Home Performance with Energy Star Improvement Proposal

Prepared for:
Cynthia Bryan
Pomona, CA

Prepared by:
Steven Rawls
REEIS CA Inc.
7408 Morris Street
Riverside, CA 92503
951.352.9904 phone
951.352.9906 fax

Project Cost:	$10,120
Rebate:	$8,000
Total Cost:	$2,120

PROGRAM INTRODUCTION

Home Performance with Energy Star is a "Whole House" approach to improving your home's energy efficiency, comfort and indoor air quality. Rather than focusing on a single problem, like an old heating or cooling system, insulation in the attic, or leaky windows, Home Performance with Energy Star looks at a home as a system and how the improvements throughout the home can work together to give you the best results.

By addressing the common failures which occur in most homes your home will be:

- More comfortable
- Cost effective saving you from 10% - 50% on your energy bills – cost savings will vary by home and improvements completed.
- Reduced maintenance and repair cost over the life of the home
- Healthier with reduced dust, pollutants, bio-aerosols, Volatile Organic Compounds (VOC's) and poisonous gas exposure
- Better for the environment
- Safer for your family

REPORT FORMAT

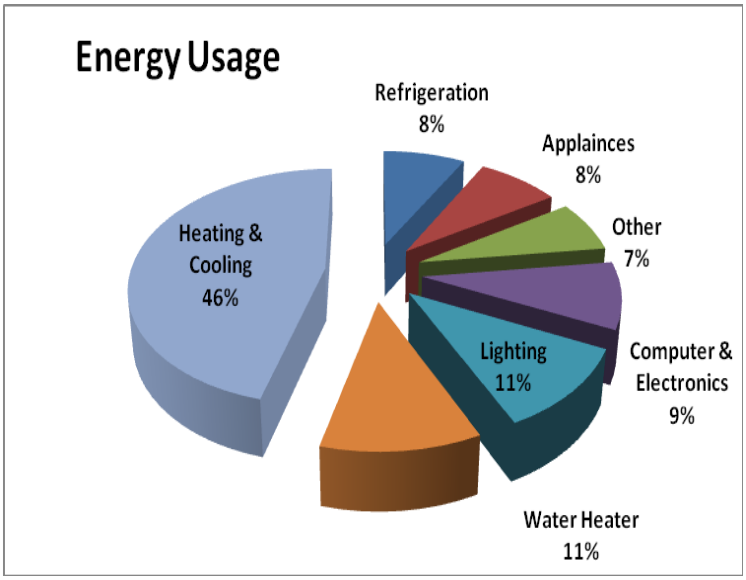
The report is designed to be easy to understand and follow. REEIS breaks down the home into different categories of performance based recommendations and improvements. You will notice that each category will include the following:

- General information
- Current condition of the home
- Recommendations
- REEIS Products & Services

Although each category is described and line itemed separately, it is important to remember the home operates as a system and relationships exist between the subcategories. If partial recommendations are performed, only partial benefits may be realized. Please review the proposal with your analyst to determine the best solutions for your specific home and goals.

The sub categories are:

- Lighting
- HVAC duct leakage
- Building envelope
- Insulation
- Pressure balancing
- HVAC air flow and performance
- Window treatments and sun screens
- Indoor air quality
- HVAC criteria & upgrades
- Service and maintenance

