HOME ENERGY ASSESSMENT

Green Homeowners United

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GREEN HOMEOWNERS UNITED

Your Home's Energy Assessment

Welcome! We are so glad you are on your way to becoming a "Green Homeowner"!

We believe a green homeowner is someone who recognizes that fighting climate change begins at home. That we can be rewarded for helping the planet with lower utility bills, better comfort and higher home value!
We are here to help you on this journey whether this year or in the next 5 years.

Did you know: Every $1 you spend to upgrade your home advances Green Homeowners United's mission to create living wage union jobs (LiUNA 113) with benefits for local residents to help fight climate change right here in the community? Green Homeowners United is a carbon-neutral, pro-union, woman-owned, lead certified social enterprise!

This energy model is built using Optimiser, a BPI-2400 compliant program to model energy use for the purposes of determining Inflation Reduction Act incentives.

Residential Energy Efficiency is Largest Source of CO2 Reduction Potential

October 05, 2017 Khalil Shahyd - National Resource Defense Council

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RESIDENTIAL ENERGY EFFICIENCY LEADS THE WAY ON CO2 REDUCTION

One of the major highlights of the report that the single largest source of CO2 equivalent emissions from a single intervention is residential energy efficiency. As the summary chart below shows, **residential efficiency can account for as much as 550 million metric tons of CO2 equivalent emissions reductions annually by 2050** (equal to the combined electric power emissions of California, Texas, New York, Florida, Illinois, and Virginia in 2016). The next highest single intervention source is electrification of vehicles which would account for approximately 481 metric tons of CO2 equivalent emissions reductions annually.

The transportation sector offers the largest combined emissions reduction potential across multiple strategies but no other sector offers a higher potential for a single source of reduction than residential efficiency.

EXHIBIT 4: SUMMARY OF CO_2E EMISSIONS REDUCTIONS IN 2050 BY CLEAN ENERGY DRIVER AND SECTOR

DRIVER OF EMISSIONS REDUCTIONS		SECTOR				Total MMT CO_2e reduced by driver (compared with Reference Case)
		Residential	Commercial	Industrial	Transport	
1. Energy efficiency (technology and system-wide approaches)	More-efficient appliances and lighting, building shells, factories, and vehicles, including behavioral changes	550	465	374	441	1,830 (38.1%)
	Reduced vehicle miles traveled (light-duty vehicle fleet only)	-	-	-	173	173 (3.6%)
2. Cleaner grid	Widespread renewables	369	454	455	33	1,311 (27.3%)
	CCS with natural gas–fired and coal-fired generation	62	80	78	6	226 (4.7%)
	Nuclear plant closures*,[m]	–111	–121	–131	–9	–372 (–7.8%)
3. Electrification	Electrification of buildings, transport (light-duty vehicles, rail, and some medium-duty vehicles), and industry	225	122	264	481	1,092 (22.8%)
4. Decarbonization of	Production of biofuels, such as biodiesel	-	-	26	240	266 (5.5%)
	Fuel switching in industry and transport (freight and some medium-duty vehicles)	-	-	61	122	183 (3.8%)
	Production of synthetic gas (power-to-gas) and hydrogen	<1	6	37	14	57 (1.2%)
	CCS on industrial processes	-	-	32	-	32 (0.7%)
Total MMT CO_2e reduced by sector (compared with Reference Case)		1,095 (22.8%)	1,006 (21.0%)	1,196 (24.9%)	1,501 (31.3%)	4,798

The results highlight the critical importance of residential efficiency to meeting our climate goals as a nation. However, even as we slowly begin to recognize the cost effective value of pursuing more energy efficiency, the provision of energy efficiency services to low income families continues to fall short of the need and potential. Struggling families sometimes spend more than 20 percent of their incomes on electricity and heat—far more than the national average of 2.7 percent.

When we invest in energy efficiency our whole society benefits. Boosting energy efficiency also means we avoid the cost of building out expensive energy infrastructure like power plants and transmission lines, reducing everyone's energy related utility cost. And everyone's health improves when we help stabilize the climate and reduce the amount of hazardous mercury, sulfur dioxide and particulate matter spewing out of power plant smokestacks and furnaces.

