

## **Building Performance Evaluation**

Green Residents  
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*YOUR HOME ENERGY AUDIT  
IDENTIFIES OPPORTUNITIES TO  
IMPROVE THE PERFORMANCE  
OF YOUR HOME BASED ON  
OUR ANALYSIS. THIS REPORT  
SUMMARIZES THE FINDINGS,  
PRIORITIZES RECOMMENDED  
IMPROVEMENTS, AND HELPS  
YOU DETERMINE  
THE BEST IMPROVEMENTS  
FOR YOUR HOME.*



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# INSPECTION RESULTS

## AIR LEAKAGE

Old homes, and some new homes are just plain not air tight. Variations in pressure between the indoor and outdoor allows air to pass in and out of the home, allowing your heated or cooled air to escape. Leaky homes are also uncomfortable due to drafts, and hot and cold points throughout a home. Reducing air leaks (or drafts) in your home is often the most cost-effective way to improve your home's energy efficiency and comfort. The biggest air leaks are usually hidden in the attic and the basement or crawlspace. Also, air leaks around pipes and wires, windows and doors, baseboards and outlets can all contribute to energy losses. Sealing these leaks with caulk, spray foam, or weather stripping will have a great impact on improving your comfort and reducing utility bills. Typically you want fresh air coming in from areas connected directly to the outdoors (windows and doors). Air shouldn't leak into your home from places like crawl spaces, garages or attics.



## BLOWER DOOR TEST REASONING:

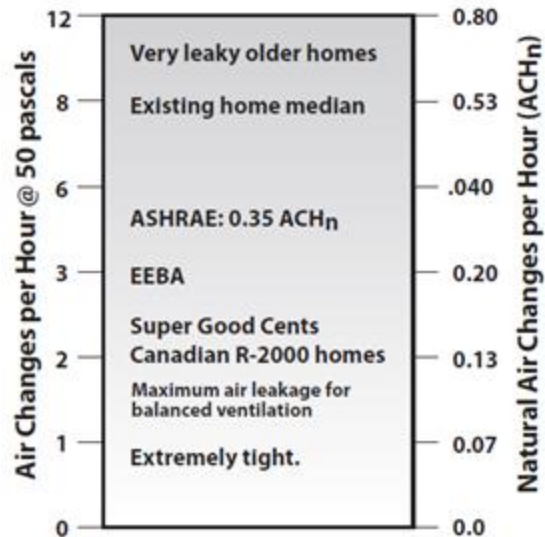
The national ventilation standard (ASHREA 62.2) requires a home to have at least .35 NACH air changes per hour for proper ventilation. All homes need a minimum amount of air changes, natural or mechanical to maintain safe and adequate indoor air quality.

## BLOWER DOOR TEST RESULTS:

**ACTUAL:** The blower door test results of your home indicates that you're Home has 23 natural air changes per day, with a NACH rate of .99 per hour and has a 7.5 square feet opening to the outside at all times. Calculation for the leakage follows (Specific leakage area (SLA) =  $CFM_{50} \times 3.812 /$  conditioned floor area) (your home  $5000 \times 3.812 / 2480$ )

**IDEALLY** your Home would have Mechanical Ventilation and would control the exchange of conditioned air (Heated air in your home in the winter, or Cooled air in your home in the summer). However without Mechanical ventilation your home should have a natural ventilation rate of NACH rate .35 to .40 and a SLA value between 2.5 to 3 square feet ( $1775 \times 3.812 / 2480$ ). The overall goal is to limit and control the movement of conditioned air to the outside and maintain adequate air quality.





## CURRENT CONDITIONS AND RECOMMENDATIONS:

- **The Flex Gas Line to the Range Leaks and needs to be replaced**
- The Home Attic needs to be Sealed from the Garage Attic
- The Fireplace chase needs to be sealed and insulated
- The Rim and Band Joist needs to be sealed and insulated
- The Fireplace doors need to be repaired or replaced
- The Plumbing, HVAC, Electrical and Cable penetrations need to be air sealed
- The Dryer Vent Needs to be Air Sealed
- All Recessed lighting fixtures need to be sealed to the ceiling from the attic
- The Wall penetrations around the Electrical breaker need to be sealed
- Entry Door to Garage Needs weather stripping
- Weather Stripping needs to be installed around sliding glass doors
- Attic Insulation needs to be upgraded to at least R-49 over whole house
- Kneewall above front porch and Attic needs Thermal and Vapor Barrier Installed

**Priority: High! CRITICAL ISSUES: Garage Wall Attic and Home Attic, No Thermal Envelope. Large Area of Movement of conditioned air to the outside**

### Create an Energy-Saving Thermal Envelope for your home

**Insulation** slows down the heat flow through a building's envelope. A home's building envelope contains the walls, attic, roof and basement—basically everything that surrounds the space you want to keep warm in the winter and cool in the summer. Insulation works all year long to make your home more comfortable and energy efficient. In the winter, it slows heat loss and helps prevent condensation buildup. During summer months, insulation reduces heat gain and helps keep your home cool.

### Current Condition and Recommendation

- Currently there is no Thermal or Vapor Barrier between Garage/Garage Attic and Home Attic
- Garage Attic Gable End – A Permanent Thermal and Vapor Barrier needs to be installed to separate the Garage Attic from the Homes Attic.



## **Priority: High! CRITICAL ISSUES: Inconsistent Levels and Inadequate Level of Attic Insulation.**

**Proper Attic or Ceiling Insulation levels help to slow Heat Transmission**

### **Current Condition and Recommendation**

- Currently there is compressed R3 Batt insulation and about 3 inches of blown fiberglass covering entire attic and blanket insulation covering about 35% of the attic. It would be inaccurate and only a guess to try and state what the R-Value of the attic insulation is at this time.
- Energy Star Standards recommend Attic or Ceiling insulation to have an effective R-49 value.
- It is recommended that the Attic insulation be upgraded at this time.

## **Priority: High! CRITICAL ISSUES: No Thermal Boundary between Home Attic and Front Porch Overhang.**

**Thermal Boundaries are created by using Insulation and Air Barriers. The Thermal Boundary is required to keep the conditioned areas of the home separate from the outdoors or unconditioned spaces.**

### **Current Condition and Recommendation**

- Currently there is no Thermal or Vapor Barrier between Front Porch Overhang and the Homes Attic
- This is another area where unconditioned Air and Moisture are entering into the homes conditioned areas
- A Permanent Thermal and Vapor Barrier needs to be installed to separate the Front Porch from the Homes Attic.