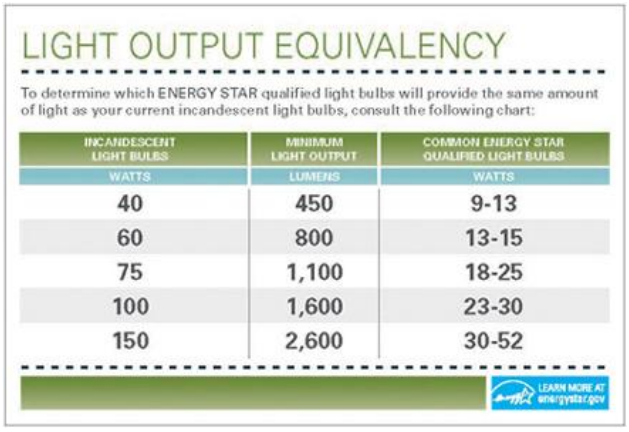


LIGHTING

General Information

Changing out all of your standard incandescent lighting to compact fluorescent lighting (CFL) is one of the fastest and easiest ways to save energy. CFL's uses 75% - 85% less electricity and last 8 to 10 times longer than incandescent bulbs. Incandescent bulbs can also produce a significant amount of heat which causes the air conditioning systems to run significantly longer to cool the house. The heat can also create uncomfortable conditions in the home.

An incandescent bulb when on will operate at 175 – 200 degrees Fahrenheit.



LIGHT OUTPUT EQUIVALENCY

To determine which ENERGY STAR qualified light bulbs will provide the same amount of light as your current incandescent light bulbs, consult the following chart:

INCANDESCENT LIGHT BULBS	MINIMUM LIGHT OUTPUT	COMMON ENERGY STAR QUALIFIED LIGHT BULBS
WATTS	LUMENS	WATTS
40	450	9-13
60	800	13-15
75	1,100	18-25
100	1,600	23-30
150	2,600	30-52

LEARN MORE AT energystar.gov

Current Home Condition

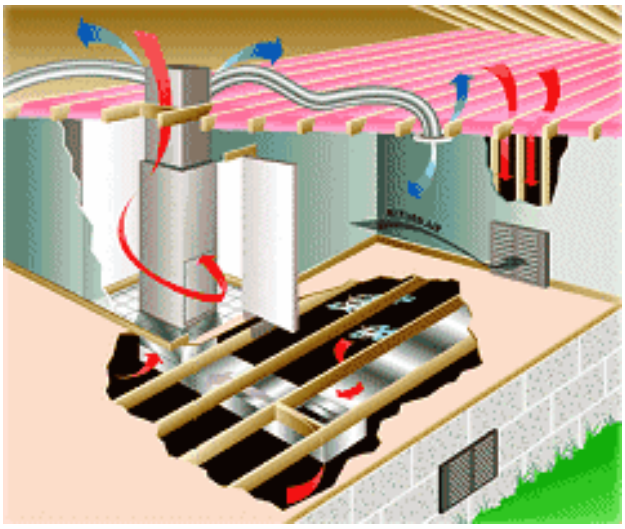
House has primarily all incandescent bulbs

Recommendation

Replace all incandescent bulbs with CFL or LED light bulbs throughout the home.

Duct Leakage

General Information



A duct system that is properly sealed and insulated can make your home more comfortable, energy efficient and safer. Sealed ducts represent one of the best improvements for better air flow and air contaminates infiltrations.

Improve Comfort
Sealing and insulating ducts can help common comfort problems, such as rooms that are too hot in the summer or uneven room temperatures throughout the house.

Enhanced Indoor Air Quality
Sealing ducts can help improve indoor air quality by reducing the risk of pollutants entering ducts and circulating through the home.

Energy Efficiency
Leaky ducts can reduce heating and cooling system efficiency by as much as 20 percent. Leaky ducts in attic space allow 140 – 150 degree attic air and blend the air with conditioned space air. The result is higher duct air temperature when the air reaches the coils. Attic air which is sucked into the duct system also coats coils and blower wheels with dust and debris further reducing the efficiency.

When testing an HVAC system for leakage a duct blaster tested is used. The test measures the pressure of the system in Pascal which will equate to an actual cubic feet per minute of actual leakage. Through this test we are able to accurately determine the percentage of air that is leaking out of the duct system.

Current Home Condition

The home has 1 HVAC system.

