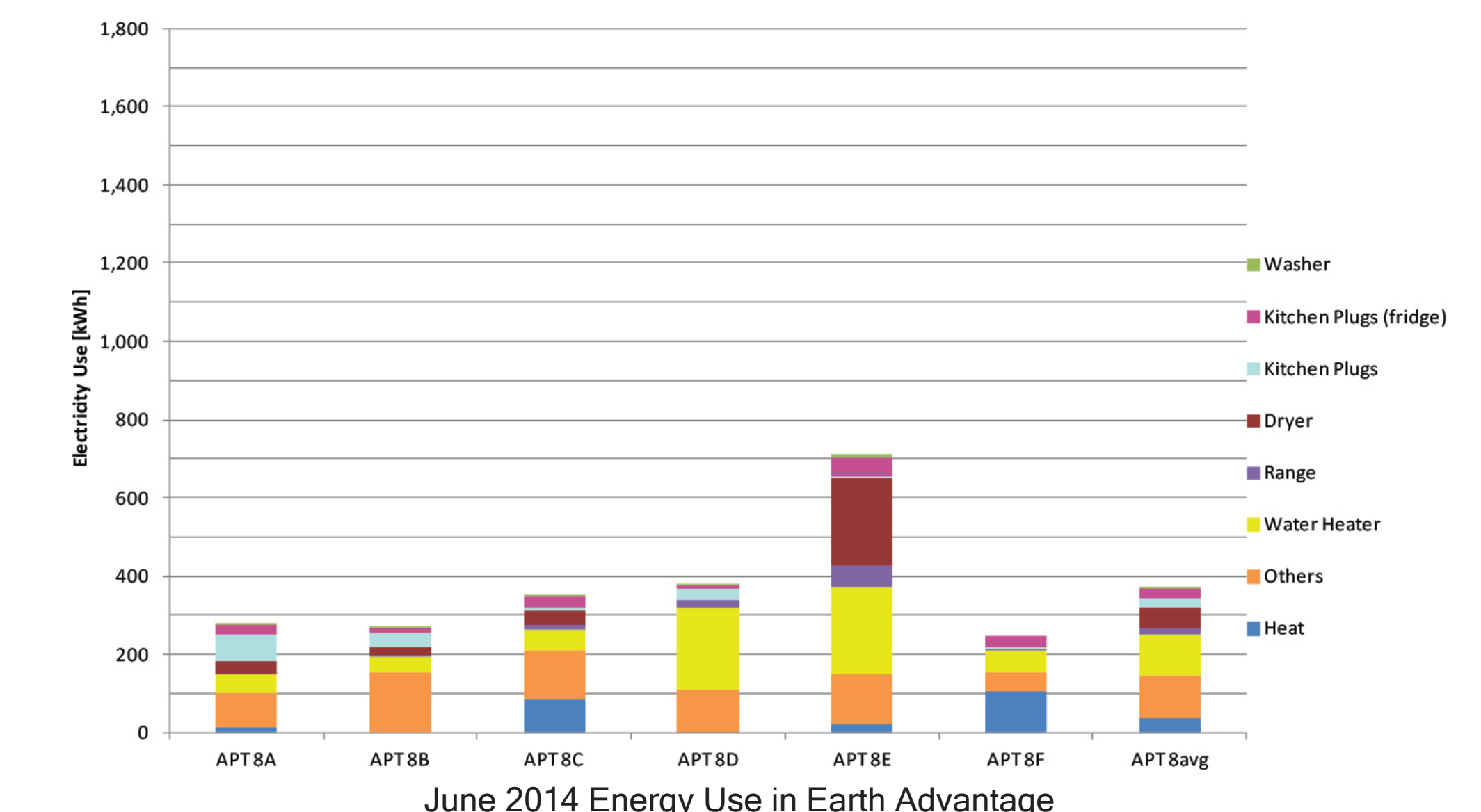
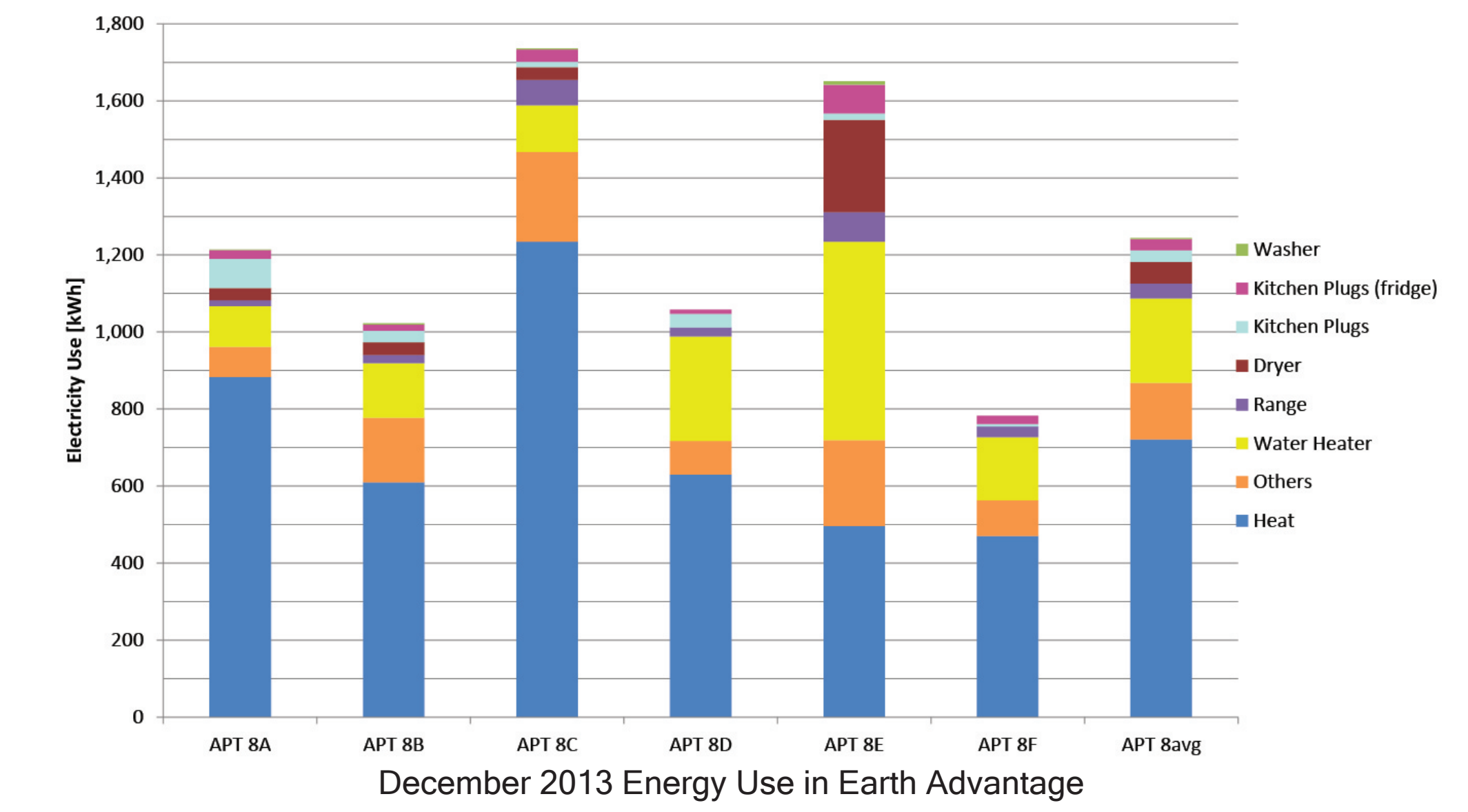


