



Sample Energy Audit



1-866-NYSEERDA • www.nyserda.ny.gov

Home

Don Sample
15 Glenwood St
Albany, NY 12203

donsample@gmail.com

Audited Date

12-07-2013
12:00 AM

Audited By

Joe Contractor
Test NYSEERDA
BPI Certified
123 Bell Street
Albany, NY 12203
joecontractor@gmail.com



Don & Margery -

Thank you for inviting us to do an energy audit on your beautiful home!
We've kept your concerns in mind during our inspection and testing.
Let's discuss the recommendations found in this report and see what works best for you.

Thanks,
Joe

Inside Your Report

- Cover
- Concerns
- Solutions for your home
- Upgrade Details
- Safety Tests
- Additional Notes
- Rebates & Incentives
- Tech Specs
- Glossary



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

Air Leaks

Air leaks have been noticed around the window frames, and especially around the front door.

The kitchen hood has a big draft around it.

The upstairs landing area is also very cold and drafty in the winter.

Heating system is old

Furnace needs to be replaced for additional comfort and health & safety issues.

Homeowner has heard about the dangers of carbon monoxide poisoning and is concerned about the old gas furnace. Wants a CO monitor installed and wants a full furnace checkup.

Kitchen gets too hot

The primary culprits are the large number of halogen can lights. Replacing these lights with new efficient bulbs will dramatically reduce the heat created by the lighting.

Kitchen floor stays cold

The kitchen floor is always cold except in the summer. The kitchen is above the unconditioned, vented crawl space.



Solutions for your home

Estimated Totals

Approximate Cost

\$ 13,200

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

Estimated Savings

\$ 1,430/yr

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.

Impact of upgrades

Energy Reduction 37 %

Carbon (CO2) Savings 9 tons

Equivalent cars removed from the road 1.9/yr

Equivalent number of tree seedlings grown for 10 years 230

Call us today to ask a question or discuss the next step!

Details	Approximate installed cost	Approximate annual savings	SIR*
Reduce Water Heater Temperature	\$0	\$20	>100
Program(mable) Thermostat	\$200	\$300	27.2
Replace Lighting with CFLs or LEDs	\$200	\$270	11.9
Seal Duct Work	\$1,000	\$110	1.7
Add Attic Insulation	\$2,300	\$150	1.4
Upgrade Your Heating System	\$6,700	\$500	1.1
Seal Air Leaks	\$1,800	\$70	0.6
Insulate Crawl Space	\$400	\$10	0.6
Bath Fan / Ventilation	\$600	-	-

* 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.



Lower Hot Water Temp

Benefits Estimate

Estimated Cost

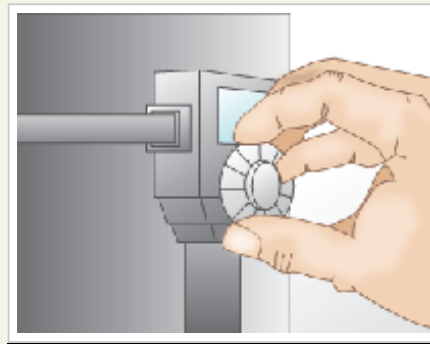
\$0

Energy Savings

Approx. \$20

Why it matters

Set water heater to deliver at 122 F (use a cooking thermometer) or the lowest practical setting for your preferences. A good measure is if you can take a shower using only hot water (not adding cold water), but still above 122 F. This will reduce standby energy loss and risk of scalding.



For the best energy savings, reduce your water heater temp to 122 degrees. You may inch this up to find your optimal comfort setting.

Notes to Homeowners

Turning down the hot water heater not only saves energy, but prevents scalding.

Now & Goal

Details	Now	Goal
DHW Temp	140°F	122°F



Program(mable) Thermostat

Benefits Estimate

Estimated Cost

\$200

Energy Savings

Approx. \$300

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 the current thermostat. A new thermostat will give you the ability to easily control the temperature.

