Carroll Electric Membership Cooperative

Community Built. Community Builder.

Home Energy Survey

Member Workbook

Your guide to an **Energy Efficient Home**

HEATING SYSTEMS

Heating System

◯ Electric ◯ Natural Gas
◯ LPG ◯ Oil
◯ Furnace ◯ Heat Pump
◯ Boiler ◯ Radiant/Space

Number of Systems

◯ 1 ◯ 2 ◯ _____

Efficiency: _____ AFUE/HSPF

Capacity: _____ Btuh

Year Installed: _____

Thermostat Setting

◯ 65°F ◯ **68°F** ◯ 70°F
◯ 72°F ◯ 74°F ◯ ___°F

Set-Back

___°F from ___°F to ___°F

Recommended Heating Efficiency Ratings:
Heat Pumps – 8.5 HSPF
Furnace – 90+ AFUE

Sizing: *ACCA Manual*

A high efficiency heating system means big savings because this is one of your home's biggest energy users.

Heating systems must be properly sized and installed to operate efficiently and provide good comfort.

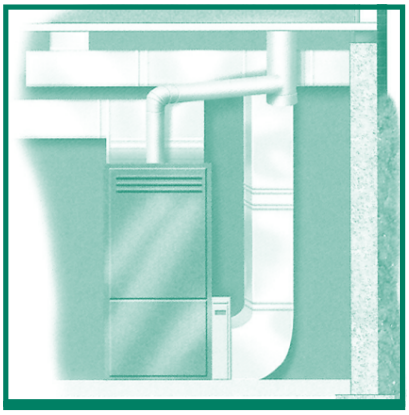
• Select the highest efficiency that your budget allows.

• Calculate the required heating capacity using Air Conditioning Contractors of America (ACCA) procedures.

• Properly size the system to match the ACCA sizing guidelines.

Under Floor Installation - Heat pump, furnace and air conditioner blower assemblies installed in crawl spaces, basements or garages may be extremely difficult to access and service.

Even small leaks in ducts or blower assemblies can introduce large amounts of moisture, mold, mildew and fungus spores into the living spaces.



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COOLING SYSTEMS

Heating System

◯ Wall/Window ◯ Heat Pump
◯ Package A/C ◯ Central A/C

Efficiency: _____ SEER/EER

Capacity: _____Tons/Btuh

Year Installed: _____

Thermostat Setting

◯ 80°F ◯ **78°F** ◯ 76°F
◯ 74°F ◯ 72°F ◯ ___°F

Set-Back

___°F from ___°F to ___°F

Recommended Cooling Efficiency Ratings: *Air Conditioners and Heat Pumps – 15 SEER*

Sizing: *ACCA Manual J*

Cooling is often the single largest energy user in Georgia homes, typically accounting for 20% to 50% of your annual energy use.

We recommend a minimum efficiency rating of 15 SEER. Systems are available with efficiency ratings of 20 SEER or more.

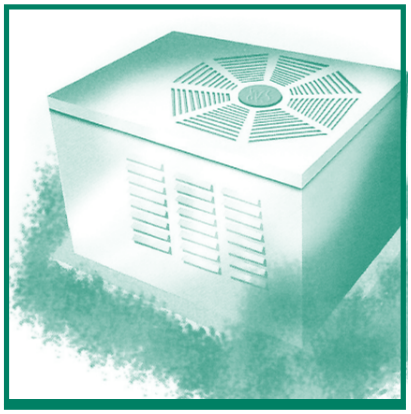
• Select the highest efficiency that your budget allows. You will save money on operating costs each month.

• Calculate the required cooling capacity using Air Conditioning Contractors of America (ACCA) procedures. Improvements increase your home's efficiency and you may be able to buy a smaller, less expensive unit.

• Properly size the system to match ACCA sizing guidelines.

• *Oversized (larger) air conditioners do not operate properly or improve comfort.*

• *Require air ducts be sealed and tested.*



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WATER HEATING

After heating and cooling, this is the largest user of energy in your home - and offers big opportunities for savings.

An efficient water heater has a well-insulated tank to reduce heat loss from the water. Insulation should be at least R-11 to R-19.

Size is also important - a tank that is too large wastes energy since it maintains a supply of unneeded hot water. A tank that is too small may also waste energy if it cannot maintain warm water supplies.

