



Home Energy Assessment Report



01/20/2015 An Evaluation of Your Home's Energy Efficiency

Overview

Today we are employing the building science approach known as House as a System (HaaS) which looks at how the house functions as a whole where insulation and air sealing can have a positive or negative effect on windows or the efficiency of the HVAC system. By addressing the buildings thermal boundary, pressure and air barriers, by improving the insulation, air sealing the building, sealing the HVAC ducts, and upgrading the windows we are able to make the buildings shell more efficient, pressurized, and subsequently more comfortable which also improves the Indoor Air Quality (IAQ). We then capitalize on the measures when we install energy efficient equipment such as the HVAC and hot water systems. We then bring the house to as close to net zero as we can when adding a right-sized solar system. When you are done you will never again have address energy efficiencies of your home and be completely ready to become net zero should you add solar.

Your existing energy use is about average for Sacramento County for homes of comparable size. After upgrading your home it will become very comfortable to live in and improve its indoor air quality reducing its effects on allergies. Studies have shown that energy efficient homes improve their resell value by up to 30%. All lighting should be replaced with LED equivalents All lighting should be replaced with LED equivalents

All new homes will have to be built to be net zero by 2020. You can buy a net zero home today. By 2020 if your home is not energy efficient it will begin to lose value as more and more buyers are already beginning to look at the utility bill and the overall efficiency of the home. Inefficient homes will not be attractive to new buyers.

Home Energy Assessment Report

AN EVALUATION OF YOUR HOME'S ENERGY EFFICIENCY

Property Owner: Robert & Arlyn Ogden

Property Address: 5648 La Casa Way, Sacramento, CA 95835

CA Climate Zone: 12

Property Type: Single family, two story 4 bedrooms with attic and slab

Square Footage: 2570

Year Built: 2005

Percent Energy Savings with Recommendations: 22%

Heating Equipment: The home is equipped with an old 92% efficient furnace

Cooling Equipment: The home equipped with an efficient 10 SEER air conditioner

Water Heater: The home is equipped with a 62% water heater.

Solar System: None

Customer Wants and Concerns: Wants to maximize comfort and improve efficiency, and lower utility bills, improve marketability and desirability.

Ventilation:

The house is currently ventilated 19% below where the building's airflow should be per ASHRAE 69-82 Building Airflow Standards (BAS). Your home should be at 2,348 Cubic Feet per Minute at -50 Pa (CFM50) or .35 in Air Changes per Hour (ACH). Your house is currently measuring 1,896 CFM50 or 0.28 in Air Changes per Hour (ACH). Recommend bringing airflow to the proper ventilation standards will help improve the comfort and indoor air quality in your home. Air sealing requires the insulation in the attic to be removed, polyurethane foam around the air barrier which is the top plate of exterior walls and all penetrations into conditioned space. It may also require we improve airflow by requiring continuous mechanical ventilation installed.

Attic:

The current attic area is 1419 square feet and has an effectively R-value is approximately R-22 with batts and loose fill fiberglass. There are peaks and valleys in the insulation reducing the effectiveness of the insulation. The current standard is R-49 which is sufficient to bury the ducts after they have been designed to lay on the attic joists to be buried in insulation. We recommend your ducts be replaced with R-8 and strapped to the ceiling joists and buried in the R-49 insulation, we recommend removing the old insulation to allow for air sealing.

Crawlspace:

The house does not have a crawlspace.

HVAC Duct System:

The duct system is in good shape and sealed to where we like it and have an R-6 insulation rating. Not much to do here as far as sealing is concerned. Unfortunately the ducts are not buried because the HVAC and general contractor didn't know to do so. Plus there appears to be ducts that do not go anywhere or were part of a heat recovery ventilation system. The recommendation is to remove the ducts and install new R-8 designed to lay of the attic floor and be buried in insulation.

Heating/Cooling System:

The heat rating on your furnace has an AFUE rating of 92% with a 10 SEER air conditioner. These produce an inefficient HVAC system and that will cost money. While the furnace is high efficient system the 10 SEER air conditioner effectively reduces the overall efficiency of the HVAC system. After air sealing the house, sealing and burying the ducts in R-49 insulation the current HVAC system will be oversized for the home. This is due to the current system is be large enough to overcome the inefficiencies of the home. This is a bigger is better approach

which works but wastes a lot of money on several fronts. Having an oversized system is bad for several reasons. (1) it will not run the allotted time needed to reach its rated efficiency, which will drive up your utility bill not lower it; (2) it will not properly ventilate the home or remove the moisture from the air, which could lead to mold issues; and (3) it will shorten the life expectancy of the equipment. We recommend replacing the current system with a 96% efficient furnace, downsizing the furnace to a 58K BTU system and condenser to a 3.5 ton 16 SEER system. This will contribute to a helping reduce the utility bill. With a properly sized coil this will produce a system that is 97% efficient and provide optimal efficiency when heating and cooling the indoor air. Since 45% of your utility bill is in your HVAC system that represents a substantial savings.