Read the full research from NRDC at: https://www.nrdc.org/experts/khalil-shahyd/residential-energy-efficiency-largest-source-co2-reduction-potential

Understanding Household Energy Use

HEATING & AIR CONDITIONING
Heating and cooling account for 54% of the average household's energy use.

WATER HEATING
Water heating is typically the second largest use of energy in your home, representing about 16% of your annual energy use.

LIGHTING
An average household spents about 6% of its annual energy budgeting on lighting.

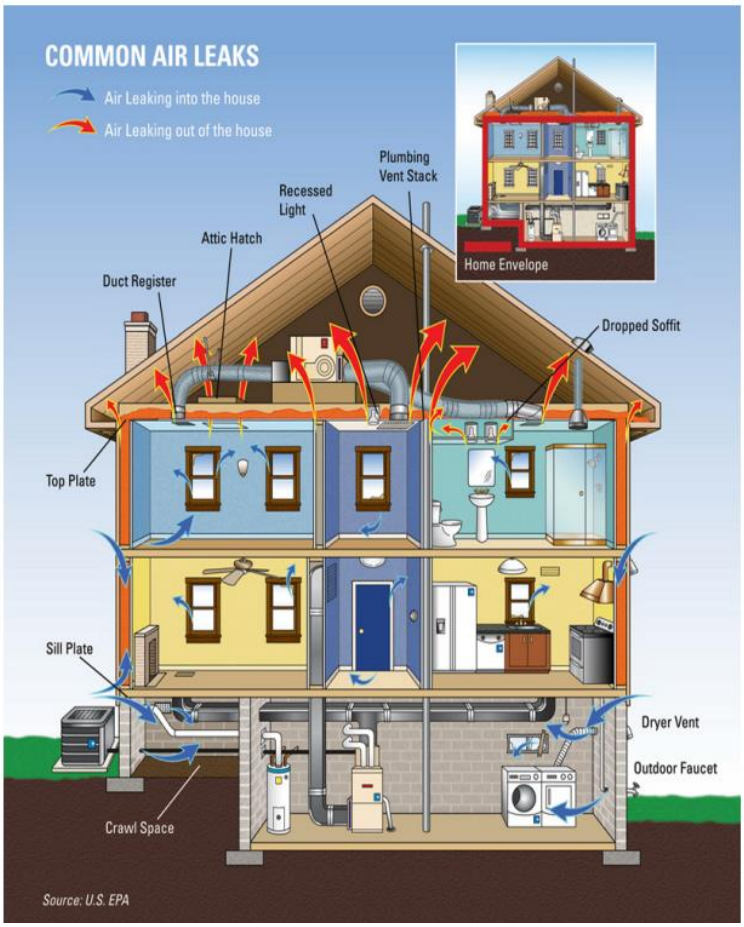
WINDOWS AND DOORS
Old, inefficient windows and doors are often amoung the primary reasons your home is uncomfortable and inefficient. Good seals around doors and windows create a tight building envelope that greatly enhance the performance of your home

ATTIC & CEILING INSULATION
Installing the right type and depth of attic insulation helps reduce heating and cooling costs.

WALL INSULATION
Insulating the sidewalls of a home to the recommended R-value will accomplish three critical goals: reduce heat loss in winter and heat gain in summer resulting in lower energy use, reduce air leakage and keep walls closer to the range of optimal comfort.

FOUNDATION INSULATION
Exposed concrete or masonry systems lose a great deal of energy during the heating season. Insulate and properly air seal the rim joist space

AIR INFILTRATION & VENTILATION
Air infiltration contributes to drafts, uncomfortable temperature and moisture problems that affect the performance of building materials. To combat these issues, take steps to air-seal your home. Proper ventilation mitigates the presence of indoor pollutants such as molds, chemicals and gases



