



QUINHAGAK HOUSE ENERGY PROFILE NOVEMBER 2010 TO APRIL 2011

The Quinhagak prototype house was completed in November of 2010. The house remained unoccupied while the community selected a family to move in. In the meantime, the monitoring system has been running in the house and collecting data on the unoccupied space. A family of five moved into the house on April 12, 2011 and future reports will reflect the energy use of the occupied house. This mid-year report concentrates on the heating and electrical demands of the unoccupied house.

Quinhagak Climate and House Temperatures

Quinhagak is on the southwest coast of the Alaska and its climate is moderated by the ocean. Quinhagak experiences approximately 11,700 heating degree days (less than in the interior and northern parts of the state). The average winter temperature from October 2010 to March 2011 was 25 °F (-4°C). The exterior temperatures fluctuated significantly and unpredictably over the course of the winter, as shown in Figure 1.

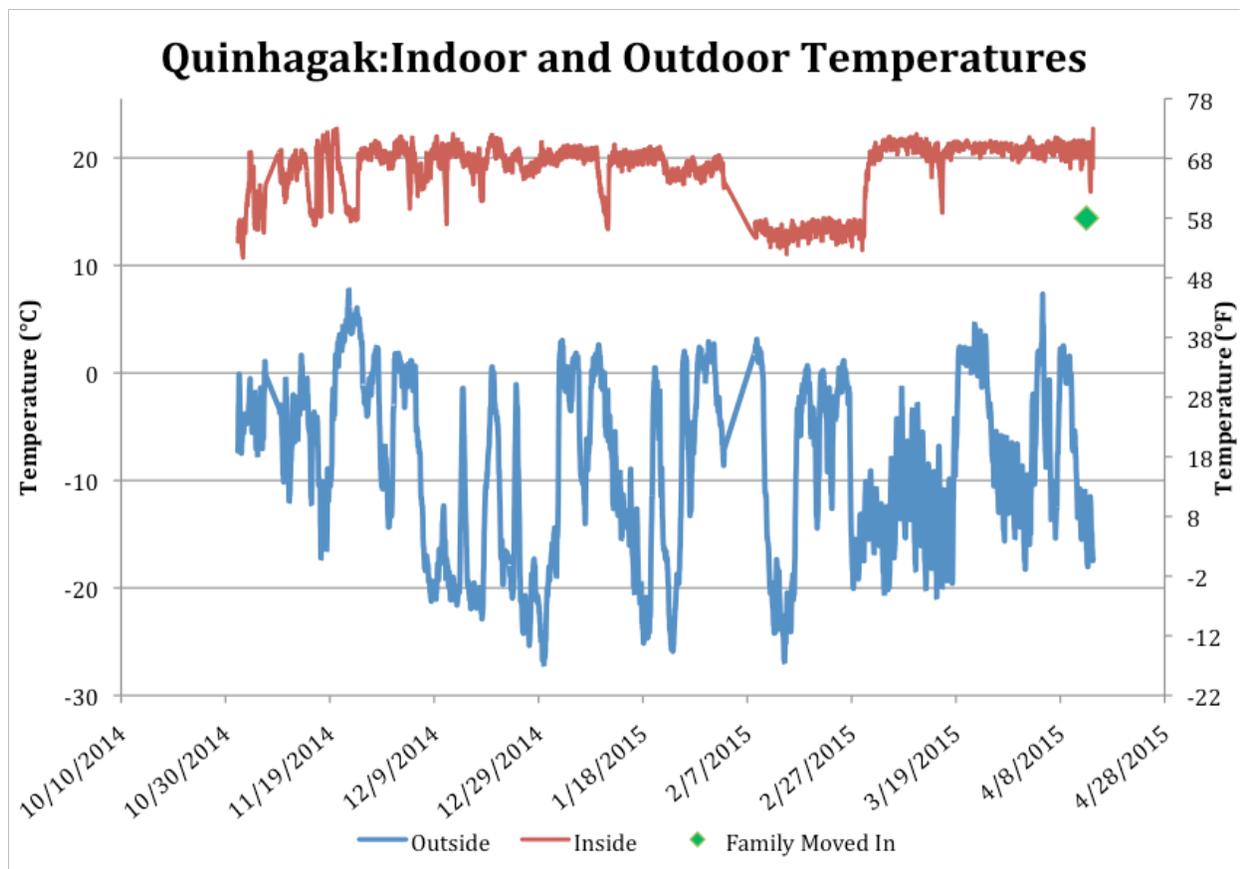


Figure 1. Interior and Exterior Temperatures for the Quinhagak Prototype House. The interior of the house has remained warm while the exterior temperatures have varied.

The interior temperatures of the house were more variable than would be expected in an occupied home. The variations from November to January are due the construction process which required workers to be in and out. Additionally, several power outages caused temperature changes. There was a particularly long power outage on February 1, when a village construction project shut down power for the day. The outage caused a week long gap in data collection and also reset the Toyotomi heater to its default setting of 54°F (someone checking on the house reset the heater to 70°F on February 28th).



