

Case Study – Front Range Retreat

Solutions Provided – Post Occupancy Energy Monitoring and Analysis

The Front Range Retreat residence is situated at the base of the foot hills of Boulder, CO. In keeping with the culture of sustainability, Front Range Retreat was designed to be a net zero home, meaning it would produce as much or more energy as it uses annually. Achieving this net zero goal was complicated by local regulations and the fact that this home was intended to be a primary residence and occupied year round. Ultimately, a 34 kW photovoltaic power production system was installed such that excess power could be sent to the grid when production exceeds consumption. Engineered Projects Consulting installed a Site Sage energy monitoring system as a proactive strategy to help ensure this project performed at a very high level and to help identify opportunities for improvement.

Site Sage EMS

The Site Sage EMS is a system of hardware and software that monitors energy use at a circuit level. Current sensors are installed on most, if not all, circuits to get a very accurate picture of how the home is using energy. The data is reported from the locally installed hardware to a web based interface where it is presented in a multitude of graphs or can be downloaded as raw data. Site Sage is also very helpful on homes with solar panels as you can monitor production and use in real time and adjust operational strategies to take full advantage of the PV system.

Energy Monitoring and Analysis

The Site Sage EMS system was installed shortly after construction was completed and the home became occupied. The first utility bills that were sent to the client were extremely high and didn't make a lot of sense. Site Sage was very useful in showing that the high utility bills were the result of billing and accounting errors by the utility company and in no way reflective of actual consumption. Further, it was found that the meter that calculates the power that is returned to the grid was faulty and the client was receiving no credit. It was comforting to the client and construction team to see that the home was actually performing very well and the energy bills were extremely inaccurate.

Several decisions were made to meet regulatory requirements that were somewhat in conflict with the net zero goal but necessary to get approval to install a solar power production system that would provide enough power to meet that goal. The utility company would only allow a system that was 120% of predicted electricity demand – so the electricity demand was intentionally increased to get the needed solar power production capacity. Site Sage was very helpful in identifying the impact of these increases after occupancy and to develop strategies to help the home perform closer to the energy model predicted level.