Senty Construction LLC - Inspection

Your Energy Audit

Home

Local Resident
5555 5th Avenue West
Grand Marais, MN 55604
555-555-5555
sample@local.com

Audit Date

Oct 1, 2023
09:00 AM

Audited By

Mike Senty
BPI 5056017
Building Analyst Technician
mail@senty.com

Senty Construction LLC - Inspection Services
EIN: 21-2014037
PO Box 969
Grand Marais, MN 55604
Office 218-387-2644

Thank you for inviting me to your home to perform your energy audit. I've identified some useful upgrades that should go a long way to address your concerns in your home. As always, if you have any questions, call me at 218-387-2644.

Inside Your Report

We listened to you!

As our client, we want to make sure we are addressing all of your concerns for your home. If we have missed any concerns in this report, please let us know right away.

Concerns

Cold feet in the kitchen

Even though the kitchen overheats when it's being used heavily, the floor still seems to always be cold in the winter and on cool summer mornings. The kitchen floor is ceramic tile that accentuates the effect of the uninsulated crawlspace below.

House feels drafty

Home feels drafty in the living room and the bedrooms. Homeowner believes the cause is the windows. After further inspection, there is no insulation in the walls and that is a bigger problem than the windows.

Street is noisy

Homeowner can clearly hear the traffic noise from the busy highway outside. Some of the occupants use earplugs to sleep at night. Again, wall insulation will go a long way to alleviating this problem.

Carbon monoxide poisoning

Homeowner heard about the dangers of carbon monoxide poisoning and bought a CO monitor. The alarm has gone off a few times in the past and is concerned that it's an ongoing issue. CAZ test was performed and leakage was detected. See Health and Safety page for more information.

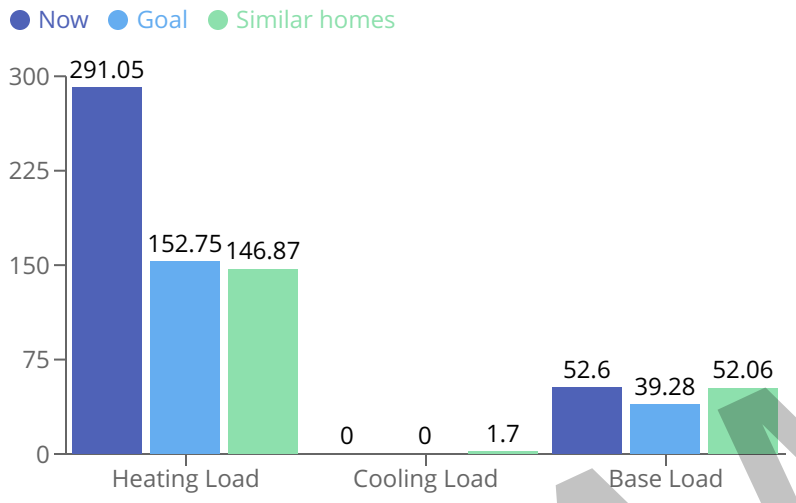
Gas bills too high

Homeowner feels that gas bills are much higher than their previous home and is concerned that they're much higher than they should be.

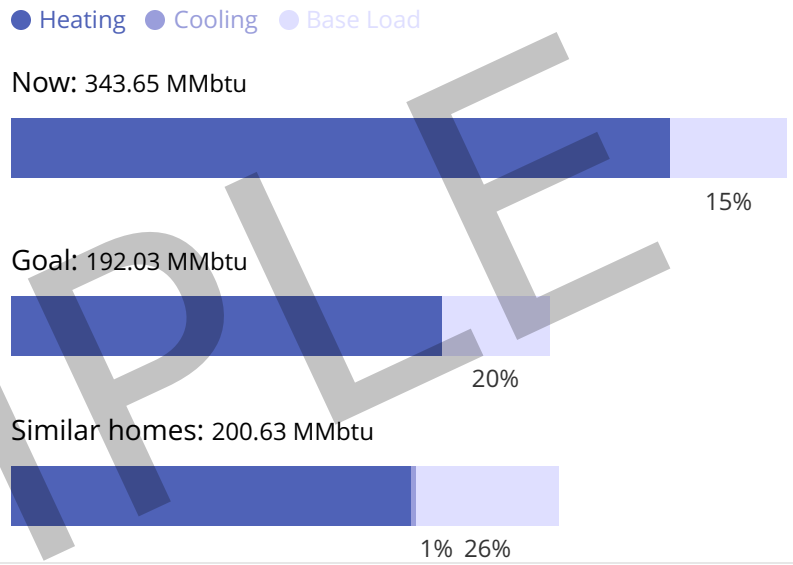
Senty Construction LLC - Inspection

Your Energy Use

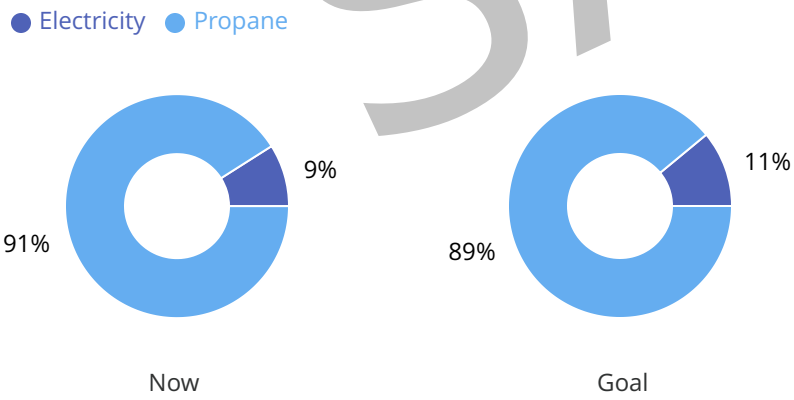
Yearly Energy Consumption (MMBtu)