## **Priority: Medium! CRITICAL ISSUES: Fireplace Chimney and Chase Not Sealed or Insulated.**

**Fireplace Openings to unconditioned space should be fully sealed with solid blocking or flashing and any remaining gaps are sealed with caulk or foam (provide fire-rated collars and caulking where required)**

### **Current Condition and Recommendation**

- Currently the Fireplace is not sealed off from the outside. The Fireplace Chimney is allowing outside air to infiltrate the home at its base entering the conditioned space of the home from the basement and the family room.
- Recommend Sealing entire Fireplace Surround in Family Room
- Recommend Adjusting Fireplace doors so they close securely and seal
- Recommend Sealing Chimney Outdoors to stop the infiltration of air indoors
- Recommend Sealing and Insulating Fireplace Chase in the Attic to Stop exfiltration of conditioned air into the attic



## **Priority: Medium! CRITICAL ISSUES: The Rim and Band Joist needs to be Sealed and Insulated**

In cold weather climates it is recommended that Air Sealing be done from the inside, establishing an air barrier at the interior surfaces of exterior walls. Sealing and Insulating the Rim and Band Joists is a critical step in stopping air movement within a home. Since wood joists make imperfect joins, they are highly prone to air leaks. The area where the joists meet the rim will have literally thousands of gaps.

### **Current Condition and Recommendation**

- Currently there is no insulation above sill plate between floor joists
- Recommend Air Sealing sill plate, rim and band joists on all exterior foundation walls and Air Sealing foundation wall adjacent to garage
- Recommend Insulating above sill plate on all exterior foundation walls and wall adjacent to garage

## **Priority: Medium! CRITICAL ISSUES: The Plumbing & HVAC wall penetrations need to be sealed**

### **CURRENT CONDITIONS AND RECOMMENDATIONS**

- Multiple exterior wall penetrations have inadequate or deteriorating sealant
- Most noticeably is the Dryer vent exhaust
- Recommend Sealing and Stabilizing Dryer Vent Exhaust Termination.
- A couple of cans of spray foam can resolve many of the HVAC PVC wall penetrations, Savings of up to 10% on your heating and cooling bill can be achieved by reducing the air leaks in your home.

## **Priority: Medium! CRITICAL ISSUES: Recessed Lighting need to be sealed**

It is estimated that one conventional (IC or non-IC) fixture can be responsible for the loss of between \$5 and \$30 per year worth of energy and can dump about one-third of a gallon of water daily into a cold attic. Older recessed lights can be a big source of air leakage, but sealing them can be tough. Insulation must be kept at least 3" away from non-insulation contact rated lights because of the heat they give off. If loose fill insulation is installed, a metal cylinder with an open top can be used as an insulation dam to keep the insulation away from the light. Insulated Rated (IC) lights can be in contact with insulation, and more recent brands are air-tight. Many of the new recessed light fixtures that are sealed use CFL bulbs, a great energy-saving combination.

### **CURRENT CONDITIONS AND RECOMMENDATIONS**

- Current Recessed Lights are a source of heat loss to the attic
- Current Recessed Lights are non-insulation contact rated and should have insulation at least 3" away
- Recommend Installing Insulated Box/Can House over recessed light fixture in attic and sealing box to attic floor

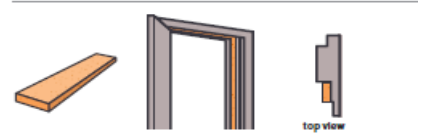


## Priority: Medium! CRITICAL ISSUES: Sliding Glass Doors to be tightened up and weather stripping needs to be installed

- Please review the suggested weather sealing techniques and apply one of the techniques in your home.

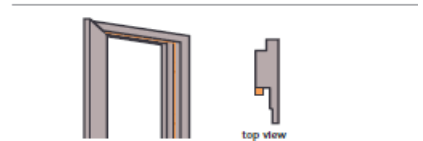
### Felt

<b>Description</b>	Plain or reinforced with a flexible metal strip; sold in rolls. Must be stapled, glued or tacked into place. Seals best if staples are parallel to the length of the strip.
<b>Uses</b>	Around a door or window, fitted into a door jamb so door presses against it
<b>Cost</b>	Low
<b>Advantages</b>	Easy to install. Inexpensive.
<b>Disadvantages</b>	Low durability. Least effective at preventing airflow. Do not use where exposed to moisture or where there is friction or abrasion. All-wool felt more expensive, but more durable. Very visible.



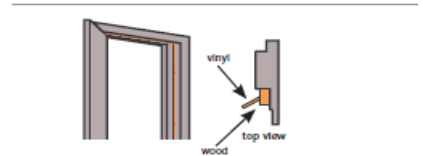
### Foam tape

<b>Description</b>	Nonporous, closed-cell foam, open-cell foam or EPDM (Ethylene Propylene Diene Monomer) rubber
<b>Uses</b>	Top and bottom of window sash, door frames, attic hatches and non-operable windows. Good for blocking corners and irregular cracks.
<b>Cost</b>	Low
<b>Advantages</b>	Extremely easy to install. Works well when compressed. Inexpensive. Self-adhesive may not adhere well in cold weather. Can be reinforced with staples.
<b>Disadvantages</b>	Durability varies with material used, but not especially high for most types. Use where little wear is expected. Visible.



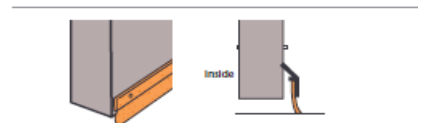
### Reinforced vinyl

<b>Description</b>	Pliable or rigid strip gasket attached to wood, plastic or metal strips
<b>Uses</b>	Door or window stops, top or bottom of window sash
<b>Cost</b>	Low to moderate
<b>Advantages</b>	Easy installation. Low to moderate cost. Some types of rigid strip gaskets provide slot holes to adjust height, increasing durability.
<b>Disadvantages</b>	Visible. Self-adhesive on pliable vinyl may not adhere well to metal or during cold weather.



### Door sweep

<b>Description</b>	Aluminum or stainless steel with a brush of plastic, vinyl, sponge or felt
<b>Uses</b>	Bottom of interior side of in-swinging door, bottom of exterior side of out-swinging door
<b>Cost</b>	Moderate to high
<b>Advantages</b>	Relatively easy to install. Many types adjustable for uneven threshold. Automatically retracting sweeps also available to reduce drag on carpet and increase durability.
<b>Disadvantages</b>	Visible. Can drag on carpet. Automatic sweeps are more expensive and may require a small pause before retracting, once door is unlatched.



## HEALTH & SAFETY

### Indoor Air Quality

Green Energy Management Solutions believes the most important aspect of a home's performance is its Indoor Air Quality. We are vigilant to check Carbon Monoxide levels, Natural Gas Levels and Leakage. We also perform Appliance Combustion Spillage Test and Combustion Appliance Zone (CAZ) Depressurization Test under worst case conditions. All of these tests are done to insure the home is operating safely and the Indoor Air Quality of the home is maintained.