Locate the water heater centrally to the areas of most use

◯ Electric ◯ Natural Gas
◯ LPG ◯ Oil ◯ HPWH

◯ Temp Set
Recommended Set Point = **120°F**

Number of Tanks

◯ 1 ◯ 2 ◯ _____

Input Energy: _____ watt/Btu

Efficiency: _____ EF Rating

Capacity: _____ gallons

Year Installed: _____

Timer ◯ Yes ◯ No
Off from ____ to ____

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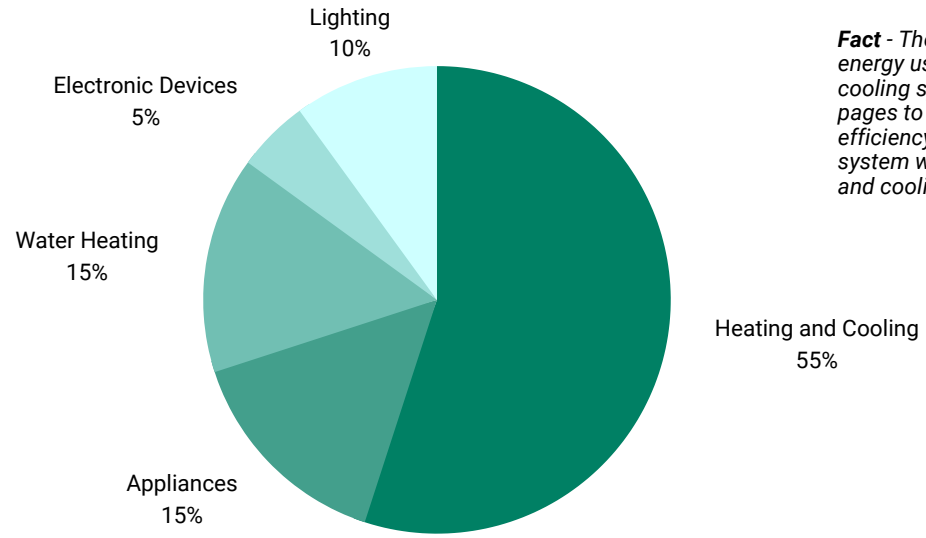
What Size Water Heater Do You Need?

HOUSEHOLD SIZE		GAS	ELECTRIC
5 or more	Regular Demand	60 Gal.	80 Gal.
	High Demand	75 Gal.	120 Gal.
3 to 4	Regular Demand	60 Gal.	50 Gal.
	High Demand	50 Gal.	80 Gal.
2 or less	Regular Demand	40 Gal.	40 Gal.
	High Demand	50 Gal.	50 Gal.

ENERGY USAGE BREAKDOWN



***Fact** - The chart shows the average consumer's energy usage. For most homes, heating and cooling systems use the most energy. In the pages to follow, we will investigate the efficiency of your building envelope and HVAC system which are directly related to the heating and cooling efficiency of your home.*

CEILING INSULATION

- ◯ No Insulation
- ◯ R-_____
- ◯ R-11
- ◯ R-19
- ◯ R-26
- ◯ R-30
- ◯ **R-38**
- ◯ R-49
- ◯ Radiant Barrier (Properly Installed)

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R-value is the measure of how well insulation resists the flow of heat. Higher R-values generally increase comfort.

Carroll EMC and the Department of Energy (DOE) guidelines recommend a minimum R-Value of 38 in all flat ceilings. That's about 15 inches of insulation.

In the winter, hot air rises and leaks into the attic through the ceiling of a poorly insulated home.

In the summer, hot air, heat and moisture move back into the house… putting a real strain on the air conditioner.

Make sure that all air that leaks between the house and attic are well sealed. A good air and vapor retarder is important to control moisture and heat loss.

Don't forget the attic access hatch or doors. Be sure that they are well sealed, weatherstripped like an exterior door and insulated.

WALL INSULATION

- ◯ No Insulation
- ◯ R-_____
- ◯ R-5
- ◯ R-11
- ◯ R-13
- ◯ R-15
- ◯ **R-19**
- ◯ R-22
- ◯ Radiant Barrier (Properly Installed)

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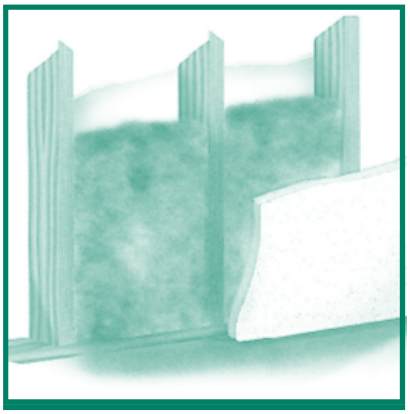
Air Barriers and Vapor Retarders *reduce leakage of conditioned air and moisture into wall cavities.*



The walls are the largest area of your home exposed to the outside air.

Recommended insulation levels for this climate range from R-13 to R-19. Rigid foam insulation may be added to improve performance.

A good air barrier (house wrap) is recommended on exterior, frame walls. All leaks must be properly caulked and sealed.

Knee walls, that back up to hot attic spaces, must be insulated to a minimum of R-18 according to Georgia energy code requirements.

Sheathing on the attic side of the knee wall is recommended.

FLOOR INSULATION

Crawl Space Floors: Floors over a crawl space should be insulated to a minimum R-value of 19.