Notes to Homeowners

Now & Goal

The improved thermostat settings below are the industry standard for energy efficiency. Try these settings to see how they match with your comfort zone, adjust by small degrees if necessary.

Details	Now	Goal
Heating Setpoint: High (at home)	70°F	68°F
Heating Setpoint: Low (not at home/sleeping)	68°F	64°F
Cooling Setpoint: Low (at home)	74°F	76°F
Cooling Setpoint: High (not at home/sleeping)	72°F	78°F



Upgrade Lighting

Benefits Estimate

Estimated Cost

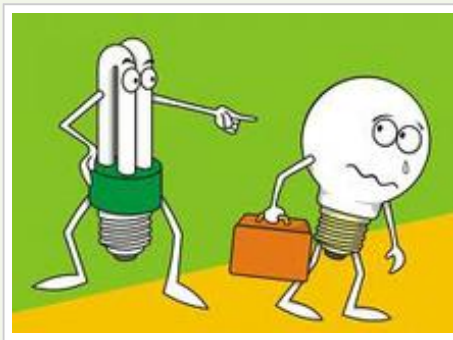
\$200

Energy Savings

Approx. \$270

Why it matters

Replacing incandescent bulbs with CFLs or LEDs will save significant energy and replacement costs over time.



Compact Florescent Lightbulbs (CFLs) use 1/4 of the energy of regular incandescent lightbulbs and last 8 to 15 times as long.



The can lights in the kitchen should be replaced with new LED lights. This will help keep the temperature down in the kitchen, save on energy, and prevent any heat related issues with the attic insulation.

Notes to Homeowners

Continue to replace the incandescent lightbulbs in your home. These figures show the savings that you would gain if 91% of your lamps and fixtures are CFL's.

Now & Goal

Details	Now	Goal
% CFLs or LED	13%	91%
Number of Light Fixtures	45#	



Seal Duct Work

Benefits Estimate

Estimated Cost

\$1,000

Energy Savings

Approx. \$110

Why it matters

If you have a forced air system for heating or cooling, a contractor will seal the connections and penetrations with mastic. This increases the efficiency of your heating and cooling system and ensures that more of the air actually gets to where it was designed to go. If you have a boiler system for heating, insulating the pipes will increase the effectiveness of the system.



In a typical house about 20 percent of the air that moves through the duct system is lost due to leaks, holes, and poorly connected ducts. The result is higher utility bills and difficulty keeping the house comfortable.

Notes to Homeowners

We have found many areas where your duct system needs to be tightened up and sealed. This will increase your efficiency even further.

Now & Goal

Details

System 1 - Duct System Efficiency

Now

80%

Goal

88%



Insulate Attic

Benefits Estimate

Estimated Cost

\$2,300

Energy Savings

Approx. \$150

Why it matters

Adding insulation to your attic can lead to a dramatic reduction in your utility bills. The estimated cost shown here is for a contractor adding cellulose throughout your attic space to increase the R-value to at least 38.



It's important to discuss insulation options with your contractor.

Notes to Homeowners

The current level of insulation in the attic is low and uneven. Taking the R Value up to a consistent 49 will vastly improve the comfort and efficiency of your home.

Now & Goal

Details	Now	Goal
Modeled Attic Area	1457ft ²	
Attic Insulation	10R Value	49R Value



Upgrade Heating System

Benefits Estimate

Estimated Cost

\$6,700

Energy Savings

Approx. \$500

Why it matters

Install a more efficient furnace or boiler. Depending on the age of the unit, substantial savings may be gained by replacing it with an Energy Star rated appliance. Also, modern heaters are much safer as the exhaust from the unit is sealed and goes directly outside. If it doesn't quite make sense to replace your furnace or boiler now, be prepared to replace it with a high efficiency Energy Star unit (92 AFUE or higher) when it finally wears out.



Due to the age and inefficiency of your current furnace, it's highly recommended that you replace the unit to also insure your health and safety.