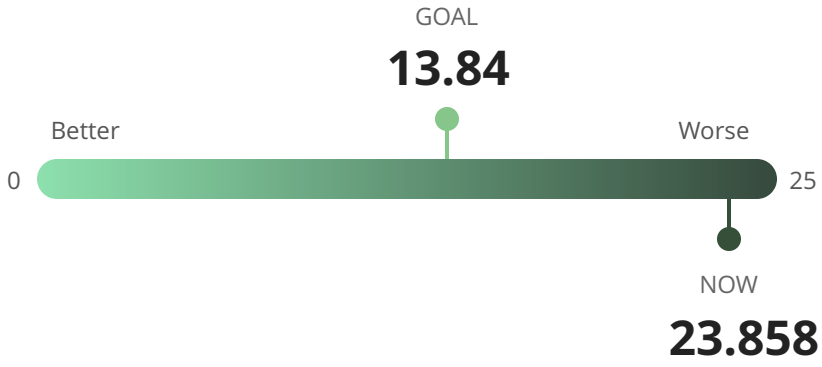
Load Profile (MMBtu)



Energy Mix by Fuel Type



CO2 Footprint (tons)



Totals

Approximate Cost

$ 32,300

This is a ballpark guess. Ask your contractor for a detailed bid.

Estimated Savings

$3,599 per year

This is an estimate of how much you could save starting in Year 1. Savings will only increase as energy prices rise over the years.

Savings to Investment Ratio*

For Package: 1.9

Impact of upgrades

Energy Reduction	44%
Carbon (CO2) Savings	10 tons
Equivalent cars removed from the road	2.1/yr

Solutions for Your Home

Call me at 218-387-2644 to ask a question or discuss the next step.

DETAILS	APPROXIMATE INSTALLED COST	APPROXIMATE ANNUAL SAVINGS	SIR *
Seal Air Leaks	$ 1,100	$ 433	6.1
Insulate Attic	$ 1,000	$ 28	0.6
Upgrade Water Heater	$ 1,100	$ 110	1.4
Replace Freezer	$ 500	$ 12	0.4
Upgrade Heating System	$ 6,200	$ 1,081	2.6
Upgrade Lighting	$ 100	$ 47	5.5
Refrigerator	$ 3,700	$ 110	0.5
Thermostat Set Points	$ 0	$ 473	100
Insulate Walls	$ 5,400	$ 736	2.8
Upgrade Windows	$ 12,700	$ 534	0.8
Insulate Vault	$ 500	$ 36	1.6

* SIR is the Savings to Investment Ratio. Simply put, if the SIR is 1 or greater, then the energy savings from the item will pay for itself before it needs to be replaced again. This metric is used to help prioritize the recommendations by financial merit.

Seal Air Leaks

AIR LEAKAGE

Approximate installed cost

$1,100

Annual Energy Savings

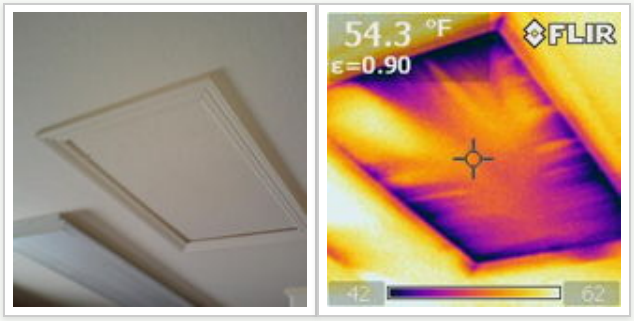
Approx. $433

Savings to Investment Ratio

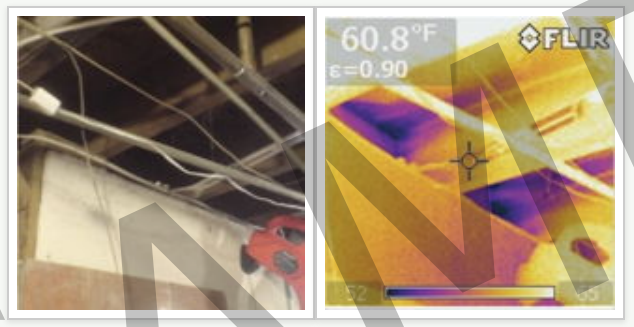
6.1

Why it matters

Air sealing is typically the most cost effective improvement you can make to your home. To properly seal out air leaks, a large fan called a blower door is used to depressurize your house. This makes air leaks easy to find, so corrective measures can be taken. A good air sealing job will dramatically increase the comfort of your home and help you save significant energy.