Current Incentives Available To You

as of 2024

Federal Tax Credits

- Energy Efficiency - $1,200 per year (*resets every year, until 2032*)
  - **Energy assessment** – 30% of assessment cost, max $150 per year
  - **Insulation/air sealing materials** - $1,200 max per year, based on materials (30%)
  - **Furnaces/Boilers/Air Conditioners/Water Heaters** - $600 max per year, 30% of materials & labor. Must be most energy efficient version
  - **Doors** - $250 max/year/door, $500 for 2+ doors, 30% of cost of material (*not labor*)
  - **Windows** (*Triple pane*) - $600 max per year, 30% of cost of window material (*not labor*)
- **Air source heat pumps or heat pump water heaters** - $2,000 max per year, 30% of materials & labor. (*Note, air-source heat pumps may require new furnace installed to qualify*)
- **Electrical service upgrade** – 30%, up to $600
- **Solar & geothermal** – 30% of installation, materials & labor. No maximum

Focus on Energy rebates

- Air sealing - $675 off (*when done together with attic or wall insulation*)
- Attic insulation - $525 off (*600 sqft or more, R-19 or less current insulation*)
- Wall insulation - $450 off (*800 sqft or more, uninsulated walls only*)
- Rim joist or basement wall insulation - $150 off (*when done with attic or walls*)
- Duct insulation - $75 off (*when done with attic insul., ductwork in attics/ crawlspaces/ garages only)*
- Smart thermostat - $50 off *(when installed by contractor)*
- Furnace upgrade (*95%+ AFUE*) - $50-$150 off
- Boiler upgrade (*90%+ AFUE*) - $300-$400 off
- Air Source Heat Pump - $1,000 off

Inflation Reduction Act – This new law will bring different incentives in the coming years. At present these funds are not yet available, and are not expected in most of 2024. As you're considering larger improvements in coming years, please check back in with us and we can provide a list of available incentives. Improvements made this year will still qualify for tax credits, and won't make you ineligible for future incentives later. *Note, this rebate only has an income limit, below.*

Ex: Electrification Rebates – *details coming in mid-2024*

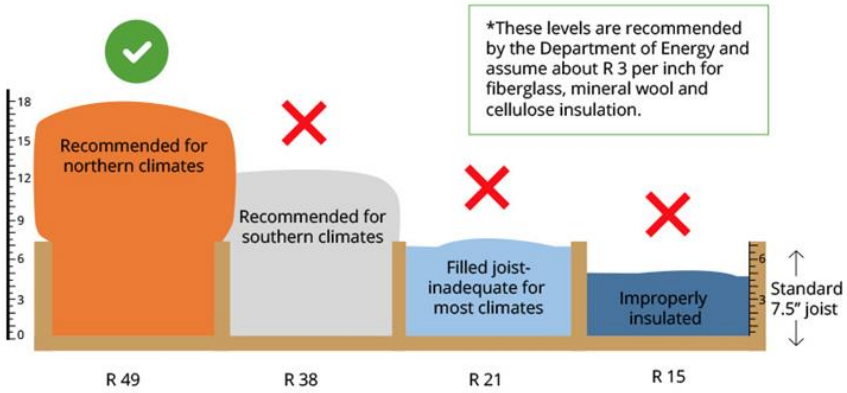
- $8,000 off a heat pump, or 50% of cost (* - see chart), whichever is less
- $1,750 off a heat pump water heater, or 50% of cost, whichever is less
- $4,000 off electrical service upgrade, or 50% of cost, whichever is less
- Additional for heat pump dryers, electrical re-wiring and induction ovens.
- (or 100% of cost, up to the dollar amount, if below a certain income)

People in household*	1 person	2 people	3 people	4 people	5 people	6 people
Up to 100% of cost, limit	$47,280	$54,080	$60,800	$67,520	$72,960	$78,400
Up to 50% of cost, limit	$88,650	$101,400	$114,000	$126,600	$136,800	$147,000

AREA OF YOUR HOME: ATTIC, KNEEWALLS AND VAULTED CEILINGS

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 performs at its maximum level.

In general, more attic insulation is better. The Department of Energy recommends 16inches or more (R-49) in the attic, if access allows. This can be accomplished by fiberglass, spray foam, cellulose, mineral wool, etc. But will be most effective if fully uniform like a blanket over you. Blowing in loose-fill insulation helps with that uniform level, as it fills gaps and voids.