Notes to Homeowners

Now & Goal

The recommended 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!

Details	Now	Goal
System 1 - Fuel Type	gas	Gas
System 1 - Equipment	furnace_ac	Furnace
System 1 - Heating System Efficiency	68AFUE	98AFUE
System 1 - Output Capacity	100kBTU/h	100kBTU/h
System 1 - Heating Load Percentage	100	100



Seal Air Leaks

Benefits Estimate

Estimated Cost

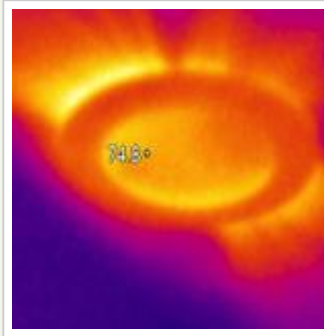
\$1,800

Energy Savings

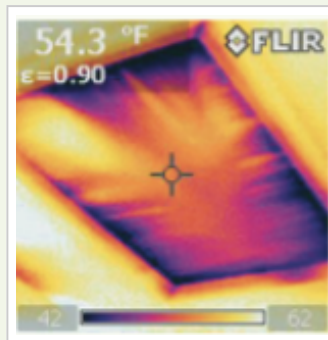
Approx. \$70

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 contractor will use a large fan called a blower door to depressurize your house. When this happens, the contractor can easily find the air leaks and take corrective measures. A good air sealing job will dramatically increase the comfort of your home and help you save significant energy.

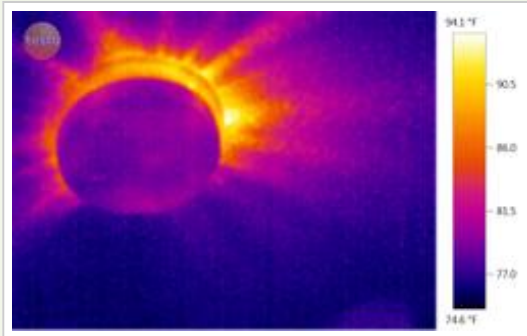


Air Leakage at can lights



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.



Air Leakage at Smoke Detector:

The ceiling mount smoke detector is also showing air leakage from the attic.



Seal Air Leaks

Benefits Estimate

Estimated Cost

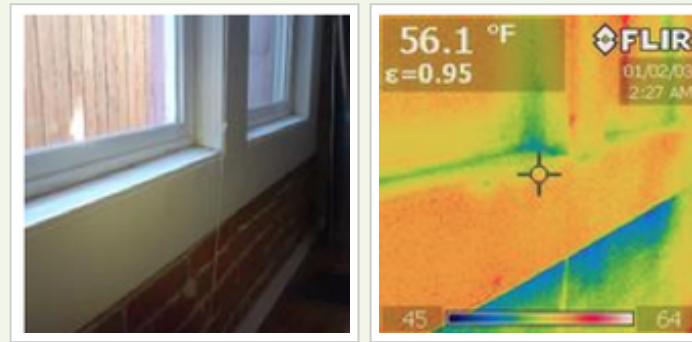
\$1,800

Energy Savings

Approx. \$70

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 contractor will use a large fan called a blower door to depressurize your house. When this happens, the contractor can easily find the air leaks and take corrective measures. A good air sealing job will dramatically increase the comfort of your home and help you save significant energy.



Air Leakage at windows:

Many of the windows have significant air flow from the lower part of the window trim.

Notes to Homeowners

Most homes are subject to what is known as the "Stack Effect", which draws cool air from the lower levels and lets hot air escape from the attic. By sealing up the air channels that exist, we can dramatically reduce this effect, and make the home more efficient and comfortable.

Notes to Contractors

Seal all interior and exterior wall bypasses in both the attic and basement before insulation is installed.