System is designed and built with flex duct. REEIS duct blaster test indicates that the ducts have above average leakage; 20%

Recommendation

REEIS recommends sealing all of the HVAC joints, collars, registers and plenum boxes. Following the system seal, a post static pressure test should be completed to insure the duct system is not adversely affecting the HVAC systems performance and air flow.

Make sure a licensed, bonded and insured HVAC contractor who understands and performs static pressure tests completes the improvements.

Additional Comments

- Seal HVAC systems from unit to registers/return
- Ideally replace all the ducts with new flex duct.

Building Envelope & House Sealing

General Information

Air infiltration (air entering and leaving the building envelope) can consume a substantial amount of energy used for heating and cooling. Drafty homes not only waste energy but make it almost impossible to maintain desired comfort levels.

Air leaks usually occur in the:

- Attic access
- Door sashes and frames
- Recessed lighting
- Electrical and plumbing penetrations
- Windows
- Chimney and fireplaces
- Drop ceilings

CFM 50 - Whole House Leakage

<1,000	1,000 - 1500	1,501 - 2,000	2,001 - 2,500	2,501 - 3,000	3,000 - 4,000	> 4,000
Tight - add ventilation	Tight - need ventilation	Relatively Tight	Moderate Leakage	Leaks	Extremely Leaky	Extremely Leaky

Based on a 2,500 square foot home with 3 occupants and 2 bathrooms.

Current Home Condition

Our blower door tests indicate a whole house CFM 50 number 2,300.

Below is a list of items which are impacting the home's air leakage and infiltration rate:

Condition	Location
Door Weatherization (single)	Laundry Room
Attic Penetration Sealing	Dining rooom Speakers
Attic Penetration Sealing	7 Recessed lights
Building Envelope Sealing	Foam seal all penetrations

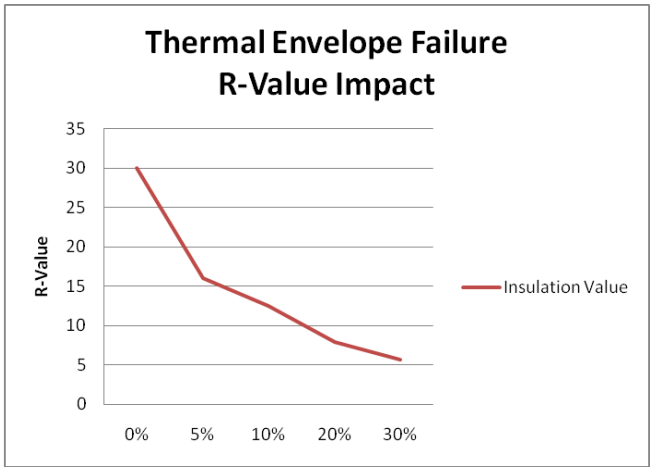
Recommendations

Seal all areas in attic access rooms as necessary. Insulate and seal attic entry.

Additional Comments

Insulation & Building Envelope

General Information

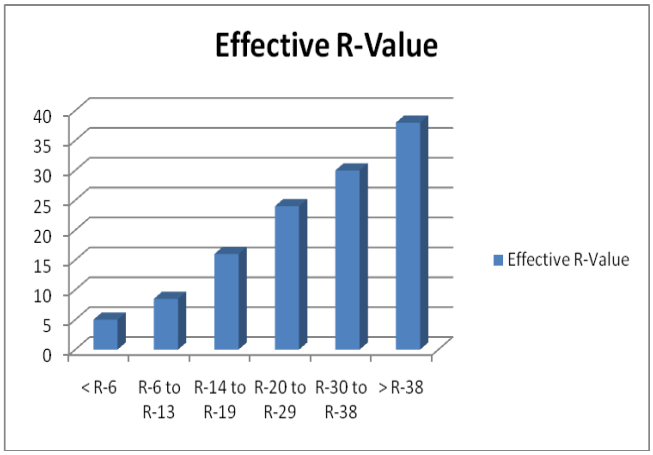


Insulation is a critical function in the prevention of heat transfer from conditioned and unconditioned space. Without proper heat transfer management, a home's performance will be dramatically impacted. Insulation works with other building components to maintain comfort while keeping the cost of heating and cooling down.