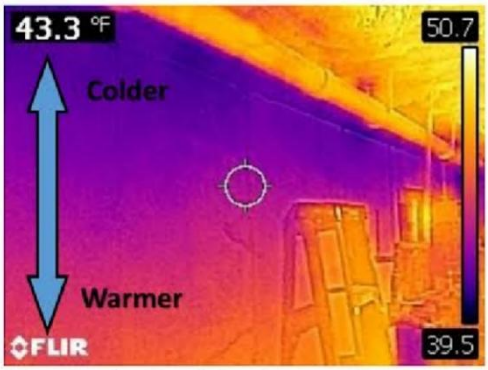


When insulating an attic, always aim to seal the various gaps and air passages that allow conditioned air to leave the home. Around wires, pipes, chimney chases, the hatch/entrance and drywall top plates. Sealing after insulating is hard.

For homes with "kneewall" attics, triangular crawlspace style attics usually on the 2nd floor of a home against a living space, care must be taken to ensure proper air seal and insulation. It is possible to insulate either the roofline or the wall and floor. Be sure to properly air seal around the entrance, electrical boxes, pipes, etc.

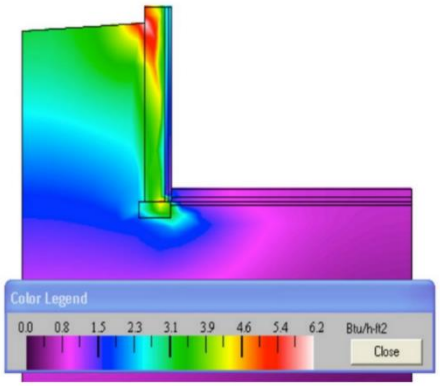
Notes to contractors - For Attic Insulation, reference (M&I) Standards page 62
For Attic Access Insulation, reference (M&I) Standards page 90
For Attic Ventilation, reference (M&I) Standards page 114
For Knee Wall Air Sealing, reference (M&I) Standards page 50
For Knee Wall Insulation, reference (M&I) Standards page 86

AREA OF YOUR HOME: BASEMENTS



Insulating your basement walls will increase the overall temperature of your basement and make the floors above more comfortable. Basements are often the largest uninsulated space in the home.

As the picture shows, even though basements are underground, heat transfers through concrete, especially where the ground freezes. As seen through a thermal camera, basements can lose a lot of heat.



Adding basement insulation to the walls can reduce heat transfer through concrete/brick, which despite its thickness is not very insulating. Most heat is lost out of most basement walls than all the windows of the building combined.

If you are going to seal/insulate anywhere in the basement, focus on the "rim joists", the portion where the foundation wall ends and the floor beams (or "joists") begin. This is often a very leaky area, as different materials come in contact, pipes and wire enter, etc. Insulate with foam - spray or rigid - and ensure sealed

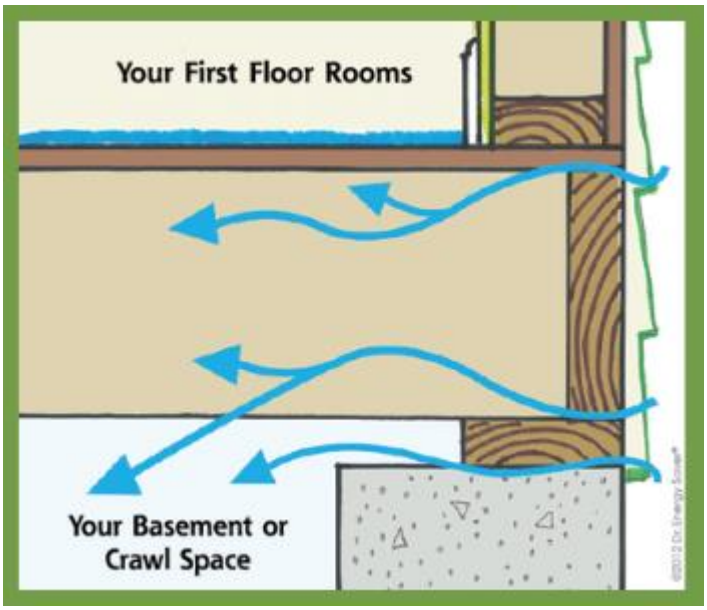
Our approach uses white R-10 rigid foam that resembles drywall, but is water safe, fire resistant & makes the basement dryer and more comfortable. Includes insulating and sealing rim joists with foam. Either mechanically secured with concrete screws and washers or with construction adhesive. Basement can also be insulated with other rigid or spray foam insulation then covered with drywall for a thermal barrier.
Notes to contractors: For Wall Insulation, reference (M&I) Standards page 79
For Rim Joist Insulation, reference (M&I) Standards page 82
For Conditioned Basement Air Sealing, reference (M&I) Standards page 41