#### CURRENT CONDITIONS AND RECOMMENDATIONS:

- Natural Gas Leak was detected at flex gas line coupler going to range
- Recommend replacing flex line and running hard pipe to within 6' of range and then using 1 flex line
- CO levels in all areas of the home were found to be below the safety test levels of 25ppm.
- Combustion Spillage Test under Worst Case Depressurization revealed no combustion gas spillage into Appliance Zone
- All Combustion Appliances appear to be operating and venting properly at this time
- Blower door test revealed a NACH of .99 at this time the home maintains adequate indoor air quality

**Priority HIGH! CRITICAL ISSUES: Natural Gas Leak has to be Repaired!**



## WATER USAGE

### Low Flow Showers and Faucets

Installing Low-Flow shower heads and faucet aerators is the single most effective water conservation savings you can do. Inexpensive and simple to install, low-flow shower heads and faucet aerators can reduce your water consumption as much as 30%, and reduce your energy cost of heating the water also by as much as 30%. This conservation of water and energy is not only good for the environment, but the savings in utility bills will pay for the cost of the aerators within a few months. Daily indoor per capita water use in the typical single-family home with no water-conserving fixtures is 74 gallons. Here is how it breaks down:

USE	Gallons per capita	Percentage of Total daily Use
Showers	12.6	17.3%
Clothes Washers	15.1	20.9%
Dishwashers	1	1.3%
Toilets	20.1	27.7%
Baths	1.2	2.1%
Leaks	10	13.8%
Faucets	11.1	15.3%
Other Domestic uses	1.5	2.1%

By installing more efficient water fixtures and regularly checking for leaks, your household could reduce daily per capita water use by about 30 percent to about 51.9 gallons per day. Here's how it breaks down for households using conservation measures:

USE	Gallons per capita	Percentage of Total daily Use
Showers	10	20.1%
Clothes Washers	10.6	21.4%
Dishwashers	1	2.0%
Toilets	9.6	19.3%
Baths	1.2	2.4%
Leaks	5	10.1%
Faucets	10.8	21.9%
Other Domestic uses	1.5	3.1%



## GREENING YOUR HOME

Green Energy Management Solutions Corp. can recommend a number of energy saving solutions which can be utilized in a home. This includes things as simple as replacing incandescent light bulbs with more efficient CFL's or more advanced techniques such as implementing the use of solar thermal area heating, solar thermal water heating. Green Energy Management Solutions also can install Electrical Automation Technology in a home. Electrical Automation is the turning on and off of electrical components in a home, such as turning lights off in a room when no one is present or turning off the power to the Television after everyone has gone to bed. Green Energy Management Solutions can also assist homeowners in taking advantage of the financial incentives offered by the federal government and local utilities for the installing and use of energy saving equipment.

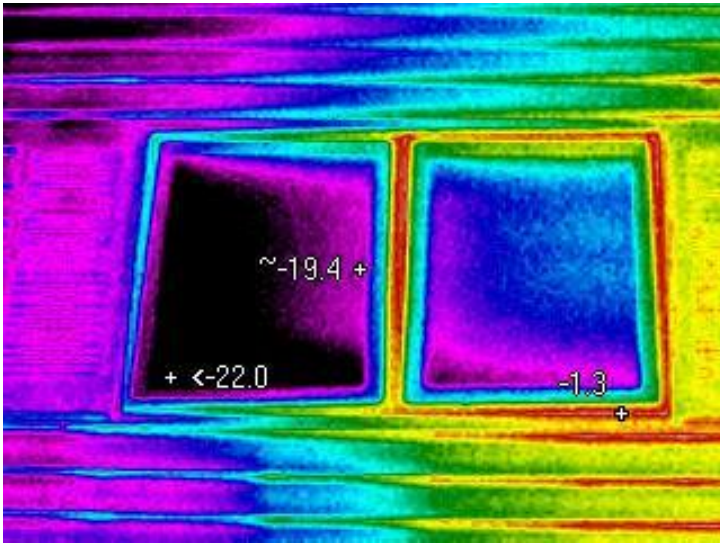
### CURRENT CONDITIONS AND RECOMMENDATIONS:

- Additional CFL lights can be utilized in your home to increase energy savings.
- No alternative energy sources are used in the home.
- No electrical energy management system is used in the home.

**Priority: HIGH!** CRITICAL ISSUES: Need to initiate Energy Efficient recommendations made in this report

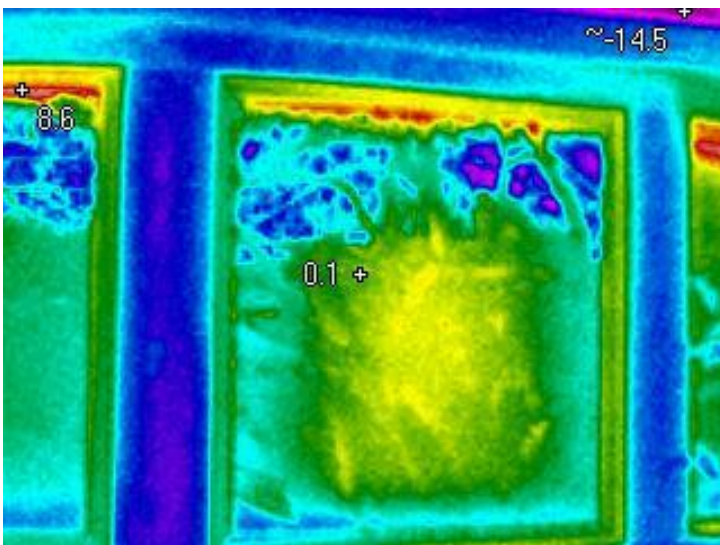


## Thermal Images



Thermal Image of Upstairs Window, notice yellow to red areas of the image is the Warmer areas of the image and the blue to purple-black the colder areas in the image. The images will always have the hottest and coldest areas marked.

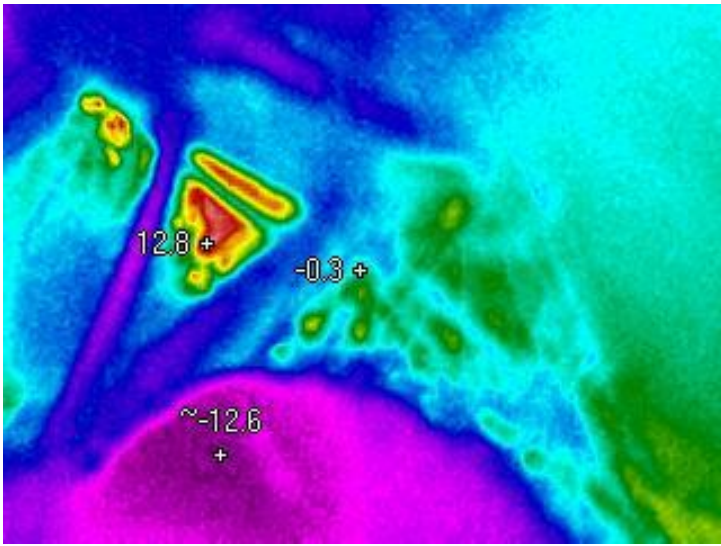
Visible Image Upstairs window. Depending on the perspective of the picture taken warm spots are naturally a problem when viewing from the outside of the home and cold spots are a problem when viewing from the inside of the home.



Thermal Image of bay window, notice some leakage at top of window.

Visible Image of bay window.