When analyzing insulation, a homeowner must understand that there are two critical components:

1) Failure rate of the insulation;
2) Amount of insulation

Insulation must be properly installed to obtain its rating performance. If a home has a failure caused from a compression, void or misalignment, the effective value can be dramatically reduced. ***A 5% failure rate in insulation will cut its effective value in half.***



In our climate, an attic should have a minimum of R-30 insulation but a performance home should aim for R-38. Installing insulation above an R-38 value is not cost effective as the benefits begin to out weight the cost.

Current Home Condition

The home has R-30 fiberglass batt insulation in the attic. However it is installed extremely poorly. When the failures are taken into considerations the installed amount of insulation is equal to R6 - R11. There are large voids and severe miss-alignments throughout the attic. There are no knee walls along any of the drops or soffits. Walls were determined to be adequately insulated by a thermal image scan.

REEIS estimates your home's effective insulation value based on the installed amount and estimated failures to be **R0 - R13 in the attic and R-11 in the walls**.

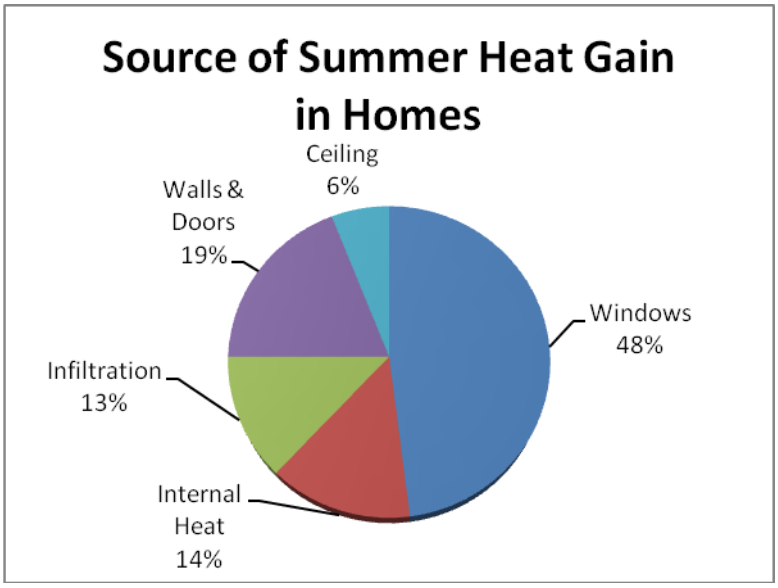
Insulation Recommendation

REEIS recommends repairing the building envelope insulation failures in order to improve the effective value to R-30, or preferably R-38.

Window Screens & Treatments

General Information

Windows on a typical home in the San Gabriel Valley can account for nearly 50% of the workload placed on an air conditioning system. According to local utility companies, untreated windows allow about 20 times more heat into your home than an equal amount of insulated wall space. By controlling the way the suns energy enters your home, you can save on summer energy bills. Properly installed sunscreens will also improve interior fabric fading and improve a home's comfort.



There are different options available to homeowners who have high solar heat gain common on east and west facing windows. The best option is the seasonal installation of 80% or 90% shading coefficient sun shades. Other options include 60% shading coefficient window coverings available from some suppliers.