AREA OF YOUR HOME: RIM JOISTS

If you are going to seal/insulate anywhere in the basement, focus on the "rim joists", the portion where the foundation wall ends and the floor beams (or "joists") begin. This is often a very leaky area, as different materials come in contact, pipes and wire enter, etc. Insulate with foam - spray or rigid - and ensure sealed

Two-part spray foam, or rigid foam sealed at the sides with one-part spray foam or caulk, both insulates in a thin portion of your building's envelope, as seals air leaks to outside. By definition, rim joists are above ground and can lose a lot of heat while causing moisture concerns.

In years past, people often put fiberglass batts into rim joists. The issue is that fiberglass rarely is put in for a perfect fit, and is also not air-tight. Because of which, outdoor air can leak in (And pests can sometimes enter too). Replace fiberglass with rigid or spray foam insulation, and once that air tight barrier is put in you can add fiberglass if desired.

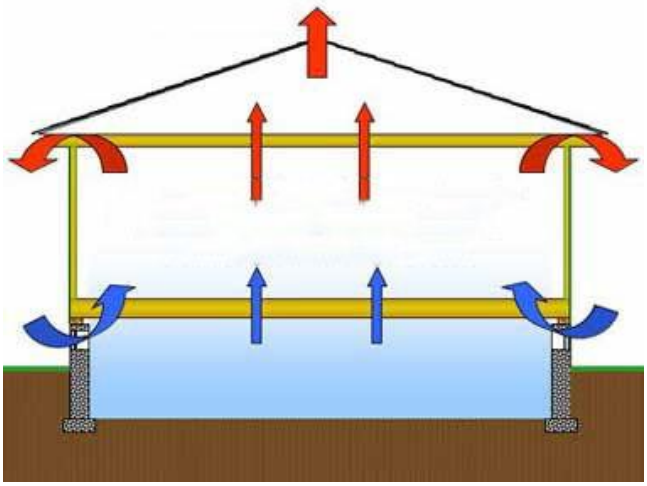


AREA OF YOUR HOME: AIR LEAKS

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.

A blower door is used to measure how leaky the house is by depressurizing it and blowing air out of the house. This in turn pulls air in through all the gaps and cracks, helping to locate them.

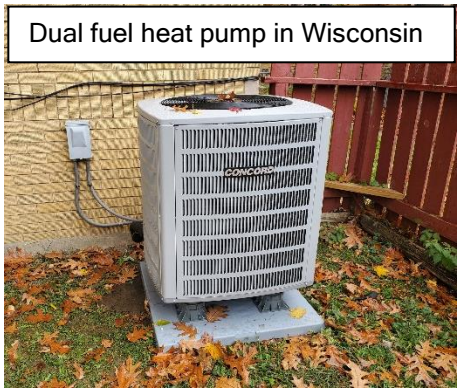
Priority for most homes will be to seal in the attic, beneath the current insulation (if present). Many gaps exist: top plates in drywall, wire and pipe penetrations, drop ceilings, chimney chases and more. Dirty fiberglass is a good indicator of air leaks, as it acts as a filter for dust and dirt when air moves through it.



Air leaks are most often exacerbated by something called the "stack effect", aka "chimney effect". This tends to have warm air leave out of the highest point in the home, and pulling outside air in at the lowest point. This makes leaks at the top and bottom of the home the most concern to energy use

Notes to contractors - For Air Sealing overview, reference (M&I) Standards Page 19
For Attic Air Sealing, reference (M&I) Standards page 27
For Wall Air Sealing, reference (M&I) Standards page 36
For Window Air Sealing, reference (M&I) Standards page 41
For Knee Wall Insulation, reference (M&I) Standards page 86

AREA OF YOUR HOME: HEATING


Dual fuel heat pump in Wisconsin

The majority of energy use in our homes in Wisconsin is heating. So to reduce heating energy, consider installing 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.