Air Leakage at Attic Hatch: The infrared camera suggests a poorly sealed and uninsulated attic hatch. The outside air from the attic space is leaking into the living space and making the upstairs hallway extremely cold. Since this is where the thermostat is located, the furnace runs more frequently than it needs to in order to maintain a consistent temperature.



Air Leakage at Rim Joists: The infrared camera suggests energy loss through air leakage and inadequate insulation at foundation rim. The same issue continues in the crawlspaces as well. Although this will be an involved improvement, it will likely improve savings and comfort throughout the house.

Notes to Homeowners

Build Tight & Ventilate Right
Some people are concerned about sealing up their house, thinking it will be stuffy or potentially unsafe. The solution is to ventilate the home properly to bring in lots of fresh air, while exchanging the heat from the outgoing air to the incoming air. Low power fans and Heat Recovery Ventilators (HRVs) are good solutions to this. Radon testing should be done in every home as well.
Attic:
• Access needs sealing & ceiling fixtures need sealing against attic

Windows & Doors:
• Gaps need caulking behind trim
• 3 weather-stripping kits for 36” Doors

Walls:

Notes to Contractors

AIR LEAKAGE

Approximate installed cost

$1,100

Annual Energy Savings

Approx. $433

Savings to Investment Ratio

6.1

Why it matters

Air sealing is typically the most cost effective improvement you can make to your home. To properly seal out air leaks, a large fan called a blower door is used to depressurize your house. This makes air leaks easy to find, so corrective measures can be taken. A good air sealing job will dramatically increase the comfort of your home and help you save significant energy.

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Seal Air Leaks

Many leaks (reference thermal images) through drywall penetrations
Recommended Actions: Caulk, repair, and seal holes, gaps behind trim, ceiling fixtures, etc Repair glazing and weather stripping.

Now & Goal

DETAILS	NOW	GOAL
Air Leakage		
Blower Door Test Performed	Estimate	Estimate
Blower Door Reading	4317 CFM50	3237.75 CFM50
Conditioned Air Volume	24318.18 ft³	
Wind Zone	2	
N-Factor	14.99	
Equivalent NACH	0.71 NACH	0.53 NACH
Effective Leakage Area	240.31 in²	180.23 in²
Equivalent ACH50	10.65 ACH50	7.99 ACH50
Kitchen Fan		
Bathroom Fan 1		
ASHRAE 62.2 Required mechanical ventilation rate	N/A CFM	N/A CFM
Minimum CFM50		2270 CFM50
Mechanical Ventilation Type	None	None

Insulate Attic

ATTIC

Approximate installed cost

$1,000

Annual Energy Savings

Approx. $28

Savings to Investment Ratio

0.6

Why it matters

Adding insulation to your attic can lead to a significant reduction in your utility bills. This process is often combined with careful air sealing of the ceiling from the attic side to ensure the new insulation perform at its maximum level.

Can lights are a huge source of energy loss in an attic. Unfortunately, you can't just caulk them up and blow insulation over them. It's important to build a "top hat" around the can light with rigid foam and then seal it together with spray foam. This keeps the light from overheating while preventing significant air leakage through the light into the attic.

This attic has very little insulation and none in some cases. By installing 10 to 15 inches of insulation in the attic, you can save a significant amount of energy. When doing so, it's really important to first clean out the existing insulation and then sealing all of the penetrations and cracks in the attic floor that's connected to the house. This will dramatically reduce the air leakage in the house and increase overall comfort.

Notes to Homeowners

Your attic needs some insulation! It's poorly distributed in a few places and is causing comfort problems.

Now & Goal

DETAILS	NOW	GOAL
Attic		
Attic 1		
Modeled Area	636.36 ft²	636.36 ft²
Insulation	37.4 R Value	49 R Value

...CONTINUED

Insulate Attic

ATTIC

Approximate installed cost

$1,000

Annual Energy Savings

Approx. $28

Savings to Investment Ratio

0.6

Why it matters

Adding insulation to your attic can lead to a significant reduction in your utility bills. This process is often combined with careful air sealing of the ceiling from the attic side to ensure the new insulation perform at its maximum level.

DETAILS	NOW	GOAL
Attic		
Radiant Barrier?	No	No
Has Knee Wall?	No	No
Cool Roof?	No	No

Upgrade Water Heater

WATER HEATER

Approximate installed cost

$1,100

Annual Energy Savings

Approx. $110

Savings to Investment Ratio

1.4

Why it matters

Replace your water heater with a tankless model or a heat pump water heater to save energy and reduce the ability for dangerous Carbon Monoxide to leak into your home.

Naturally drafting tank water heaters like the one on the left are very inefficient. Most of the heat produced is lost up the flue that cools off the middle of the tank when it's not firing. The tankless unit on the right has no standby losses, keeps combustion gasses out of your house, and will save you a lot of money!

Now & Goal

DETAILS	NOW	GOAL
Water Heater		
Water Heater 1		
Fuel	Propane	Propane
Type	Tank Water Heater	Tankless Water Heater
ENERGY STAR		No
Energy Factor	61 EF	90 EF
Manufacturer	Unknown	Unknown
Model Year		2023

Replace Freezer

FREEZER

Approximate installed cost

$500

Annual Energy Savings

Approx. $12

Savings to Investment Ratio

0.4

Why it matters

Old freezers can easily cost twice as much to operate as a new freezers. Replace your old freezer with a new Energy Star model and be sure to recycle the old one (keeping it running in your garage or basement will use even more energy).