Current Home Condition

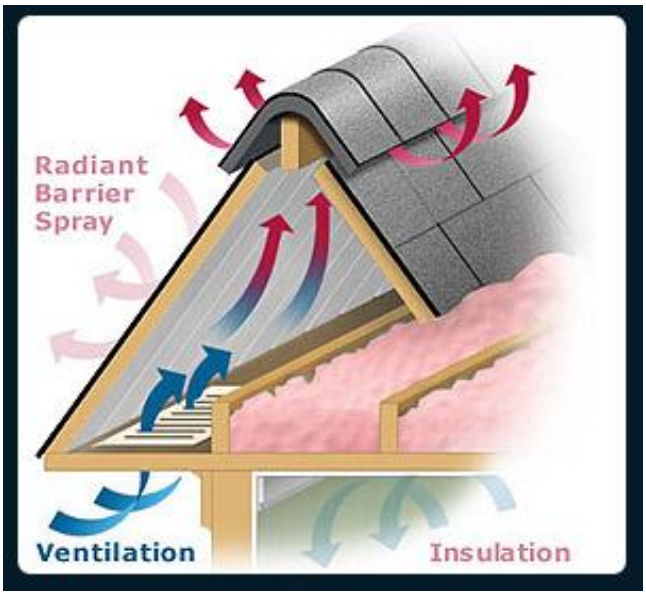
Windows are dual paned and in reasonable condition.

Recommendation

REEIS recommends sealing the sliding glass door to prevent air infiltration and either installing a sun screen, window film, or some sort of shading on all South and West facing windows.

Attic Ventilation

General Information



If your attic isn't properly vented, attic temperatures can reach 140 – 160 degrees in the summer months. Attic ventilation helps cool your home and reduce the air conditioning costs. It is important to seal your attic space from the conditioned environment before adding additional attic ventilation in order to prevent a positive attic air pressure which can lead to attic air penetrating into the conditioned space.

Attic ventilation encourages whole roof ventilation and attic space air movement. Eave vents draw in air and cause a vacuum effect that forces air out through upper vents. The passive system encourages the many advantages of natural, ongoing airflow exchange.

Properly ventilated attics will maintain a lower attic temperature and decrease moisture.

Current Home Condition

Attic is properly ventilated.

Recommendation

None at this time.

HVAC System Performance & Air Flow

General Information

HVAC (Heating, Ventilation and Air Conditioning) systems are more than just a piece of equipment which heats or cool air. A proper function HVAC system requires a proper air flow on both the intake (return) side and the exhaust (supply) side. In California, a number of new homes and HVAC retrofits have been constructed with improperly installed duct systems.

Energy efficiency: Undersized or improperly designed duct systems will force HVAC equipment to operate below the manufactured Seasonal Energy Efficiency Rating (SEER) rating causing higher electricity bills.
Comfort: Properly designed duct system insures proper HVAC system air flow and home comfort
Air quality: Many people have heard that the best filter to install in a house is a basic, cheap air filter. The reason for this recommendation is that good quality air filters restrict air flow and most system returns are already undersized. Also, undersized return ducts will create high negative pressure which actual pulls pollutants through filter medias.
Equipment life: High static pressure caused by undersized returns or improperly designed duct systems will cause excessive back pressure on fans and motors of your HVAC equipment shortening the expected equipment life and in some cases seizing units.

Proper return sizing is listed on the chart below

			Grill Size**	
Tonnage	**CFM Rate**	**Duct Size**	**Bar- Faced***	**Stamp Faced***
2	800	16"	400	480
2.5	1,000	18"	500	600
3	1,200	18"	600	720
3.5	1,400	20"	700	840
4	1,600	20"	800	960
5	2,000	22"	1,000	1,200

* Based on the ACCA Standards and Filter Manufactures Standards

** Square inches of grill space

Current Home Condition

System 1

Tonnage	4.0
Return Grill Size	Return grill is adequately sized for proper air flow and filtration
Return Duct Size	Duct is adequately sized for proper air flow

Recommendation

The size of the ducts is correct the configuration drastically limits airflow to certain parts of the home. REEis strongly recommends a new flex duct system properly installed to achieve desired airflow.

