



Building Performance Institute Accredited Contractors prove the highest level of competency for home energy



COMPREHENSIVE HOME ASSESSMENT

Prepared By: Conservation Services Group

Anaheim's Home Investment Package (HIP)

Anaheim residents enjoy the lowest energy costs in Orange County in one of the most moderate climates in the country; however your home still may not be performing to its full potential. Homes that are not properly insulated and sealed, heating/cooling systems that are not properly sized and balanced, poorly performing windows and ineffective controls of moist air can result in homes with higher energy bills, seasonal comfort issues and possible health and safety concerns.

Now there's something you can do about it! Anaheim's Home Investment Package (HIP) is Anaheim's version of the Home Performance with ENERGY STAR® initiative developed by the Department of Energy and the Environmental Protection Agency. HIP provides Anaheim residents with a pre-approved list of certified contractors to diagnose and correct the key performance issues in their homes. Anaheim's HIP contractors have received technical and field training in building science prior to being certified by the Building Performance Institute to become one of Anaheim's exclusive HIP contractors. In addition, Anaheim offers a whole menu of home improvement incentives and will even waive the fees for the permits required to install your qualified rebate measures!

Your Home's Assessment

Your comprehensive home assessment is personalized to identify the particular needs of your home. It provides a full whole house diagnosis to show you the overall performance of your home as a system, as well as the most cost effective improvements you can make to improve your homes' efficiency, comfort and safety, and increase the overall value of your home. Read on to see your results!



PREPARED FOR

John Doe
123 Oak Street
Anaheim, CA 92805

BUILDING INFORMATION

Conditioned area: 1606 sq.ft.
Heated floors above grade: 1
Building volume: 12848 cu.ft.

PREPARED BY

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YOUR ASSESSMENT

Blower Door Test and Air Leakage

California's energy efficiency building standards are continually increased to make our new homes as efficient as possible. The older your home is, however, the lower the efficiency standards were when it was built. But that isn't the whole story. Your comfort is dependent on more than insulation. Most Anaheim homes were built with sufficient insulation to keep your home warm in the winter and cool in the summer. But insulation can degrade or settle over time, or even be rendered ineffective if it is damaged by moisture or exposed to the elements.

The other crucial piece of the story is how the rest of the building envelope performs, particularly with respect to air leakage in and out of your home's living space. Typically, as much as 25% of your heating and cooling dollars escape through unseen cracks and gaps in your home, usually found in attics, air duct systems, and around floors, doors and windows. If you combine all the holes and gaps in a typical home, it can be the equivalent of leaving a window or door open year-round. Sealing these air leaks will reduce energy losses and prevent moisture from entering the attic and the walls, protecting your home from structural and insulation damage.

Building Envelope Air Leakage

There are two factors to consider in your home's air leakage. The Shell Leakage describes your home's overall air leakage in cubic feet per minute (cfm) when placed under a constant pressure of 50 Pascals. The Building Air Tightness Limit is the minimum rate of air exchange (in cfm) that your home should provide in order to maintain healthy indoor air quality. When air leakage significantly exceeds that limit, it is recommended you take action to seal the air leaks. If your home is tighter than the Building Air Tightness Limit either before or after sealing the leaks in your home, it is recommended that you install manual ventilation, a healthy alternative to provide sufficient air exchange while keeping a tight, energy efficient home.

Methods to Stop Air leaks

A variety of materials may be used to seal air leaks, depending on their size and location. A combination of sealant foams, rigid baffles, caulking, weatherstripping and rigid insulation may be utilized to effectively seal air leaks in your home. This procedure also helps prevent moisture problems, peeling paint and structural damage in walls and building cavities. Air sealing should accompany most attic insulation activity. Your air sealing recommendations are indicated at right.



Blower Door Test



Sealing Air Leaks around Plumbing Chases

AIR LEAKAGE RESULTS

Your building Shell Leakage was determined to be 3557 cfm50. Current industry standards indicate that your Building Air Tightness Limit is 1836 cfm50.

Shell Leakage indicates how much air is leaking into your home. If a Blower Door test was performed, the leakage was calculated from measurements taken during this test. If no test was performed, the leakage was estimated based on your building volume and the age and overall condition of your home.

The Building Air Tightness limit indicates how much air should be leaking so you have fresh air even when the windows and doors are closed.

Given that your leakage is 94% greater than the limit, it is recommended that airsealing be performed to improve the comfort of your home and reduce unnecessary leakage.