Now & Goal

Details	Now	Goal
Air Infiltration	3628CFM50	2895CFM50
Equivalent NACH	0.71NACH	0.56NACH
Equivalent ACH50	10.6ACH50	8.4ACH50
Effective Leakage Area	204in ²	163in ²
Modeled Conditioned Air Volume	20588ft ³	



Insulate Crawl Space

Benefits Estimate

Estimated Cost

\$400

Energy Savings

Approx. \$10



Unconditioned to Conditioned
Crawlspace

Notes to Homeowners

Insulating and "conditioning" your crawl space will increase the overall temperature of your crawl space and make the kitchen floor above more comfortable.

The estimated cost shown here is for converting your crawlspace from an unconditioned to a conditioned space which includes sealing off any vents to the outside, insulating the foundation walls, and installing a vapor barrier on top of the dirt floor.

Now & Goal

Details	Now	Goal
Crawlspace Type	Unconditioned Crawl	Conditioned Crawl
Wall Insulation	0R Value	29R Value
Floor Cavity Insulation	0R Value	19R Value
Modeled Crawl Wall Area	186ft ²	
Modeled Crawl Floor Area	478ft ²	



Bath Fan / Ventilation

Benefits Estimate

Estimated Cost

\$600



Photo shows that the moist bathroom air is being vented directly into the attic.

Notes to Homeowners

The exhaust fan in your main bath is not properly exhausting air to the outside of the home, but instead is venting into the attic, this causes moisture build up and eventually mold. This needs to be corrected prior to installing your attic insulation.

The price here includes a new energy efficiency quiet fan, plus the vents and needed parts to secure the air is going to the outside of the home.

What's This?

These tests are recommended by the Building Performance Institute (BPI). They can help identify potential health and safety concerns in your home.

Test Summary

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

✓ Passed | ✗ Failed | ⚠ Warning



Install a Carbon Monoxide Detector

CO detectors are highly recommended in homes with fuel-burning appliances. The detectors signal homeowners via an audible alarm when CO levels reach potentially dangerous levels.



Over time, furnaces can develop small cracks in the combustion chamber. These cracks may not be visible to the naked eye. It is through these cracks that Carbon Monoxide can leak into your home.



Additional Notes

Replace Refrigerator ➤



Due to the age of your current refrigerator, it is costing you approximately twice as much to run as a new Energy Star refrigerator.

Notes to Homeowners

While its not something that we actually install, we recommend you replace your old refrigerator with a new Energy Star model at some point in the next few years.



Incentives and Financing

The 10% cashback incentive

When you complete energy efficiency upgrades through the Home Performance with ENERGY STAR program, you will be eligible to receive 10 percent of the cost of eligible upgrades back (up to a maximum of \$3,000) after the work is complete.

Your contractor can help you verify that your upgrades qualify for this incentive.

For a full list of energy efficiency improvements that qualify for 10% cash back, download this PDF:

bit.ly/ny-eligible-measures

Assisted Home Performance with ENERGY STAR grants

Depending on household income you can qualify for a grant of up to \$5,000 to cover up to 50 percent of the cost of energy efficiency upgrades. In most New York State counties, a family of four with a household income up to about \$65,000 will qualify.

Two- to four-unit residential buildings with additional income-eligible households can qualify for a grant of up to \$10,000.

To learn more go to: <http://bit.ly/ny-assisted>

Get low-interest financing! Two options:

Option 1: On-Bill Recovery Loans with a 3.49% interest rate

An On-Bill Recovery Loan allows you to have your loan payments built into your utility bill. You'll have no extra bills each month and nothing new to keep track of. Even better: your monthly payments will be calculated not to exceed the expected amount your energy upgrades will save you on energy costs. So your energy savings cover most or all of your payment. Interest rates are subject to change.

When you rent or sell your home, you will have the option to transfer the unpaid balance of loan to the new owners or tenants. If you do choose to transfer the balance, you'll be required to provide notice to the new owner or tenant.