Upgrading our heating systems is usually the most straightforward way to reduce carbon emissions, either by increasing the efficiency of the unit or reducing reliance on natural gas instead for systems called "heat pumps".

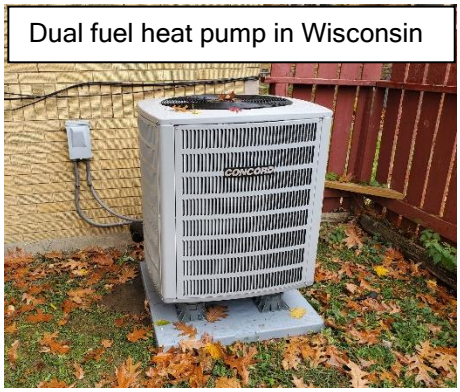
Heat pumps can be 200-300% efficient, where even high efficiency furnaces and boilers may only be 95-97% efficient. However, while a heat pump will reduce the amount of energy needed to heat your home (as well as can be powered by solar panels), at today's natural gas prices switching to an electric heat pump will likely cost you more to operate.

However, as natural gas prices continues to increase, you can have an alternative, and as the grid gets greener (or if your house is mostly powered by solar) then your space heating will be very green!

Note, heat pumps aren't as efficient below certain temperatures below freezing (or sometimes well below 0 degrees, depending on model), as such a "dual fuel" model is recommended in most Wisconsin homes, where the heat pump operates above that temperature to heat or cool, and the gas appliance heats below that.

AREA OF YOUR HOME: COOLING

While Wisconsinites don't spend as much time cooling as they do heating, a high efficiency air conditioner or heat pump can save on cooling expenses. Choose a high "SEER" model (Seasonal Energy Efficiency Ratio), generally SEER 16 or above. Heat pumps can be SEER 19 or more, while also being able to heat the home too.



Dual fuel heat pump in Wisconsin

AREA OF YOUR HOME: THERMOSTAT

Installing a smart thermostat will help you to use less energy when you're not at home or when you're sleeping, by learning behavior and sensing occupancy.

Installing a smart thermostat can reduce heating & cooling costs by adjusting the temperature based on occupancy, learning behavior and other smart upgrades. Some smart thermostats work better for different wiring behavior, consult an HVAC expert if needed.

Contrary to some opinions, adjusting the thermostat up and down throughout the day as needed WILL save energy, as it takes a lot of energy to keep the house at a constant temperature when it is really hot or really cold outside.

Some smart thermostats, such as the Ecobee, can coordinate around our utility's Time of Use electric plans, where we can opt to pay more or less for electricity depending on what time of day we use it, further saving money.

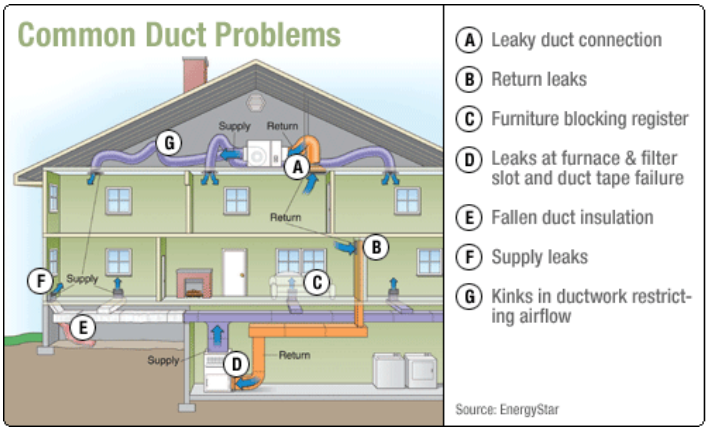
AREA OF YOUR HOME: LIGHTING

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 and CFLs with LEDs will save significant energy and replacement costs over time.

Example of LED bulbs. LED bulbs come in a variety of sizes, colors and shapes.

Another way to save on lighting is the use of motion sensors, dimmers, schedulers, smart-bulbs, etc. Example of a motion-sensor built in LED bulb.