YOUR ASSESSMENT

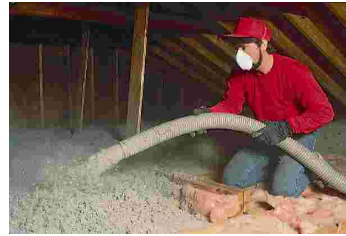
Insulating Your Home for Greater Performance

Attic Insulation

Attic Insulation is your first line of defense against heat loss in the winter and heat gain in the summer. When your home's existing attic insulation properties are below today's minimum industry standards you should upgrade your insulation. When adding insulation, you should also seal all sources of air leakage between the conditioned living space and the attic space. Your report indicates the current state of your attic insulation. You can see the insulation qualities and characteristics of various insulation products in the attached Insulation Products Table.

Attic Ventilation

Attic Ventilation is important in removing moisture from the attic, preventing damage to the insulation and roof structure. Ventilation also aids in removing excess heat buildup in the attic in hot summer months. A key component of attic ventilation, specifically as it pertains to the utilization of forced air fans, is to provide sufficient air sealing between the attic and the living space. **IMPORTANT NOTE:** Forced air ventilation in the summer months can actually create a pressure difference between the attic and the conditioned space, removing cooled air conditioned air from the living space if the attic is not properly sealed. Anaheim Public Utilities offers incentives for attic fan ventilation when it is performed in conjunction with building envelope sealing.



Cellulose Insulation



Cellulose Insulation *

ATTIC RESULTS

Existing

One of your attic flats with an area of 1600 sq.ft. has 2" of cellulose insulation. The effective R-Value for this surface is 10.6.

Proposal

By installing 8" of cellulose on top of the existing insulation, the resulting effective R-Value will be 39.

At least one attic area requires ventilation. Please see below for any recommended ventilation.

YOUR ASSESSMENT

Insulating Your Home for Greater Performance

Wall Insulation

Wall insulation also helps resist heat flow and help maintain the comfort level in your home. If your home does not have wall insulation, you should consider upgrading it to achieve a heat flow resistance value of R-13. Please contact the Gas Company at (888) 431-2226 to learn more about their incentives and program requirements.



*Foam Insulation **



Cellulose Insulation



Fiberglass Insulation

WALL AND FLOOR INSULATION RESULTS

FLOOR INSULATION

Existing

One of your crawlspace surfaces with an area of 1600 sq.ft. has no insulation. The effective R-Value for this surface is 4.5.

Proposal

By installing 6" fiberglass batting, the resulting effective R-Value will be 23.9.

WALL INSULATION

Existing

One of your exterior wall surfaces with an area of 1952 sq.ft. has no insulation. The effective R-Value for this surface is 5.

Proposal

By installing 4" of dense pack cellulose, the resulting effective R-Value will be 17.1.

* Photo ©2002 by John Curtis, reprinted with permission from Insulate and Weatherize by Bruce Harley, published by the Taunton Press.

YOUR ASSESSMENT

Windows and Doors

High Performance windows and doors are key components to your homes overall performance. Your windows provide a beautiful view to the outside world but have the lowest insulating quality of all of your building envelope materials. Replacing leaky single pane windows with ENERGY STAR qualified dual pane low-e windows can double or triple your windows' energy efficiency performance. ENERGY STAR qualified windows are also available in sliding glass doors and skylights. High quality, high performance windows also add value to your home and provide sound proofing benefits as well. Anaheim Public Utilities offers incentives to customers who install windows that have earned the ENERGY STAR.

In addition, the feeling of comfort high efficiency windows provide through reduced radiant heat loss in winter and heat gain in summer is significant. A one degree temperature difference in radiant temperature in surrounding surfaces to the human body is equal to a degree and a half change in air temperature. Have you noticed the "feeling" you get when sitting next to a cool window in the winter!!

Your doors are another direct link to the outside air. While there are numerous materials that are used to construct doors today, the crucial property is the insulating value or R-value, the resistance to heat flow. Your doors should have an R-value of 4.0 or higher to be an effective barrier to heat gain and loss.



*Low-E Windows help keep heat inside during winter, outside in the summer **

WINDOWS AND DOORS RESULTS

* Photo ©2002 by John Curtis, reprinted with permission from Insulate and Weatherize by Bruce Harley, published by the Taunton Press.

YOUR ASSESSMENT

Heating, Cooling and Ventilation Systems

The performance of your heating and cooling system is crucial to the comfort, safety and year-round utility bill costs for your home. Regular maintenance and system tune-ups can extend the life and dramatically increase the performance of your centrally cooled or heated home. In 2005 the California Title 24 energy efficiency standards for air conditioning were increased by 30%, from a 10.0 seasonal energy efficiency ratio (SEER) to 13.0 SEER. In April 2006, the Department of Energy and the Environmental Protection Agency established the ENERGY STAR efficiency standard for a new air conditioning unit of 14 SEER. Anaheim Public Utilities offers incentives to residential customers who install a new ENERGY STAR qualified A/C unit of \$100 per ton. Even if your system is less than 10 years old, it may be performing at a much lower efficiency if it is not properly tuned, having the correct balance of refrigerant charge and system air flow.