Your freezer is an older model, but despite the frost, it's running fairly well. Eventually, consider a new energy star freezer that will not have frost problems and will save money.

Now & Goal

DETAILS	NOW	GOAL
Freezer		
Basement Chest Freezer		
Name	Basement Chest Freezer	
ENERGY STAR	No	Yes
Usage	483.51 kWh/yr	354 kWh/yr
Manufacturer	Unknown	Bosch
Model		X42
Model Year		2023

HEATING SYSTEM

Approximate installed cost

$6,200

Annual Energy Savings

Approx. $1,081

Savings to Investment Ratio

2.6

Why it matters

Install a more efficient furnace, boiler or heat pump. Depending on the age of the unit, substantial savings may be gained by replacing it with an Energy Star rated appliance. If you?re heating with gas, look for a sealed combustion unit. They?re much safer since the exhaust pathway from the unit is sealed and goes directly outside. If it doesn't quite make sense to replace your heating system now, be prepared to replace it with a high efficiency Energy Star unit when it finally wears out.

Upgrade Heating System

Congratulations! You have a modern high efficiency furnace. This system is a sealed combustion unit. That means that any flue gasses produced by burning the natural gas go directly outside without the opportunity to leak into your home. Also, fresh air from the outside is brought directly to the burners in the furnace as opposed to pulling air from the house. This keeps the cold outside air in a closed loop and keeps the exhaust air outside where it belongs!

Now & Goal

DETAILS	NOW	GOAL
Heating System		
Basement Heating System		
System Name	Basement Heating System	
Equipment Type	Furnace with standalone ducts	
Upgrade action	Replace with a newer model	
% of Total Heating Load	100%	100%
Heating Energy Source	Propane	Propane
Heating Capacity	100000 BTU/h	100000 BTU/h
Heating System Efficiency	76 AFUE	95 AFUE
Heating System Manufacturer	Unknown	Unknown
Heating System Model Year	1988	2023

Upgrade Lighting

LIGHTING

Approximate installed cost

$100

Annual Energy Savings

Approx. $47

Savings to Investment Ratio

5.5

Why it matters

Compact Florescent Lightbulbs (CFLs) use 1/4 of the energy of regular incandescent light bulbs and last 8 to 15 times as long. Light Emitting Diode (LED) bulbs use 12% of the energy of regular incandescent light bulbs and last up to 50 times as long. Replacing incandescent bulbs with CFLs or LEDs will save significant energy and replacement costs over time.

The can light on the left has an incandescent bulb that produces significant heat and is very inefficient. Replacing it with the dimmable LED kit on the right will save considerable money and could last a lifetime.

Now & Goal

DETAILS	NOW	GOAL
Lighting		
# of CFLs	5	4
# of LEDs	20	32
# of Incandescents	15	4

Refrigerator

REFRIGERATOR

Approximate installed cost

$3,700

Annual Energy Savings

Approx. $110

Savings to Investment Ratio

0.5

Why it matters

Old refrigerators can often cost twice as much to operate as a new refrigerator. Replace your old refrigerator with a new Energy Star model and be sure to recycle the old one (keeping it running in your garage or basement will use even more energy).

That old refrigerator sure does look cool, but the amount of energy it consumes is astronomical! If you can manage it, just eliminate that backup refrigerator. If you really need the extra space, be sure to get a high efficiency Energy Star refrigerator.

Now & Goal

DETAILS	NOW	GOAL
Refrigerator		
Refrigerator 1		
Name	Kitchen	
ENERGY STAR	No	No
Usage	762.08 kWh/yr	427 kWh/yr
Manufacturer	Unknown	Unknown
Model Year		2023
Refrigerator 2		
Name	Garage	
ENERGY STAR	No	No
Usage	1249.81 kWh/yr	427 kWh/yr
Manufacturer	Unknown	Unknown
Model Year		2023
Refrigerator 3		
Name	Kitchen Wine Cooler	
ENERGY STAR	Yes	No
Usage	252.98 kWh/yr	252.98 kWh/yr

...CONTINUED

Refrigerator

REFRIGERATOR

Approximate installed cost

$3,700

Annual Energy Savings

Approx. $110

Savings to Investment Ratio

0.5

Why it matters

Old refrigerators can often cost twice as much to operate as a new refrigerator. Replace your old refrigerator with a new Energy Star model and be sure to recycle the old one (keeping it running in your garage or basement will use even more energy).

DETAILS	NOW	GOAL
Refrigerator		
Manufacturer	Unknown	Unknown
Model Year		2023

Thermostat Set Points

THERMOSTAT

Approximate installed cost

$0

Annual Energy Savings

Approx. $473

Savings to Investment Ratio

100

Why it matters

Installing a programmable thermostat (or correctly setting the one you currently have) will help you to use less energy when you're not at home or when you're sleeping.

Replace your manual thermostat with programmable one like this one or if you already have a programmable thermostat, be sure it is programmed correctly.