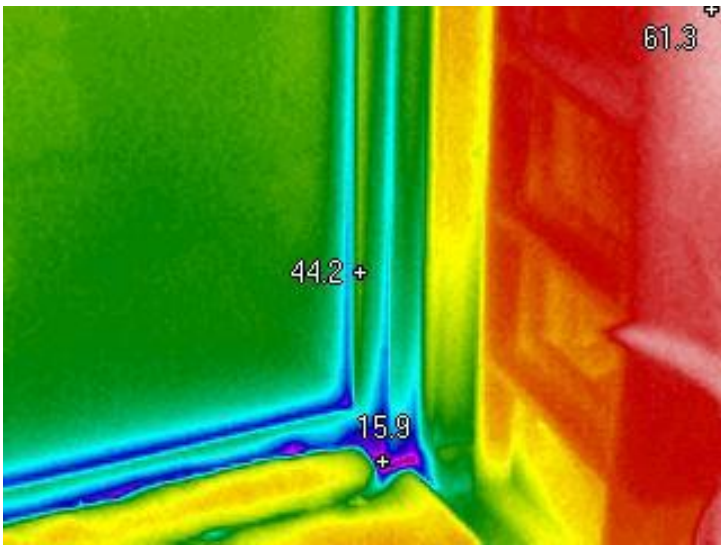




Thermal Image of Electrical wall penetrations need to be sealed properly.



Visible Image of Electrical wall penetrations.

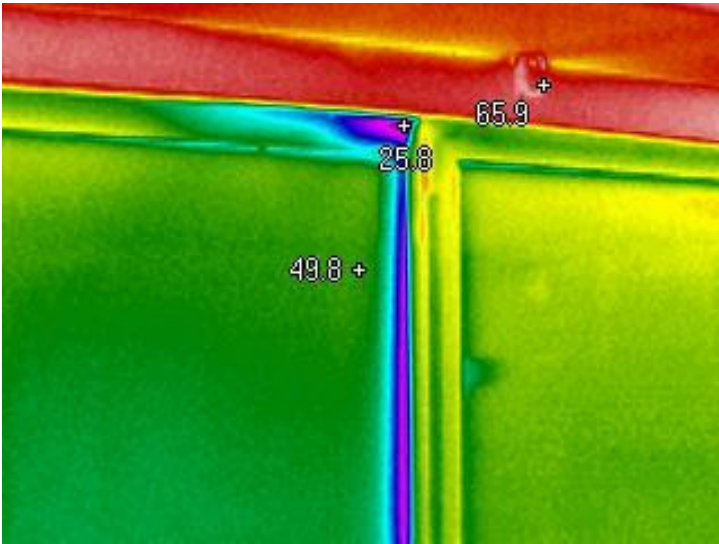


Thermal Image of sliding glass door needs to be sealed properly with added weather stripping.



Visible Image of sliding glass door.

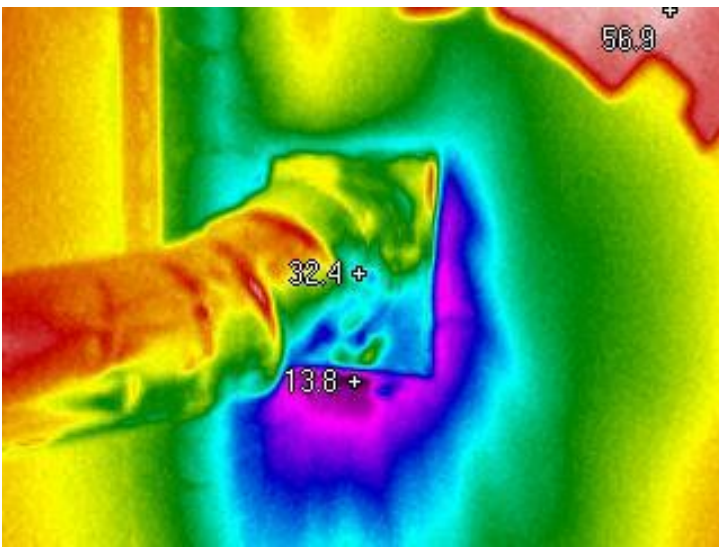




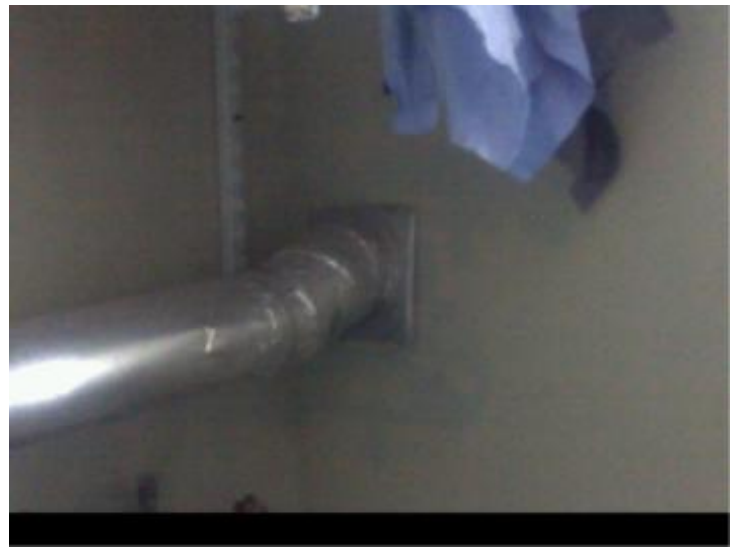
Thermal Image of sliding glass door needs to be sealed properly with added weather stripping.



Visible Image of sliding glass door.

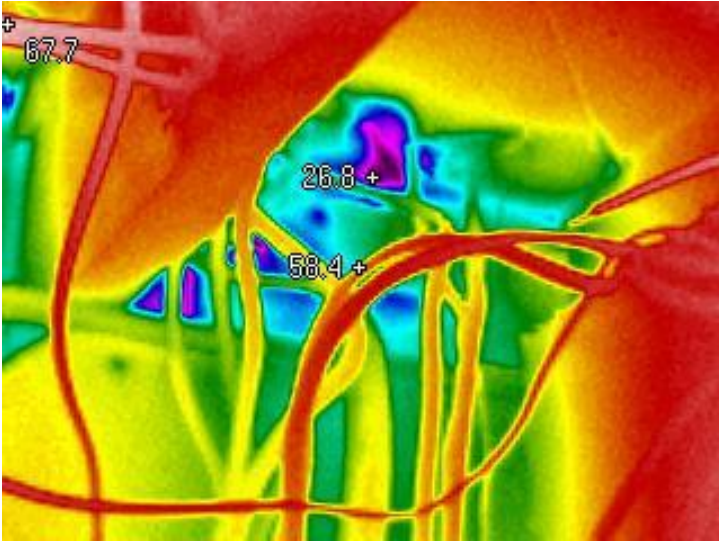


Thermal Image of dryer vent needs to be secured properly to wall plus add gasket, proper sealing.