Hot Water Systems:

The existing hot water heater system is inefficient and rated at 62%. The closet doors should be treated as you would an exterior door. Recommend a 97% efficient tank-less water heater. This will save you roughly \$0.38 for every dollar spent heating your water.

Lighting:

Lighting can be a huge energy draw. Incandescent are not only expensive to operate they release 90% of their energy as heat. Fluorescent lighting releases 80% of their energy as heat, although the heat is barely noticeable it can reduce your energy consumption by 68% over incandescent. Replacing fluorescent bulbs require special ecologically handling. LED produces almost no heat and reduces your energy consumption by 85%. We recommend replacing all lighting with LED. Recommend replacing all indoor and outdoor incandescent, halogen, and fluorescent lighting with equivalent LED lighting. The savings will more than offset the cost with an ROI of 6 months or less. We can help you get the right LED lighting.

Windows:

Your windows are has a good U-factor rating and are sufficient to prevent heat and cold air transferring into and out of the home. We do not recommend replacing the windows.

Solar Systems:

The house has a 3.0 kW solar system.

Eligible Tax Credits and Rebates:

- SMUD Home Performance Program rebate is estimated at \$3,350.
- PG&E Energy Upgrade California rebate is estimated at \$1,403.
- Federal Solar Tax Credit is estimated at \$3,600.

Operations, Maintenance & Safety:

- Gas leaks found at the meter on the customer side and the furnace. PG&E was called for resolution.
- CO levels: 0 ppm.
- Check furnace filters bi-monthly and replace at least three times per year.
- Clean out rain gutter.

Do-It-Yourself Recommendations

Not everything recommended here may be applicable to your home.

- Remove plug and switch plate covers. Caulk or foam around the junction box to seal any openings. Place a gasket fitting your type of switch and plug plate (traditional vs. square) behind the cover and replace the covers. Though it is recommended to caulk behind all interior wall, and exterior walls, the exterior walls are MOST important.
- Remove the registers and caulk or foam around the boot that ties the duct to the opening. This will prevent air from coming into your living space from your attic and or crawlspace.
- Paint any areas of your rafter tail, fascia, soffit, or eaves that are exposed to the elements to prevent dry-rot.
- All appliances should be Energy Star rated.

- Install a minimum of two carbon monoxide sensors.
- Replace all indoor and outdoor lighting with LED and add occupancy sensors.
- Add weather stripping to all exterior doors and attic access.
- Seal plumbing and electrical penetrations into the crawlspace and attic space, especially internal bathroom and kitchen sink areas.

Recommendations for Professional Scope of Work:

These can be done in any order but are listed in the order of preference.

- Air seal the building envelope to 0.35 ACH per ASHRAE 62-89 standards or 2,348 CFM50 with polyurethane foam in the attic.
- Remove old R-22 attic insulation and install ~1,419 ft² of new R-49 installation to the attic floor.
- Replace duct system with R-8 and strap to the ceiling joists in the attic. Bury the ducts in the attic in R-49 insulation. Seal to ≤ 3% duct leakage and zero to the outside.
- Replace old HVAC system and install a new high efficient 96% AFUE furnace with a 16 SEER air conditioner. Requests Wi-Fi enabled thermostats
- Replace existing tank water heater with a 95% high efficient tankless water heater with built-in recirculating pump. Recommend the Navien NPE-240A or Noritz NRC-1111.
- Install 3.0 solar system to bring the home to net zero.
- Would like the house wired with CAT-5 for use with Local Area Network (LAN).

Photography

These photos are representatives of what we saw with the infrared camera and what we saw with the digital camera of the same area while the house was being depressurized. It depicts where the air leakage is and where the heat and cold transfers exists. Heat and cold transfers is that area where the outside air penetrates into the home. Dark blue means a lot of air movement. The red and orange is heat coming through the leaks in the ceiling and crawlspace.





