Now & Goal

DETAILS	NOW	GOAL
Thermostat		
Heating Setpoint High	69-72 °F	68 °F
Heating Setpoint Low	65-68 °F	62 °F
Cooling Setpoint High		85 °F
Cooling Setpoint Low		80 °F

Insulate Walls

WALLS

Approximate installed cost

$5,400

Annual Energy Savings

Approx. $736

Savings to Investment Ratio

2.8

Why it matters

Insulating your walls can lead to a significant reduction in utility bills. The is done by drilling small holes in the wall cavities either from the inside or outside and filling the space with cellulose, fiberglass, or even foam insulation. If it's time to replace your exterior siding, then be sure to ask your contractor about adding a layer of rigid foam underneath the new sheathing of 1" or more.

Typical among homes of this age, there is no insulation in the walls. By “dense packing” cellulose insulation in your wall cavities, air leaks and drafts will be dramatically reduced. To install the insulation, contractors will lightly pry up a few rows of siding of on your house and temporarily remove it. They will then drill a 2” hole in the sheathing for every wall cavity. A blower pushes cellulose insulation at high speed through a hose into the holes, filling the wall cavity. Great care is taken to ensure the cellulose fills into every part of the wall.

Notes to Homeowners

Wall insulation with air sealing will have the biggest impact on your comfort issues.

Because there is no insulation in your walls, they create a sense of extreme discomfort in your home. The insulation value of your walls is about the same as your windows, but the total surface area of walls is 4x the surface area of windows. Tackling the wall insulation will make a dramatic difference in your discomfort and will also make the house a lot quieter!

Notes to Contractors

Wall Construction

- Balloon framed 2 story house. Be sure to seal off rim joists where possible.
- Difficult access due to landscaping in some areas

Now & Goal

DETAILS	NOW	GOAL
Walls		
Wall 1		
Modeled Area	1224 ft²	1224 ft²
Siding	Brick Veneer	
Construction	2x4 Frame	
Cavity Insulation		13 R Value
Continuous Insulation		

...CONTINUED

Insulate Walls

WALLS

Approximate installed cost

$5,400

Annual Energy Savings

Approx. $736

Savings to Investment Ratio

2.8

Why it matters

Insulating your walls can lead to a significant reduction in utility bills. The is done by drilling small holes in the wall cavities either from the inside or outside and filling the space with cellulose, fiberglass, or even foam insulation. If it's time to replace your exterior siding, then be sure to ask your contractor about adding a layer of rigid foam underneath the new sheathing of 1" or more.

DETAILS	NOW	GOAL
Walls		
Wall 2		
Modeled Area	1224 ft²	1224 ft²
Siding	Wood/Fiber Cement siding	
Construction	2x4 Frame	
Cavity Insulation	7 R Value	13 R Value
Continuous Insulation		

Upgrade Windows

WINDOWS

Approximate installed cost

$12,700

Annual Energy Savings

Approx. $534

Savings to Investment Ratio

0.8

Why it matters

Adding storm windows, solar screens or replacing your current windows can save energy and help reduce drafts or solar gain.

Metal window frames conduct heat at 1000 times the rate of wood, vinyl or fiberglass. Triple pane fiberglass windows like those in the picture on the right conduct very little heat, seal tightly, and have an insulating value that's better than most insulated walls!

Now & Goal

DETAILS	NOW	GOAL
Windows		
Window 1		
ENERGY STAR	No	No
U-Value	0.7 U Value	0.39 U Value
Solar Heat Gain Coefficient	0.67 SHGC	0.52 SHGC
Window Area: North (Front)	68 ft²	68 ft²
Window Area: East (Left)	81.6 ft²	81.6 ft²
Window Area: South (Back)	68 ft²	68 ft²
Window Area: West (Right)	217.6 ft²	217.6 ft²
Exterior Treatment: North (Front)	No Treatment	No Improvement
Exterior Treatment: East (Left)	No Treatment	No Improvement
Exterior Treatment: South (Back)	No Treatment	No Improvement
Exterior Treatment: West (Right)	No Treatment	No Improvement

Insulate Vault

VAULTED CEILING

Approximate installed cost

$500

Annual Energy Savings

Approx. $36

Savings to Investment Ratio

1.6

Why it matters

Vaulted ceilings are almost always poorly insulated. If your roof is in need of replacement, it's a perfect time to also insulate the area between the interior drywall and the roof deck. Dense packing this cavity with blown fiberglass or cellulose will help prevent significant heat loss.

Now & Goal

DETAILS	NOW	GOAL
Vaulted Ceiling		
Vault 1		
Modeled Area	295.45 ft²	295.45 ft²
Cavity Insulation	7 R Value	11 R Value
Continuous Insulation		
Cool Roof?	No	No

Health & Safety

Test Summary

- Ambient Carbon Monoxide ⊗
- Natural Condition Spillage ✓
- Worst Case Depressurization ✓
- Worst Case Spillage ⚑
- Undiluted Flue CO ✓
- Draft Pressure ✓
- Gas Leak ✓
- Venting ✓
- Mold & Moisture ✓
- Radon ⚑

✓ Passed ⊗ Failed ⚑ Warning

Notes to Homeowners

COMBUSTION APPLIANCES like furnaces and propane water heaters have the potential for improper venting of the flue gases. This means that carbon monoxide could spill into the home, which is very dangerous. In extreme cases there may even be flame roll-out from the appliances. If the appliances are not vented correctly and supplied with adequate combustion air, as air sealing measures are applied to a house, the chance increases for hazardous back drafting of flue gases to occur.