AREA OF YOUR HOME: DUCTWORK



If you have a forced air system for heating or cooling, sealing the connections and penetrations with mastic will ensure that all of the air makes it to where it was designed to go. This increases the efficiency of your heating and cooling system and improves comfort. If you have a boiler system for heating, insulating the pipes will increase the effectiveness of the system.

Examples of duct sealing, either with mastic tape or painted on mastic. Mastic is similar to a rubberized cement that can withstand movement when the ducts have air running through them

Duct sealing is an important job that often gets overlooked in HVAC systems. When new furnace/air-conditioner systems are installed the ducts are often left alone, but this "distribution system", which moves conditioned air in the home like arteries do for the heart, has important impacts for energy efficiency.

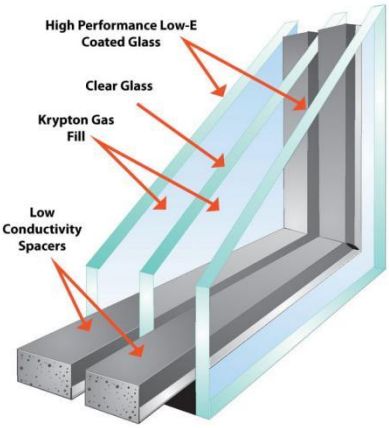
If ductwork is in an unconditioned space, like an attic, garage, crawlspace or some basements, leaks in the metal anywhere where one piece touches another can be lost energy. Furthermore, leaks in the return or supply even in conditioned spaces can lead to over or under-pressurizing rooms, which increases air leak issues (see the air leak section). Lastly, if the air you are heating/cooling cannot make it fully to the intended rooms (aka "death by a thousand cuts"), then the air handler fan has to work harder to correctly condition rooms, and may encourage residents to turn up the heat, further using energy.

Notes to contractors: For Duct Sealing, reference (M&I) Standards page 103
For Duct Insulation, reference (M&I) Standards page 107

AREA OF YOUR HOME: WINDOWS

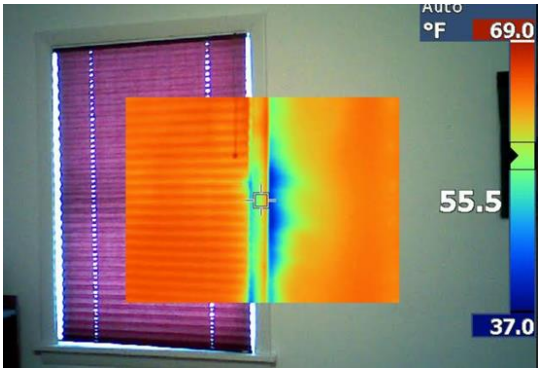
Adding storm windows, solar screens or replacing your current windows can save energy and help reduce drafts or solar gain. However, the cost of window replacements often don't reduce energy use by as much as some would believe. Window replacements usually take decades to pay for themselves. That being said, there are many good reasons to replace windows (aesthetic look, concern with lead paint, broken or not well functioning, etc.)

Triple pane windows work by having 3 panes of glass, with a near invisible metallic "Low-E" (emissivity) coating that reflects heat out of the house in the summer and back into the house in the winter. The space between the panes is filled with an inert gas, such as argon.



A less expensive option, and one that can maintain historic building look, are "interior window panels", sometimes called "interior storm windows". These go inside the home and are usually glass with the option of a Low-E coating for further savings (although they can come in different materials). Interior window panels can add that 2nd or 3rd layer of glass, increasing air-tightness and bringing windows closer to triple pane performance

(Examples) However, air leaks near windows may actually not be from the window itself, but behind the frame where the window is in contact with the wall. The "rough-in" portion is sometimes stuffed with fiberglass, which isn't air-tight. Instead, use window-formula one-part spray foam to seal and insulate. This can be done in some cases on existing windows by removing the trim to apply foam.
Note to contractors: For Window Air Sealing, reference (M&I) Standards page 38



AREA OF YOUR HOME: WATER HEATER

While in years past water heating was a larger portion of our annual budget, with the relatively lower cost of natural gas (compared to electric or propane water heating) it is small now. Higher efficiency water heaters won't save a lot of money, we don't spend a large portion of our energy bills to heat water. However, that doesn't mean it isn't worth doing, especially considering the average water heater lasts for only 13-15 years.