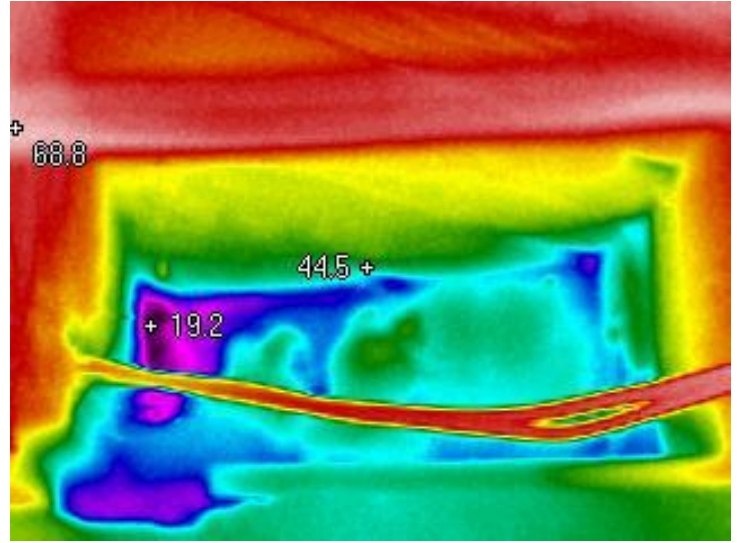


Visible image of dryer vent.

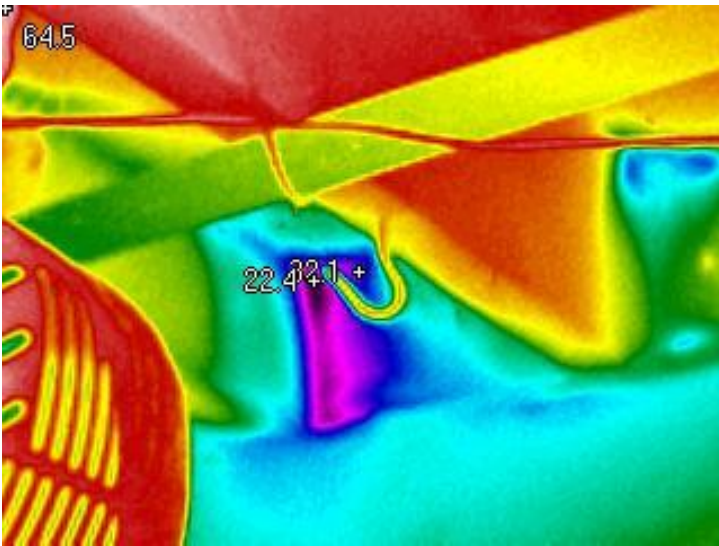




Thermal Image of above the electrical breaker pane, needs to be sealed, allowing outside air infiltration into home.



Visible Image of wall penetration in basement.

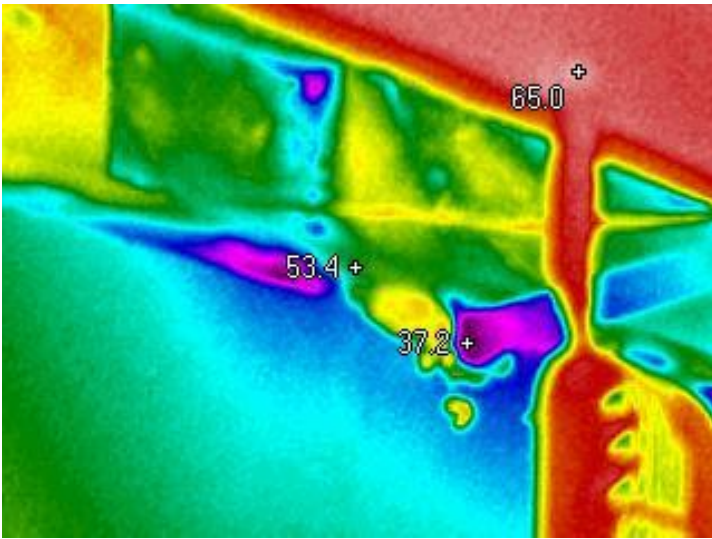


Thermal Image of basement wall penetration.



Visible image basement wall penetration.

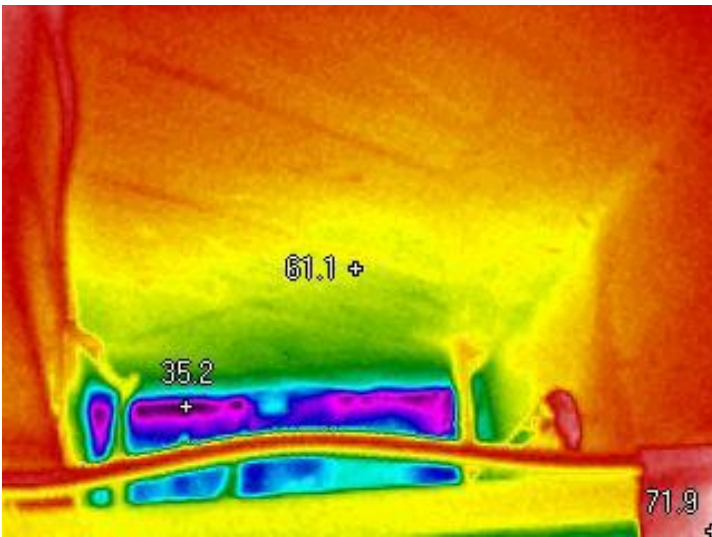




Thermal Image of plumbing penetration in basement wall and poorly sealed rim above foundation wall.



Visible Image of plumbing wall penetration.

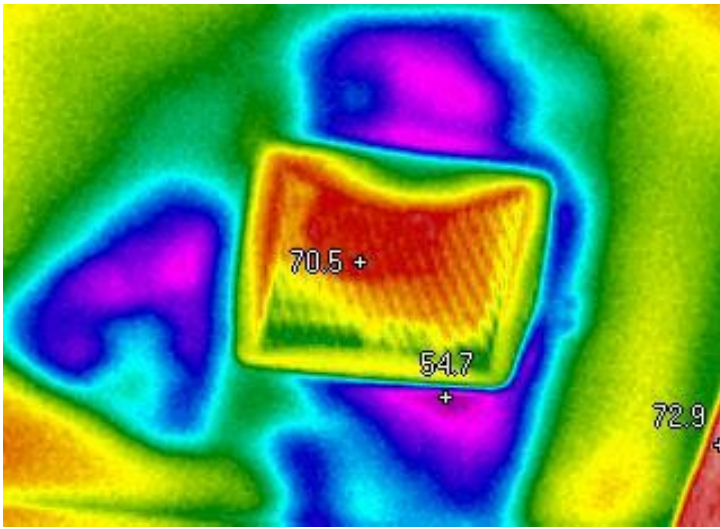


Thermal Image of rim and band joist, needs to be sealed and insulated.



Visible Image of rim and band joist.