RADON: The Minnesota Department of Health strongly recommends that ALL homeowners have an indoor radon test performed and recommends having the radon levels mitigated if elevated radon concentrations are found. Elevated radon concentrations can easily be reduced by a licensed radon mitigator. Exposure to dangerous levels of indoor radon gas may place the occupants at risk of developing radon induced lung cancer. Radon, a Class A human carcinogen, is the leading cause of lung cancer in nonsmokers and the second leading cause overall. Over 40% of tested Cook County properties have radon levels above the mitigation threshold of 4.0 pCi/L.

Notes to Contractors

DURING THE SPILLAGE TEST, the ambient carbon monoxide (CO) level increased to 100 ppm, and the test was immediately halted, the water heater turned off, and all windows opened. The home was evacuated until CO levels decreased to a safe level. The water heater was then tested under natural conditions and passed the spillage test. The measured level of CO directly from the exhaust was 5,800 ppm,

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Health & Safety

well in excess of the 400 ppm upper limit set by the Building Performance Institute (BPI).

Test Summary

Ambient Carbon Monoxide	⊗
Natural Condition Spillage	✓
Worst Case Depressurization	✓
Worst Case Spillage	⚑
Undiluted Flue CO	✓
Draft Pressure	✓
Gas Leak	✓
Venting	✓
Mold & Moisture	✓
Radon	⚑

✓ Passed ⊗ Failed ⚑ Warning

Metrics

About the metrics

These metrics are for the whole house in a pre and post-retrofit state.

The 'Base' savings numbers will likely not be the same as the actual energy consumption of the home. These numbers are weather normalized and then projected based on the 30 year weather normals data from NOAA. In other words, this is the modeled energy consumption of the home for a typical year, not the year that the utility bills were from.

FUELS	BASE	IMPROVED	SAVED
Total Fuel Energy Usage therms/year	3,144	1,702	1,442
Propane Energy Usage gallons/year	3,442	1,864	1,578

METRIC	BASE	IMPROVED	SAVED
Electric Energy Usage kWh/year	8,577	6,386	2,191
Total Energy Usage MMBtu/year	343.65	192.03	151.62
Fuel Energy Cost $/year	$ 7,179	$ 3,888	$ 3,291
Electric Energy Cost $/year	$ 1,203	$ 896	$ 307
Total Energy Cost $/year	$ 8,383	$ 4,784	$ 3,599
CO2 Production Tons/year	23.9	13.8	10.1
Payback years			8
Total Energy Savings			44%
Total Carbon Savings			42%
Net Savings to Investment Ratio SIR			1.9
Net Annualized Return MIRR			8.0%

HEATING & COOLING LOAD CALCULATIONS		
Heating Load Btu/hr	Base: 118,293	Improved: 85,516
Cooling Load: Sensible Btu/hr	Base: 42,131	Improved: 32,057
Cooling Load: Latent Btu/hr	Base: 1,000	Improved: 1,000
Winter Design Temperature	Outdoor: -25°	Indoor: 70°
Summer Design Temperature	Outdoor: 81°	Indoor: 75°

Tech Specs

Property Details

Year Built:	1936
Conditioned Area:	2500 ft²
Area Includes Basement:	Yes
Average Wall Height:	8 ft
House Length:	40 ft
House Width:	32 ft
Floors Above Grade:	2
Number of Occupants:	2
Number of Bedrooms:	4
Type of Home:	Single Family Detached
Front of Building Orientation:	North
Shielding:	Normal
Tuck Under Garage:	No

Thermostat

Programmable Thermostat Installed:	No
Heating Setpoint High:	69-72 °F
Heating Setpoint Low:	65-68 °F

Heating & Cooling

Heating Design Load:	118293 Btu/hr
Hvac: 1	
System Name:	Basement Heating System
Equipment Type:	Furnace with standalone ducts
Upgrade action:	Replace with a newer model
Heating Energy Source:	Propane
% of Total Heating Load:	100%
Heating Capacity:	100000 BTU/h
Heating System Efficiency:	76 AFUE
Heating System Manufacturer:	Unknown
Heating System Model Year:	1988
Heating System Equivalent Full Load Hours:	2179.9188
Duct Location:	50/50 Basement (unconditioned) - Conditioned Space
Duct Insulation:	No Insulation
Duct Leakage:	15% - Somewhat leaky
Duct Efficiency:	100%

Appliances

Range: 1	
Range Fuel Type:	Electricity
Oven: 1	
Oven Fuel Type:	Electricity
Clothes Dryer: 1	
Dryer Fuel Type:	Electricity

Clothes Washer

Type:	Top Load
Integrated Modified Energy Factor:	0.64 IMEF
ENERGY STAR:	No
Manufacturer:	Amana
Model #:	D2351B31

Dishwasher

Dishwasher Installed?:	Yes
Energy Factor:	0.55 EF
ENERGY STAR:	Yes
Manufacturer:	Unknown

Freezers

Freezer: 1	
Name:	Basement Chest Freezer
Usage:	483.51 kWh/yr
ENERGY STAR:	No
Manufacturer:	Unknown