On-Bill Recovery Financing requires a declaration to be signed and filed by NYSERDA. The declaration is not a lien on the property but is recorded to provide notice to others of the obligation under the loan note.

Customers of the following utilities are eligible for On-Bill Recovery Financing: Central Hudson Gas & Electric, Con Edison, Long Island Power Authority, NYSEG, National Grid (upstate NY customers only), Orange & Rockland, and Rochester Gas & Electric.

Option 2: Smart Energy Loans with interest rates as low as 3.49%

Smart Energy Loans offer affordable interest rates, flexible terms and simple repayment options. Paying for a Smart Energy Loan is similar to any other conventional loan. You make monthly payments to NYSERDA's loan servicer by check or automatic bank withdrawals. The current interest rate is 3.49% if you pay via automatic bank withdrawals. Interest rates are subject to change.

To apply for financing visit Energy Finance Solution:

<http://bit.ly/ny-financing>



Tech Specs

Property Details

Year Built:	1988
Conditioned Area:	2394 ft ²
House Volume:	20588.4 ft ³
# of Stories:	2
# of Occupants:	2
Home Style:	Single Family Detached
Tuck Under Garage:	No
# of Cars:	3

Insulation & Air Leakage

Attic Insulation Type:	Cellulose
Attic Insulation Amount:	1-3
Foundation Type:	
Basement:	50 %
Crawlspace:	50 %
Slab on Grade:	%
Basement Wall Insulation:	Finished wall with Insulation
Crawlspace Insulation:	Crawlspace is uninsulated, open, or vented
Exterior Wall Construction:	Frame
Exterior Wall Cladding:	Wood/Fiber Cement siding
Wall Insulation:	No
Air Leakage:	3628 CFM50

Heating & Cooling Equipment

Details:	System 1
Type:	Both (Heating / Cooling)
Primary Energy Source:	Natural Gas
% of Total Load:	100% / 100%
Equipment:	Furnace / Central AC
Age:	16-40 yrs / 16-20 yrs
Capacity:	100 kBTU/h / kBTU/h
Duct Location:	Basement (unconditioned)
Duct Leakage:	15% - Somewhat leaky
Duct Leakage Value:	CFM25
Duct Insulation:	None

Water Heating

Energy Source:	Natural Gas
Type:	Standard tank
Age:	0-5
Location:	Indoors and within heated area
Temperature:	High (140-150 F)

Doors

Door 1 Type:	Wood
Door 2 Type:	Wood

Windows

Window Glazing:	Double pane
Window Frames:	Vinyl
North Window Area:	20 %
East Window Area:	20 %
South Window Area:	20 %
West Window Area:	20 %
North Overhang:	2 ft
East Overhang:	2 ft
South Overhang:	2 ft
West Overhang:	2 ft
Skylight Area:	ft ²



Tech Specs (cont)

Refrigerators

Refrigerator 1::

Size: 19-21 ft³
Age: 16-20 years old

Appliances

Number of Freezers: 1
Cooking Range Fuel: Natural gas
Dryer Fuel: Electric

Lighting

Percent CFLs or LEDs: 1-25%
Approx # of light fixtures: 45

Thermostat Setpoints

Programmable: No
Thermostat Installed?:
High Heating Setpoint: 70 °F
Low Heating Setpoint: 68 °F
High Cooling Setpoint: 72 °F
Low Cooling Setpoint: 74 °F

Utility Details

Electric Utility Name: —
Electric Utility Account Number: —
Fuel Utility Name: —
Fuel Utility Account Number: —

Utility Bills

Primary Heating Fuel: Natural Gas
Highest monthly summer electric bill: \$341
Lowest monthly summer electric bill: \$136
Highest monthly winter natural gas bill: \$250
Lowest monthly natural gas bill: \$57

Auditor's Contact Information

Joe Contractor
Test NYSERDA
BPI Certified
123 Bell Street
Albany, NY 12203
joecontractor@gmail.com



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.

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.

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.