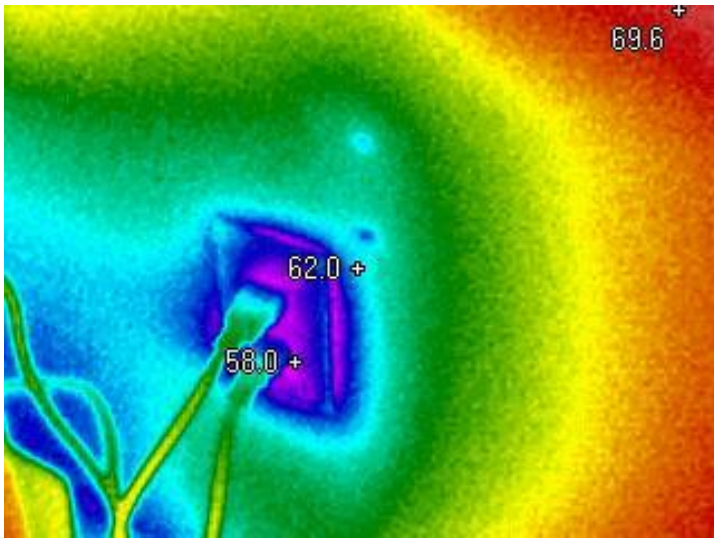




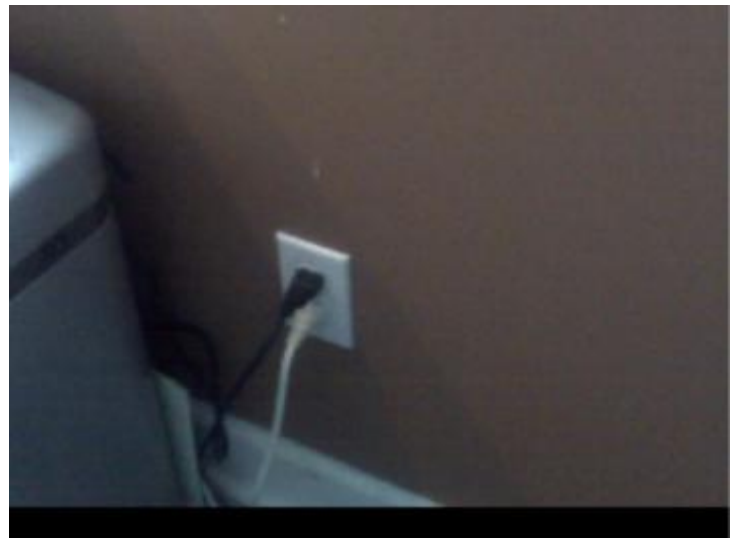
Thermal Image of ceiling vent, needs to be sealed properly.



Visible image of ceiling vent.

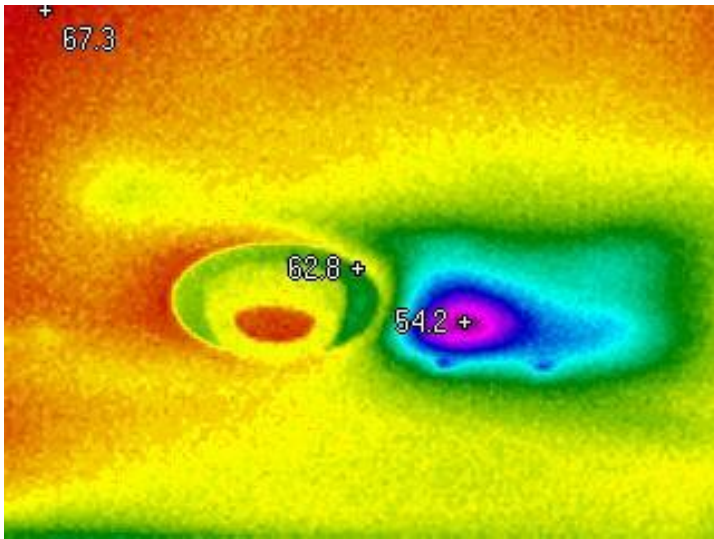


Thermal Image of Electrical outlet, needs to have a gasket or a good indication of poor insulation in wall.



Visible Image of Electrical outlet

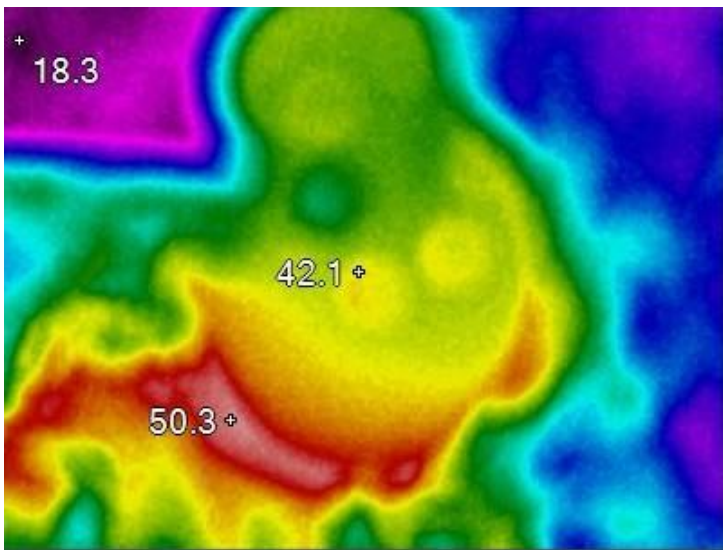




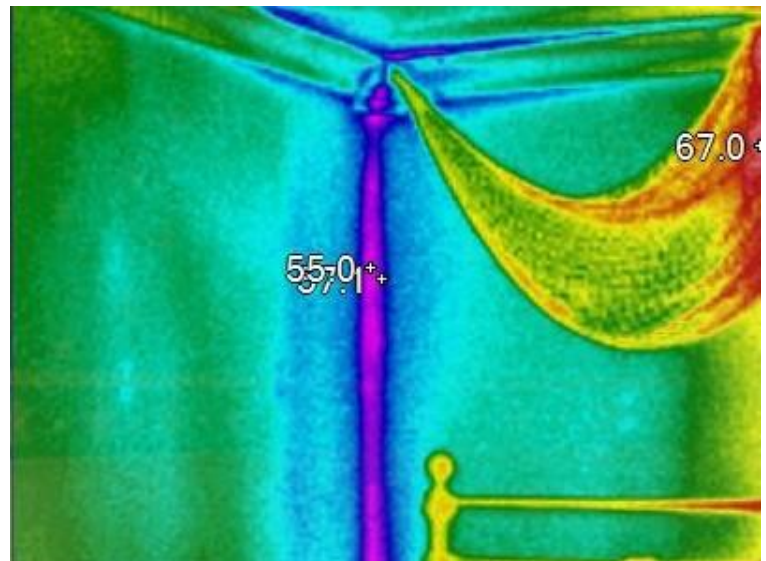
Thermal image of ceiling can light. Needs to be sealed and insulated from attic.



Visible image of ceiling can light.