Refrigerators

Refrigerator: 1	
Name:	Kitchen
Refrigerator Age:	27-30
Refrigerator Size:	19-21
ENERGY STAR:	No
Usage:	762.08 kWh/yr
Manufacturer:	Unknown
Refrigerator: 2	
Name:	Garage
Refrigerator Age:	35-42
Refrigerator Size:	19-21
ENERGY STAR:	No
Usage:	1249.81 kWh/yr
Manufacturer:	Unknown
Refrigerator: 3	
Name:	Kitchen Wine Cooler
Refrigerator Age:	15-21
Refrigerator Size:	1-5
ENERGY STAR:	Yes
Usage:	252.98 kWh/yr
Manufacturer:	Unknown

Lighting

% CFLs or LEDs:	1-25%
Total # of Light Bulbs:	40
# of CFLs:	5
# of LEDs:	20
# of Incandescents:	15

Doors

Tech Specs

Door: 1

Type:	Wood with Storm
Area:	21 ft²
ENERGY STAR:	No
U Value:	0.31 U Value

Door: 2

Type:	Wood
Area:	21 ft²
ENERGY STAR:	No
U Value:	0.46 U Value

Door: 3

Type:	Steel, insulated
Area:	21 ft²
ENERGY STAR:	No
U Value:	0.16 U Value

Exterior Walls

Wall: 1

Modeled Area:	1224 ft²
Insulated?:	No
Siding:	Brick Veneer
Construction:	2x4 Frame
Cavity Insulation:	0 R Value
Continuous Insulation:	0 R Value

Wall: 2

Modeled Area:	1224 ft²
Insulated?:	Yes
Siding:	Wood/Fiber Cement siding
Construction:	2x4 Frame
Cavity Insulation:	7 R Value
Continuous Insulation:	0 R Value

Attic & Vaulted Ceiling

Attic: 1

Modeled Area:	636.36 ft²
Insulation Depth:	10-12
Insulation Type:	Cellulose
Insulation:	37.4 R Value
Radiant Barrier?:	No
Has Knee Wall?:	No
Cool Roof?:	No

Vault: 1

Modeled Area:	295.45 ft²
Insulated?:	Yes
Cavity Insulation:	7 R Value
Continuous Insulation:	0 R Value
Cool Roof?:	No

Foundation - General

Foundation: Basement:	75%
Foundation: Crawlspace:	25%
Foundation Above Grade Height:	0.5 ft

Foundation - Basement

Modeled Basement Floor Area:	681.82 ft²
Basement Wall Insulation:	None or Bare Walls
Basement Rim Joist Treatment:	Same as Basement Wall
Basement Heating:	Intentional w/ continuous circulation
Basement Cooling:	None or Undesired Incidental

Foundation - Crawlspace

Modeled Crawl Floor Area:	227.27 ft²
Crawlspace Type:	Conditioned Crawl
Crawlspace Insulation:	Crawlspace is uninsulated
Crawl Wall Insulation:	0 R Value
Crawlspace Rim Joist Treatment:	Same as Crawl Wall

Frame Floors

Modeled Floor Area:	0 ft²

Windows

Window: 1

Window Area: North (Front):	68 ft²
Window Area: East (Left):	81.6 ft²
Window Area: South (Back):	68 ft²
Window Area: West (Right):	217.6 ft²
Type:	Single pane + storm
Frame:	Metal
ENERGY STAR:	No
U-Value:	0.7 U Value
Solar Heat Gain Coefficient:	0.67 SHGC
Window Area: North (Front) Overhang Depth:	0 ft
Window Area: East (Left) Overhang Depth:	0 ft
Window Area: South (Back) Overhang Depth:	0 ft
Window Area: West (Right) Overhang Depth:	0 ft
Exterior Treatment: North (Front):	No Treatment
Exterior Treatment: East (Left):	No Treatment
Exterior Treatment: South (Back):	No Treatment
Exterior Treatment: West (Right):	No Treatment

Skylights

Skylight Area:	0 ft²

Air Leakage

Blower Door Test Performed:	Estimate
Blower Door Reading:	4317 CFM50
Conditioned Air Volume:	24318.18 ft³
Wind Zone:	2

Tech Specs

N-Factor:	14.99
Equivalent NACH:	0.71 NACH
Effective Leakage Area:	240.31 in²
Equivalent ACH50:	10.65 ACH50
Kitchen Fan:	0 CFM
Bathroom Fan 1:	0 CFM
ASHRAE 62.2 Required mechanical ventilation rate:	N/A CFM
Mechanical Ventilation Type:	None

Water Heating

Water Heating: 1

Fuel:	Propane
Type:	Tank Water Heater
Age:	0-5
Location:	Indoors and within heated area
Temperature Settings:	High (140-150 F)
Energy Factor:	61 EF
Manufacturer:	Unknown

Pool & Hot Tub

Pool:	No
Hot Tub:	No

PV

Pv: 1

Has PV?:	No

Utility Bills

Electric

Electric Utility Provider Name	Grand Marais PUC
Electric Account Number	

Fuel

Fuel Utility Provider Name	Eagle Mountain Energy
Fuel Account Number	

Contact Information

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About This Report

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Report & modeling software: Snugg Pro™ 5.0

Glossary

Annual Fuel Utilization Efficiency (AFUE) The measure of seasonal or annual efficiency of a residential heating furnace or boiler. It takes into account the cyclic on/off operation and associated energy losses of the heating unit as it responds to changes in the load, which in turn is affected by changes in weather and occupant controls.