Heating Demand

The Quinhagak Prototype house is equipped with a Toyotomi OM-22 Oil Miser Direct Vent Oil Heater, as well as a Vermont Castings Dutchwest woodstove for space heating. Domestic hot water is supplied by a Bradford White 20 gallon electric hot water heater. During the first five and a half months the house has used approximately 70 gallons of fuel. The heater was installed on November 7, 2010 and 30 gallons of heating fuel were deposited in the above ground tank. Those 30 gallons lasted until March 7, 2011 when approximately 40 gallons were added. From March 7th until April 25th ---approximately 40 gallons of heating fuel were used. These are very rough estimates because the fuel level sensor failed and was not replaced until May 2, 2011.

Electrical Demand

The monthly electrical demand for the house is shown in Figure 2. The major construction in the house was completed in November, hence the larger electrical usage for that month. Finish-work construction tasks were done in December, January and March. The February electrical usage reflects the demand of the unoccupied house. The oil heater, heat recovery ventilator (HRV), monitoring system, and refrigerator were the only appliances running in the house while unoccupied.

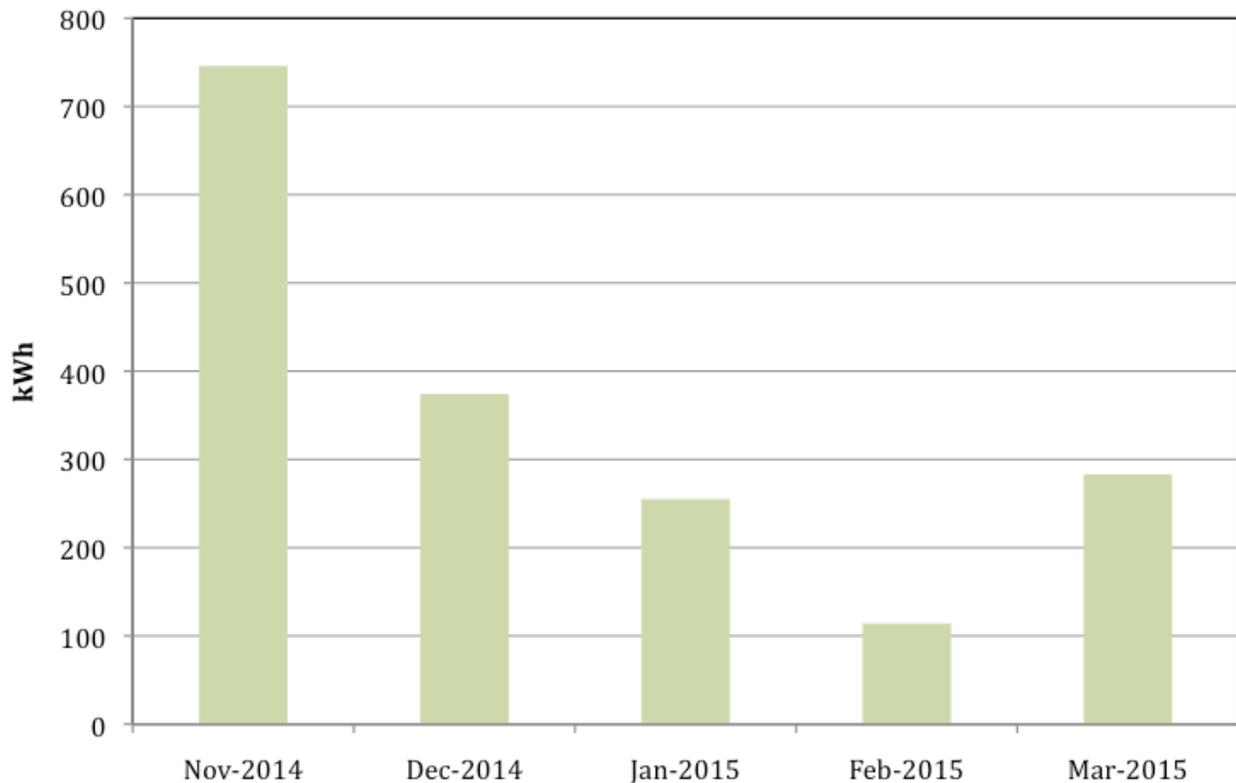


Figure 2. Electrical Demand for the Quinhagak Prototype House. This data reflects the electrical use of the unoccupied house and some construction activities.

Conclusions

Monitoring this house for five months while unoccupied has given a rough baseline of the electrical and heating demands. The base amount of seventy gallons of heating fuel will change as occupant influence impacts energy use. For instance, the family has already changed the set point of the oil heater from 70°F to 72°F and they are using the woodstove. The electrical demand of the unoccupied home in February demonstrates the small base load of the house, 114 kWh. This value will most likely increase with a family of five using the house. CCHRC is looking forward to meeting the new occupants and working with them to gain a better understanding of how the house performs.