Although Anaheim Public Utilities does not provide gas service for your home, proper care and maintenance of your central gas furnace is critical to its performance as well. If your furnace is over 15 years old or performing at a lower efficiency, it may be time to consider replacing your inefficient unit with a high performance one. Please contact the Gas Company at (888) 431-2226 to learn more about their incentives and program requirements.



*Always look for the ENERGY STAR when buying heating/cooling equipment **



Computerized Air Flow Testing

HEATING AND COOLING SYSTEM RESULTS

Existing System Specifications:

- * Location: Closet
- * System: Electronic ignition
- * Fuel: Natural Gas
- * Manufactured: 1980
- * Distribution: Regular Velocity
- * Estimated AFUE: 74%
- * Overall Efficiency: 55%

It is recommended that you:

- * Remove this system.

Existing System Specifications:

- * Location: Exterior
- * System: Airsourced
- * Fuel: Electric
- * Manufactured: 1988
- * Distribution: Regular Velocity
- * Rated SEER: 8
- * Overall Cooling COP: 1.82

It is recommended that you:

- * Remove this system.

It is recommended that you:

- * Install a Heatpump - 8.5 HSPF with a Rated SEER of 16 and a Rated HSPF of 8.5
- * Reduce duct leakage and improve your air quality by having your ducts sealed.
- * Add duct insulation to ensure correct and comfortable air delivery temperature.

Based on these proposed recommendations, the overall system Cooling COP will be 3.18 after the work is performed.

YOUR ASSESSMENT

Forced Air Distribution Systems

Your air duct distribution system ensures that your high performance cooling and heating equipment deliver comfort to all areas of your home. Forced air supply and return ducts should be tightly sealed to deliver conditioned air to all rooms evenly. Leaks in supply ducts can lead to hot rooms in summer or cold rooms in winter and increased operation of your air conditioning system. Leaks in return ducts that are exposed to outside air (like attics, crawl spaces, wall cavities and garages) can bring a host of unhealthy particles into your home, including mold, dust and other air borne pollutants.

Many homes with newer air duct systems are not adequately sealed; in recent years California added “tight ducts” to its list of energy efficiency improvements that could be documented to meet Title 24 requirements. If your duct system has greater than 10% leakage of the furnace’s air flow, it should be sealed by a professional with appropriate sealing materials, such as mastic sealant (but never duct tape!). Anaheim Public Utilities offers an incentive to customers who repair or replace their air ducts to the “tight duct” standard. **Please Note: If your current duct system is wrapped with asbestos, you must contact a certified asbestos abatement company before proceeding with any duct sealing or system removal!**

In addition, your air ducts must be adequately insulated. All ducting that is in contact with outside air should be insulated to meet Title 24 efficiency standards. The insulation should also be secured with approved, mechanical fasteners to ensure that all seams are properly sealed and will be maintained for the life of the system. Needless to say, poorly sealed and insulated air ducts will lead to reduced comfort, increased operation of your heating and cooling system, and increased utility bills.



Contractors use a special mastic & fiberglass perma-sealant to guard against air leaks in the duct system.



A properly installed and tested duct system maximizes your heating/cooling system efficiency.



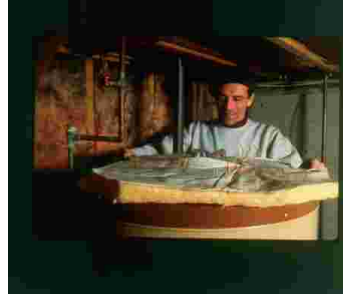
To reduce heat flow to unused rooms, valves on some hot-water radiators may be turned down. Valves on steam radiators should always be completely on or off.

YOUR ASSESSMENT

Water Heating

Water heating accounts for 15% of the average home's annual energy consumption. Regular maintenance, including draining the sediment from your water heater annually can improve performance and increase the life of your unit. If you are considering replacing your water heater with an electric model, choose an energy efficient model with an energy factor (EF) of .93 or higher.

If you are considering replacing your water heater with a gas model, please contact the Gas Company at (888) 431-2226 to learn more about their incentives and program requirements.