Annualized Return The return an investment provides over a period of time, expressed as a time-weighted annual percentage. This is the equivalent annual interest rate you would get if you put the same amount of money spent on the energy upgrade into a savings account.

Asbestos Asbestos is a mineral fiber that has been used commonly in a variety of building construction materials for insulation and as a fire-retardant, but is no longer used in homes. When asbestos-containing materials are damaged or disturbed by repair, remodeling or demolition activities, microscopic fibers become airborne and can be inhaled into the lungs, where they can cause significant health problems.

British Thermal Unit (Btu) The amount of heat required to raise the temperature of one pound of water one degree Fahrenheit; equal to 252 calories.

Carbon Monoxide (CO) A colorless, odorless but poisonous combustible gas with the formula CO. Carbon monoxide is produced in the incomplete combustion of carbon and carbon compounds such as fossil fuels (i.e. coal, petroleum) and their products (e.g. liquefied petroleum gas, gasoline), and biomass.

Cashflow When financing energy efficiency improvements, cashflow is the difference between the average monthly energy savings and the monthly loan payment.

Combustion Appliance Zone (CAZ) A contiguous air volume within a building that contains a combustion appliance such as furnaces, boilers, and water heaters; the zone may include, but is not limited to, a mechanical closet, mechanical room, or the main body of a house, as applicable.

Compact Fluorescent Light bulb (CFL) A smaller version of standard fluorescent lamps which can directly replace standard incandescent lights. These highly efficient lights consist of a gas filled tube, and a magnetic or electronic ballast.

Cubic Feet per Minute (CFM) A measurement of airflow that indicates how many cubic feet of air pass by a stationary point in one minute.

Carbon Dioxide (CO2) A colorless, odorless noncombustible gas that is present in the atmosphere. It is formed by the combustion of carbon and carbon compounds (such as fossil fuels and biomass). It acts as a greenhouse gas which plays a major role in global warming and climate change.

Energy Efficiency Ratio (EER) The measure of the energy efficiency of room air conditioners: cooling capacity in Btu/hr divided by the watts consumed at a specific outdoor temperature.

Energy Factor (EF) The measure of efficiency for a variety of appliances. For water heaters, the energy factor is based on three factors: 1) the recovery efficiency, or how efficiently the heat from the energy source is transferred to the water; 2) stand-by losses, or the percentage of heat lost per hour from the stored water compared to the content of the water: and 3) cycling losses. For dishwashers, the energy factor is the number of cycles per kWh of input power. For clothes washers, the energy factor is the cubic foot capacity per kWh of input power per cycle. For clothes dryers, the energy factor is the number of pounds of clothes dried per kWh of power consumed.

Heating Seasonal Performance Factor (HSPF) The measure of seasonal efficiency of a heat pump operating in the heating mode. It takes into account the variations in temperature that can occur within a season and is the average number of Btu of heat delivered for every watt-hour of electricity used.

Heat Recovery Ventilator (HRV) / Energy Recovery Ventilator (ERV) A device that captures the heat or energy from the exhaust air from a building and transfers it to the supply/fresh air entering the building to preheat the air and increase overall heating efficiency while providing consistent fresh air.

Light Emitting Diode (LED) Lighting An extremely efficient semiconductor light source. LEDs present many advantages over incandescent light sources including lower energy consumption, longer lifetime, improved physical robustness, and smaller size.

Modified Internal Rate of Return (MIRR) This is your return on investment. Roughly speaking, if you invested the same amount of money for this project (listed on this report as the total cost) into a bank account, your equivalent interest rate from all of the energy savings would be the MIRR.

N-Factor A factor of how susceptible your house is to wind, influenced by weather patterns, location, and the number of floors in the home. Used in the calculation of NACH.

Natural Air Changes per Hour (NACH) The number of times in one hour the entire volume of air inside the building leaks to the outside naturally.

Payback Period The amount of time required before the savings resulting from your system equal the system cost. Our payback calculation is amortized with an annual inflation of 3% and a fuel cost escalation of 5%.

R-Value A measure of the capacity of a material to resist heat transfer. The R-Value is the reciprocal of the conductivity of a material (U-Value). The larger the R-Value of a material, the greater its insulating properties.

Radon A naturally occurring radioactive gas found in the U.S. in nearly all types of soil, rock, and water. It can migrate into most buildings. Studies have linked high concentrations of radon to lung cancer.

Rim Joist In the framing of a deck or building, a rim joist is the final joist that caps the end of the row of joists that support a floor or ceiling. A rim joist makes up the end of the box that comprises the floor system.

Seasonal Energy Efficiency Ratio (SEER) A measure of seasonal or annual efficiency of a central air conditioner or air conditioning heat pump. It takes into account the variations in temperature that can occur within a season and is the average number of Btu of cooling delivered for every watt-hour of electricity used by the heat pump over a cooling season.

Savings to Investment Ratio (SIR) A ratio used to determine whether a project that aims to save money in the future is worth doing. The ratio compares the investment that is put in now with the amount of savings from the project.