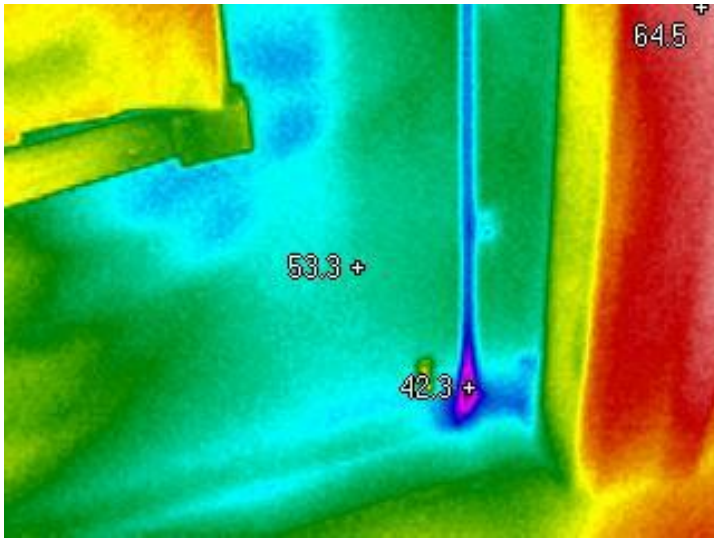


Thermal image from attic of Can light, showing conditioned air leakage to the outside

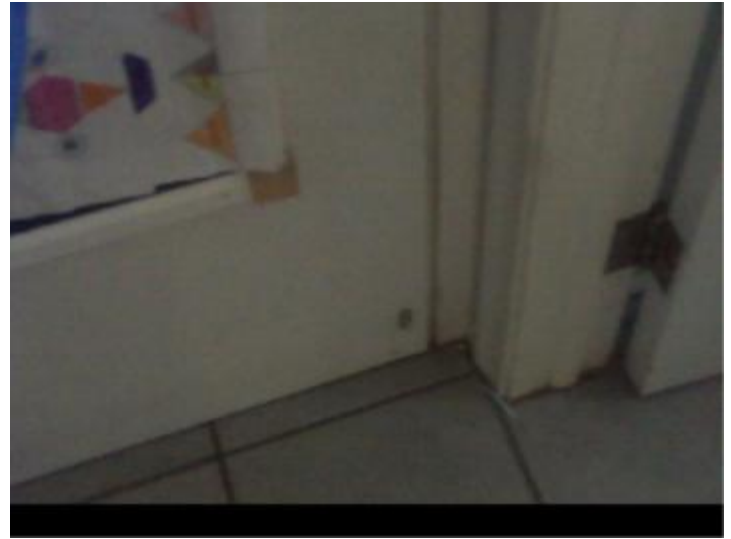


Thermal image of bedroom exterior wall showing adequate insulation in walls.

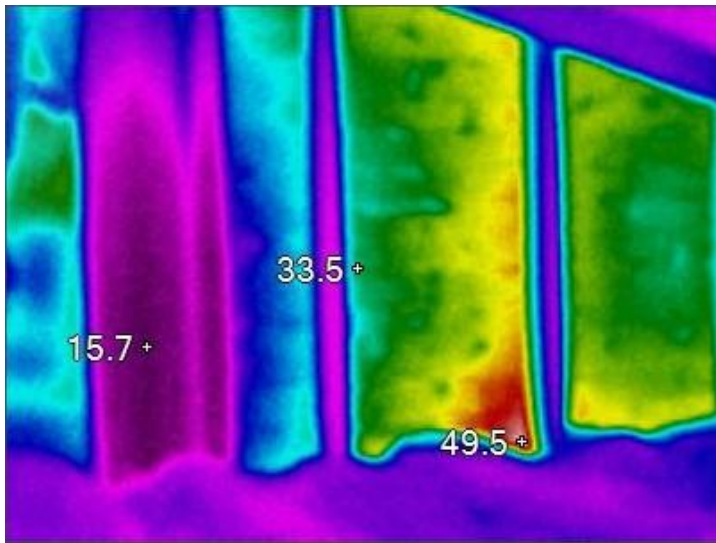




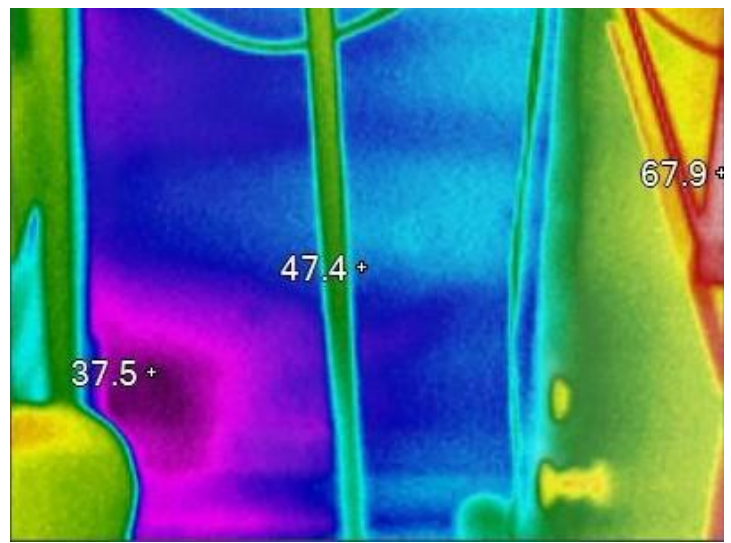
Thermal image of garage door needs to have additional weather stripping.



Visible image of garage door.



Thermal image attic fireplace chase from attic.