Water Heater Insulation

Combustion Appliance Testing and Performance

Combustion safety is an important component of all gas using appliances. All of your gas using appliances must operate within the prescribed safety ranges established by the Environmental Protection Agency. Incomplete combustion by these appliances can lead to increased carbon monoxide (CO) levels. In addition to testing the CO levels, the draft in the flues must be tested to make sure the heating/cooling system and other fans in the house cannot back draft the gas appliances, causing health issues for the occupants. All of your appliances were tested for their CO levels as well as the draft in the flues. The results of your appliances and their associated CO readings are included in the attached Combustion Safety Table.



Combustion Safety testing on a gas stove.

WATER HEATER RESULTS

Existing

Your natural gas tank - standard It is recommended that you water heater located in the utility room was manufactured in 1995.

Proposal

replace this unit with a natural gas tankless-instantaneous with a rated Energy Factor of 0.8.

COMBUSTION SAFETY RESULTS

Appliance	CO Readings (PPM)	CO Limit
Gas Oven		50 PPM
Range	22	
Oven	55	
Water Heater	14	100 PPM
Heating System	118	100 PPM

YOUR ASSESSMENT

Appliance Replacement

A large component of residential energy use comes from the many appliances in the home. Anaheim Public Utilities offers incentives for many ENERGY STAR qualified appliances, including refrigerators, dishwashers, room air conditioners and central air conditioners. You may also receive an incentive for clothes washers that meet minimum water factor (WF) criteria. In July 2008, Anaheim Public Utilities established a WF of 5.0 (or lower) for residential customers who installed a new high efficiency clothes washer.

Lighting Upgrades

Lighting can be a significant source of energy use in the home. Often times we aren't even aware of the quantity or the type of lights we have in our homes. Compact fluorescent lamps (CFLs) use about one fourth of the energy and have ten times the life of standard incandescent lamps. These are an excellent replacement strategy for both indoor and outdoor locations. The costs for these lights are extremely competitive and the energy savings alone will pay for any additional first time costs. Today, there are numerous CFL models, wattages and color rendition options available in the market that have earned the ENERGY STAR.

NOTES:



You'll find the ENERGY STAR on brand name appliances and lighting



ENERGY STAR qualified lighting uses 75% less energy and lasts 10 times longer than conventional incandescent lighting.



ENERGY STAR qualified compact fluorescent light bulbs provide the same quality color and light output as conventional bulbs.

APPLIANCE & LIGHTING RESULTS

REFRIGERATION

Existing Units

You have 1 Amana side by side refrigerator(s) in your Garage. Manufactured in 1989, this is a 24.8 cu.ft. automatic defrost unit(s), with annual usage estimated at 1339 kWh.

Proposal

It is recommended that you purchase 1 E-Star Side Freezer 25 ft3 - no ice to replace this unit.

LIGHTING UPGRADES

It is recommended that you install/purchase the following energy efficient lighting products:

22 Bulbs

Please see your contract for details on the specific recommended products for any of these measures.

Common House Problems That Cause High Energy Costs and Sacrifice Comfort

Many homes have these problems which may go undetected by the homeowner without proper diagnostic performance testing. The problems are color coded in the diagram below.

Problem: Inadequate Insulation Levels

- Effects:**
- Warm and cool air escapes, causing heating and cooling equipment to work harder than necessary
 - Ice damming may occur, leading to roof and ceiling leaks
 - Freezing pipes

Problem: Air Leakage

- Effects:**
- Drafts and cold spots
 - Overworking of heating and cooling equipment
 - Moisture problems leading to peeling, paint, mold, mildew or structural damage in walls and attic
 - Inadequate air exchange causing unhealthy air quality, high humidity or dryness

Problem: Inefficient Heating Systems

- Effects:**
- Uneven room temperatures due to low air flow
 - High energy costs due to equipment that's older than ten years with low efficiency ratings
 - Reduced system efficiency due to oversized and/or poorly maintained equipment.

Problem: Inefficient Central Air Conditioning Systems

- Effects:**
- Refrigerant undercharging or overcharging may lead to premature compressor failure
 - Low air flow may be caused by dirty inside coils, closed registers or inadequate duct sizing
 - Incorrectly wired thermostats and other controls can affect system performance
 - Oversized or improperly serviced equipment reduces efficiency

Problem: Duct Leakage

- Effects:**
- Uneven distribution of warm or cool air
 - Uncomfortable room temperatures
 - Poor heating and cooling equipment performance

Problem: Improperly Vented Appliances

- Effects:**
- Dangerous carbon monoxide fumes can enter the living space when gas or oil-fired appliances are not vented properly. This is known as backdrafting and often occurs with poorly vented heating systems, stoves, water heaters, and clothes dryers.