## What is Earth Advantage?

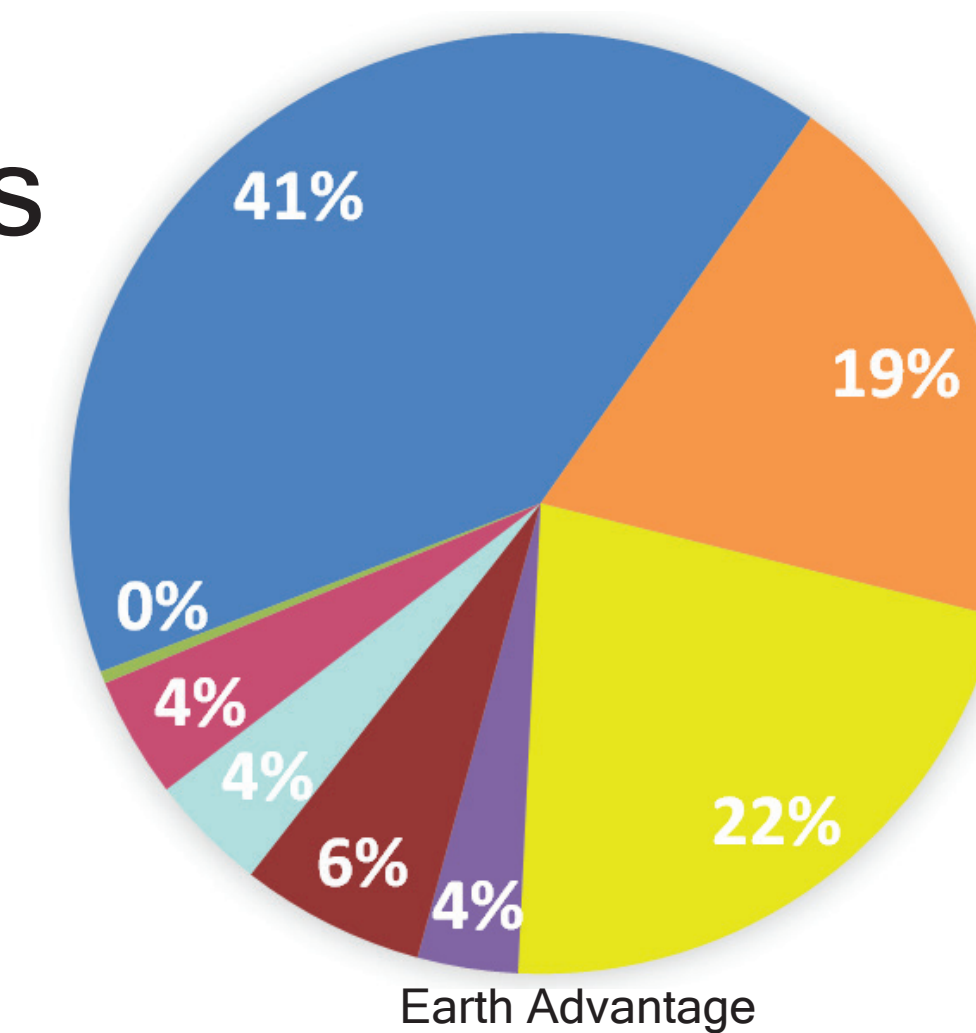


Earth Advantage is a certification that boasts 10% better than code in overall energy performance. From the wall section on the left, you can see that the Earth Advantage wall is similar to conventional light frame wood construction with insulation between studs.

## How did December compare to June?



## Annual Energy Pie of End Use Appliances



## Total Monthly Heating Energy Use Comparisons for 2013-15