Additional Health Warning Comments

HVAC System

General Information

Since heating and cooling our homes accounts for the largest single component of our energy costs (over 50%), installing a highly efficient heating and air conditioning system is a good improvement which will reduce utility expenses and annual maintenance expenses. Heating and cooling equipment are subject to efficiency ratings similar to mile per gallon comparisons in automobiles

A gas furnace has an "AFUE" (Annual Fuel Utilization Efficiency) rating which is a measure of the gas furnace's efficiency in converting fuel to energy – the higher the rating, the more efficient the unit.

Saving in Annual Cooling Cost for a 4-Ton HP/AC						
		New SEER Rating				
		13	14	15	16	17
Old SEER Rating	5	$800	$835	$867	$894	$918
	6	$582	$618	$650	$676	$700
	7	$427	$462	$494	$522	$546
	8	$312	$347	$379	$406	$430

A central air conditioning unit has a "SEER" (Seasonal Energy Efficiency Ratio) rating, which is a measure of cooling efficiency for air conditioners and heat pumps. The higher the SEER, the more efficient the unit performs. Older units typically have a SEER rating around 8 with newer units having a SEER rating as high as 21. A 16 SEER unit will use 50% less electricity than an 8 SEER unit.

Current Home Condition

System 1

Tonnage	4.0
Type of System	Split System
Heating/Cooling	AC/Furnace
Est. Manufacture SEER	8 SEER
Est. Functioning SEER	6 SEER_____

Recommendation

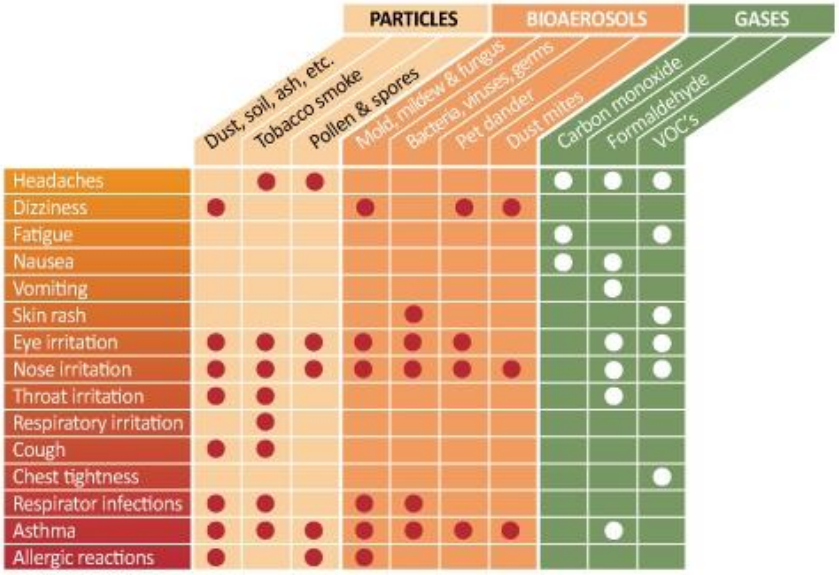
The home would benefit from higher SEER HVAC equipment but it is not critical at this time.

Additional Comments

Indoor Air Quality

General Information

Indoor air quality is a critical component of your family's health and reducing the pollutants and contaminants with filter and air purification options.



Indoor Air Quality Facts

- Indoor air contaminants cause 50% of all illnesses**
- The average house generates 40 pounds of dust with 40,000 dust mites per ounce*
- Indoor air is 4-5 times more polluted than outdoor air*
- Children inhale 50% more air per pound of body weight than adults
- 90% of our lives are spent indoors making indoor air quality critical to our health
- Newer constructed homes are more polluted than older homes
- Poor air quality causes inefficiency in the HVAC system and costs more to operate

Benefits of improved indoor air quality

- Reduce household sickness
- Better sleep & reduced snoring
- Reduced pet and household odors
- Reduced allergy, asthma and lung disease
- Reduced dust and improved household cleanliness

Current Home Condition

The home has no air purification equipment installed. There is evidence of water damage and mold. There is also a crimped vent in the attic that is of concern.