Consider replacing the current unit with a "heat pump water heater", a fully electric model that can be powered by renewable energy. Heat pump water heaters move heat instead of burning it, and can help dehumidify the room it is located in.

Insulating an older water heater with a blanket of insulation can help reduce “standby loss”. The majority of water heaters have some insulation in them, but like in an attic more can help. Depending on where it is located, such as a garage or unheated basement, it can make more sense.

The same is true for hot water pipes from a water heater. Insulating cold water pipes can also help with condensation issues during summer.

AREA OF YOUR HOME: EXTERIOR WALLS

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.

Notes to contractors: For Wall Air Sealing, reference (M&I) Standards page 33
For Wall Insulation, reference (M&I) Standards page 65

AREA OF YOUR HOME: WATER USING DEVICES

You can see savings on your water, water-heating, and sewer bills by using more efficient devices and settings for devices that use water: toilets, showers, faucets, dishwashers and washing machines.

When choosing a new dishwater or washing machine, choose an ENERGY STAR rated model, and for washing machines consider a “front loading” washing machine to further save.

Thermostatic shower valves can reduce heat loss while you're waiting for the shower to warm up. By shutting the water off the moment it has hit the perfect temperature, allowing you to get in and pull the pull chain to start it, wasting less water and energy!

Faucet aerators reduce the amount of water used per minute. Most faucets are 2.2 gallons per minute (gpm), while higher efficiency models are 0.5-1.0 gpm, saving both water and energy used to heat water.

High efficiency toilets now come in 1.28 gallons per flush, and sometimes even less than 1 gallon per flush.Contrasted with older, pre-1994, toilets that used 3 or more gallons with every flush. Toilets can also be retrofit to reduce water via devices like “toilet tank banks” or “dual flush” kits.

Lastly, consider turning down the temperature of your water heater to 120 degrees to further save energy.

OPTION FOR YOUR HOME: SOLAR PANELS

Install a solar PV (photovoltaic) system to offset electric energy consumption in your house. A PV system can reduce or even eliminate your electric bill entirely.

While the electrical grid is slated to be 100% renewable by 2050, having solar panels can source your electricity from the sun now.

Generally, because of what is known as "net-metering" rules on how you can send excess power back to the grid, it is generally best practice to size the solar system to the amount of power you use now, or expect to soon use (don't expect to turn your home into a solar farm!). But if you are considering "electrifying" your home with heat pumps, heat pump water heaters, induction stoves and/or electric car chargers, consider doing that first so you know how much electricity you'll be using and need to offset with the solar panels

Definitions, Explanations and Links

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 op-eration and associated energy losses of the heating unit as it responds to changes in the load, which in turn is af-fected 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, remodelling 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 improve-ments, cashflow is the difference between the average monthly energy savings and the monthly loan payment.

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 station-ary 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) and other methods. It acts as a greenhouse gas which plays a major role in global warming and anthropogenic climate change.

Energy Efficiency Ratio (EER)
— The measure of the instantaneous energy efficiency of room air conditioners; the cooling capacity in Btu/hr divided by the watts of power consumed at a specific outdoor temperature (usually 95 degrees Fahrenheit).

Energy Factor (EF)
— The measure of overall 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 defined as the number of cycles per kWh of input power. For clothes washers, the energy factor is defined as the cubic foot capacity per kWh of input power per cycle. For clothes dryers, the energy factor is defined as the number of pounds of clothes dried per kWh of power consumed.

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.

Heat Recovery Ventilator (HRV) / Energy Recovery Venti-lator (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 effi-cient semiconductor light source. LEDs present many ad-vantages 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 build-ing leaks to the outside naturally.

Payback Period
— The amount of time required before the savings resulting from your system equal the system cost.

Heating Seasonal Performance Factor (HSPF)
— The measure of seasonal or annual 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 by the heat pump over a heating season.

R-Value
— A measure of the capacity of a material to resist heat transfer. The R-Value is the reciprocal of the conduc-tivity 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 con-centrations 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 deter-mine whether a project that aims to save money in the fu-ture is worth doing. The ratio compares the investment that is put in now with the amount of savings from the project.