Thermal image of cold wall



## **Please review the following Utility charts:**

### **1. Monthly Weather Chart**

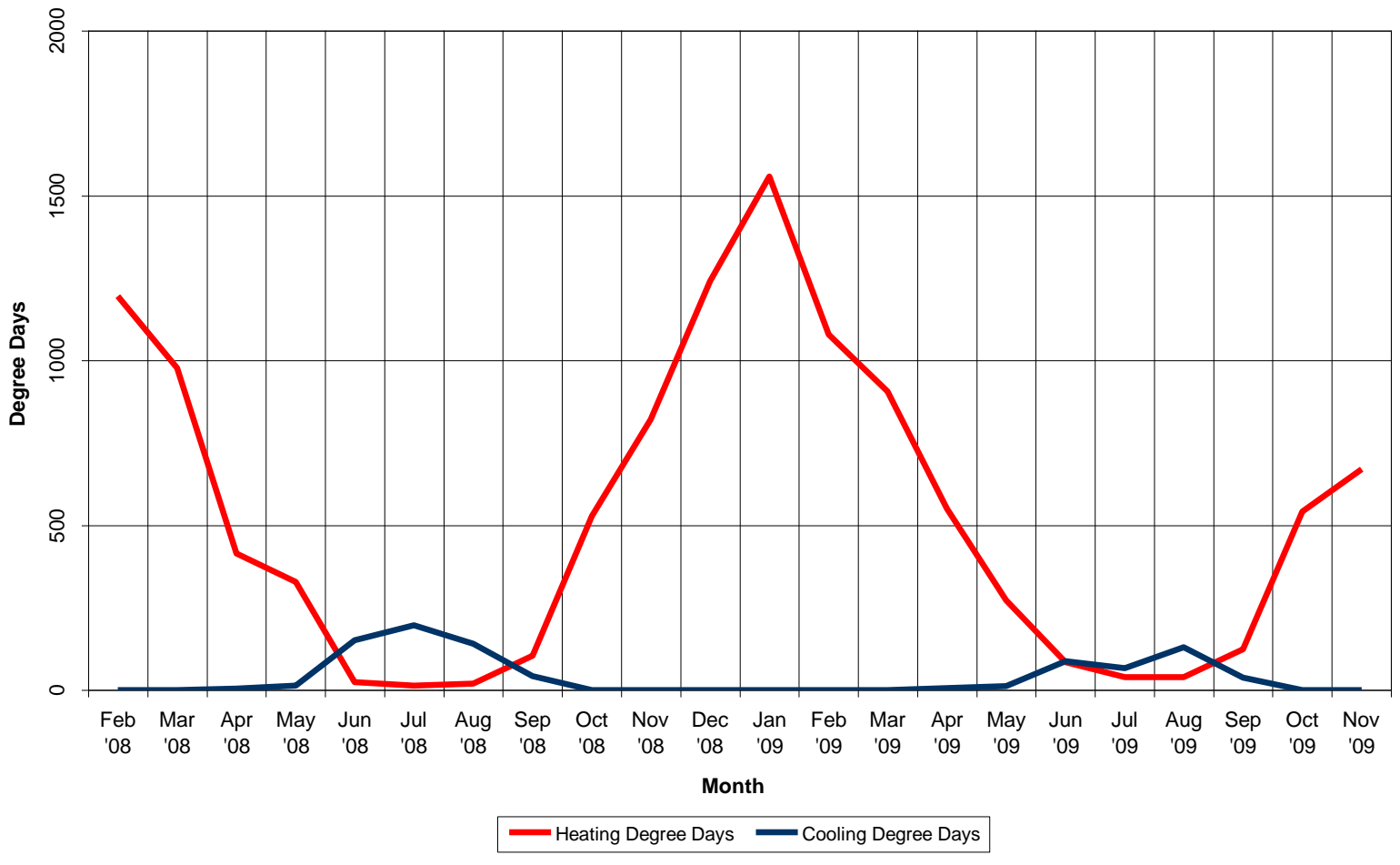
- Weather for the month of the given utility bill. Please reference the Weather history for each month and follow the pattern of increased amounts of energy usage for the Heating and Cooling.
- Please note that there is an increase of amount of Electricity used in the warmer months for the extra cooling needed.

### **2. Monthly Utility Bill**

### **3. Monthly Kwh Usage**



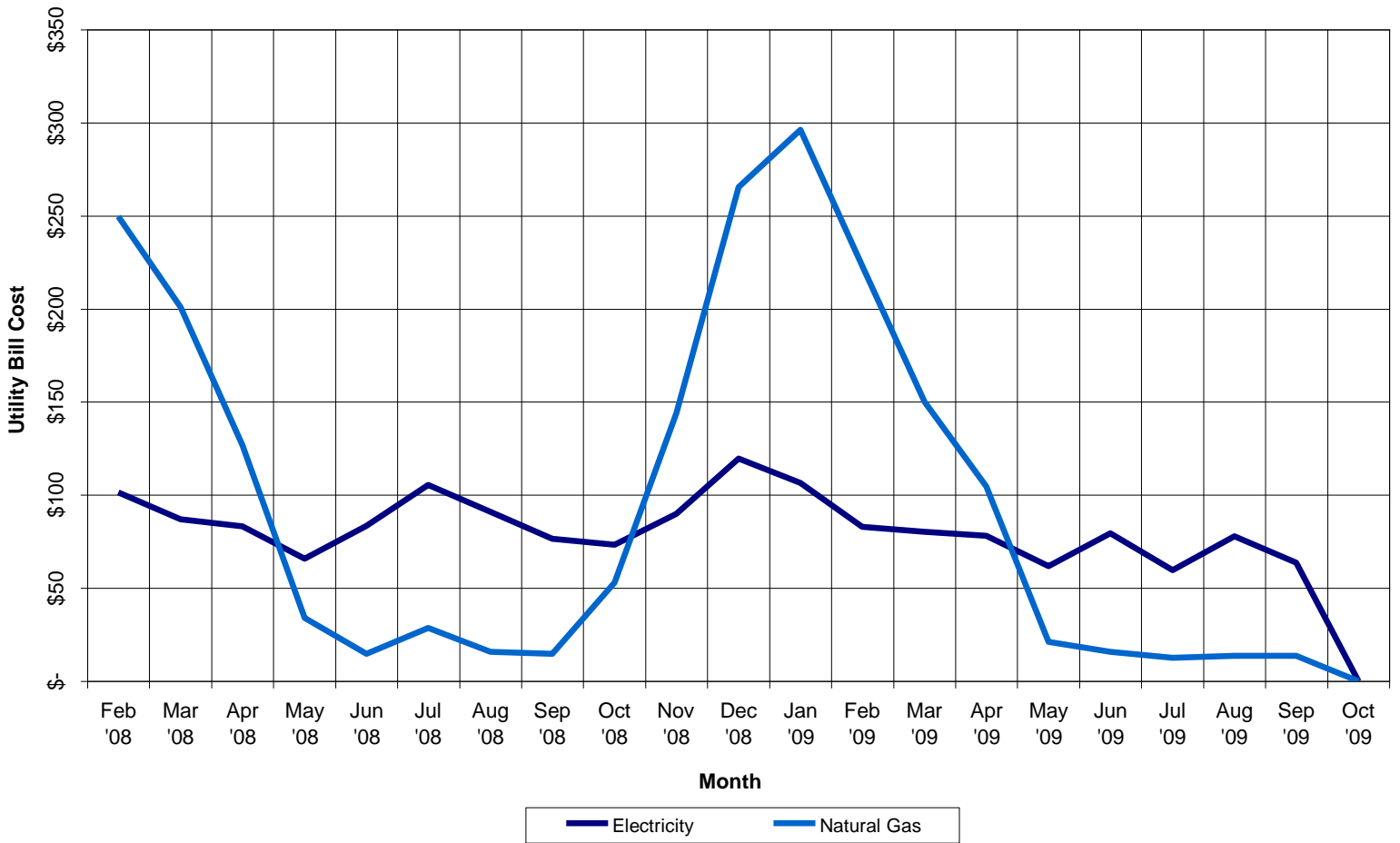
Monthly Weather Chart



Degree-day, (HDD or CDD) is a unit of measure used to estimate the fuel and power requirements in heating and cooling a building; it is equal to a difference of 1 degree between the outdoor daily average temperature (the mean of the maximum and minimum daily dry-bulb temperatures) and a reference temperature. Degree-days are an indicator of how far the average temperature departs from a human comfort level called the base. In the United States the base is generally 65°F. For example to calculate the CDD, take the average of a day's high and low and subtract 65. For example, if the day's average temperature is 80F, its CDD is 15. If every day in a 30-day month had an average temperature of 80F, the month's CDD value would be 450 (15 x 30).



### Monthly Utility Bills



Monthly KWh Usage