Recommendation

REEIS recommends removing the portion of damaged wall, identifying and treating source of water damage, patch and paint. REEIS also recommends repairing crimped vent.

Service & Maintenance

General Information

Home Performance is not just about making improvements to your home, proper home maintenance is just as critical. When systems and mechanical equipment are not serviced and cleaned regularly, the energy efficiency, equipment life proper function of your home's systems begin to deteriorate.

HVAC System
A precision tune up on your HVAC system should occur before every heating and cooling season to insure cleaner, more efficient operation and help ensure future problems are discovered before they occur. Routine annual maintenance is vital to efficient, worry-free heating and cooling. Common HVAC problems from lack of maintenance include dirty evaporator coils and clogged blower wheels.

Dryer vents
Dryer vents which are not properly maintained require dryers to use more electricity, exhaust pollutants into the air and cause over 15,000 fires each year. Dryer vents should be cleans every 1-2 years depending on use.

Calcium Build Up
Washers, dishwashers and water heaters require regular maintenance to remove calcium build up. Calcium and hard water are a leading cause of equipment failure and reduced manufacture efficiency

Refrigerators coils
A refrigerator functions just like an air conditioner and requires regular cleaning to maintain efficiency

Current Home Condition

Homeowner indicated they do not have a service and maintenance plan.

Recommendation

REEIS recommends an annual service and maintenance plan which should include: seasonal HVAC tune ups, dryer vent cleaning, refrigerator coil cleaning, dish washer and clothes washer cleaning.

Proposed Home Performance Scope of Work

Product Name	Total Price
Home Energy Evaluation test in & test out	$ 499.99
Demolition and removal of existing duct work	$ 499.99
New R-8 HVAC flex duct	$ 1,499.99
Flex duct system seal	$ 299.99
Batt removal	$ 299.99
Attic foam sealing	$ 499.99
Weatherization of 2 sliding glass French doors	$ 199.99
Weatherization of laundry room door	$ 49.99
Miscellaneous building envelope sealing	$ 199.99
Insulation -1700 Sq. Ft. Blown fiberglass R-0 to R-38	$ 2,108.00
Insulation - Knee Wall Insulation 300 Sq. Ft	$ 398.00
Recessed Light insulated box and Seal 7	$ 489.93
Attic vent repair	$ 24.99
Mold remediation	$ 399.99
Annual service and maintenance plan	$ 149.99
Subtotal	**$ 7,620.81**
Sales Tax	**$ 495.35**
Total Due	**$ 8,116.16**
Estimated Energy Upgrade Rebate	$ 2,000.00
LA County Bonus	$ н[л00.00
Total Net Investment	**$ п[м16.16**

Company Background

Founded in February 2009, REEIS (www.REEIShome.com) provides clients a turnkey Home Performance with Energy Star service called the REEIS Integrated Solution. REEIS is the "Whole House" home performance and energy efficiency expert. Our service offering includes all of the critical elements of home transformation under one roof. We have been successful in evaluating and repairing homes throughout the valley and we continue to offer new and proprietary products.

Mission Statement:

The company's mission is to provide a turnkey retrofit Home Performance with Energy Star solution.

Home Performance with Energy Star Program Elements

- Diagnosing problem within the home
- Making the recommended improvements
- Retesting the home
- Facilitating the incentives

Entity Structure

- REEIS CA Inc. – An California Corporation

Offices Location:

- 7408 Morris Street, Riverside, CA 92503

REEIS memberships and accreditations

- Member of the Better Business Bureau
- Building Performance Institute accredited auditor
- Approved Energy Upgrade CA Contractor
- RESNET accredited auditor
- Home Performance with Energy Star certified auditor and contractor
- Member of the Efficiency First

Licensing
REEIS CA Inc is a licensed, bonded, and insured general and HVAC contractor: CSLB # 936445