Floors over unheated spaces: Floors exposed to outdoor air should be insulated to the same levels as crawl space floors. In addition, protect insulation from wind and weather

Slab-on-grade floors do not require insulation. When on-grade slabs are insulated, the insulation shall extend from the top of the slab down to at least the finish grade.

◯ No Insulation ◯ R-_____

◯ R-11 ◯ R-13 ◯ **R-19**

◯ R-26 ◯ R-30 ◯ R-38

Crawl Space: ◯ Enclosed ◯ Open/Exposed

Crawl Space Wall Insulation: R- _____

Conditioned Basement:

Percentage of wall below grade:

Percentage of wall above grade:

Basement Wall Insulation: R-_____

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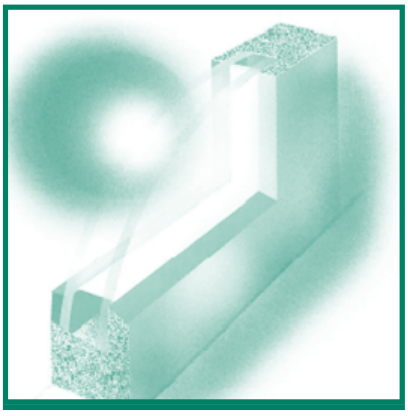
Crawl space *– Install a complete vapor retarder (e.g. 4-mil or 6-mil black polyethylene film) on the ground to reduce moisture migration into the crawl space.*

WINDOW INSULATION



Window Comparison (U-Factor)

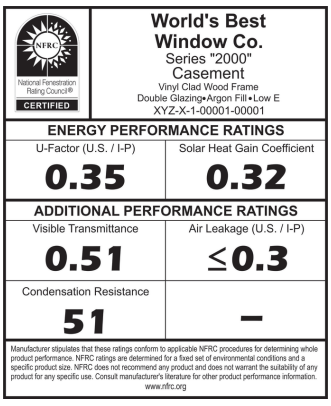
Glazing	Wood	T.IM.	Metal
SP, clear	0.999	1.045	1.155
SP, storm	0.475	0.525	0.650
Dbl, clear	0.551	0.609	0.725
Dbl, storm	0.341	0.385	0.490
Dbl, low-e	0.361	0.399	0.475

Old-fashioned, single-pane windows lose up to half of your heating and cooling energy.

Double pane windows with Low-e coating can keep heat in during the winter and summer heat out, yet still let light in.

Interior drapes and blinds particularly on west and south glass can also be very important. Shaded glass will block summer sun and heat while keeping the house more comfortable

Look for the NFRC Label



◯ Single Pane ◯ **Double Pane**

◯ Triple Pane ◯ Storm ◯ **Low-e**

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Exterior Shade:

◯ South ◯ West ◯ East ◯ North

Interior Shade: _____

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U-factor *is the common rating used to compare window efficiency. With U-factor, smaller is better, so look for the lowest rating possible for your budget.*

Low-e *is a coating applied to high-performance glass to reflect heat without blocking visible light.*

DOOR INSULATION

- ◯ Hollow-Core Wood
- ◯ Solid Wood
- ◯ Storm
- ◯ Insulated (Fiberglass Core)
- ◯ **Insulated (Urethane Core)**
- ◯ Other: _____
- ◯ Recommend: Improve Weatherstripping

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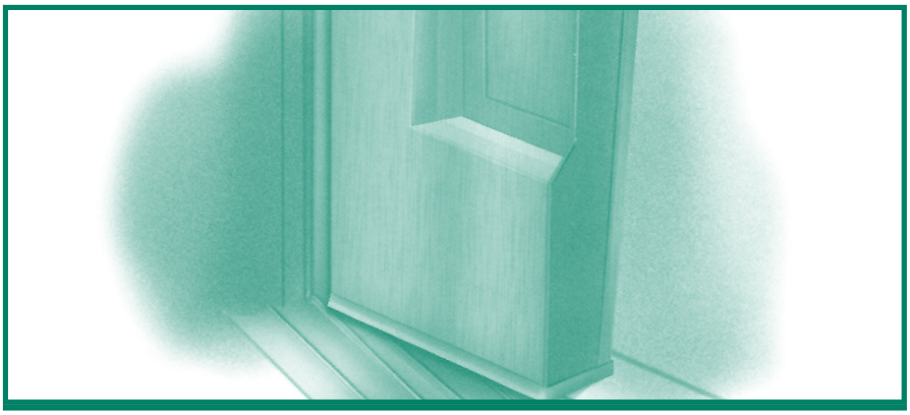
High-performance Metal (steel) or Fiberglass *Doors should be filled with urethane foam. Use high-quality weatherstripping for best performance.*



An insulated door is built like a sandwich with an insulated core to hold in heated and cooled air. In addition, the door will have a rubber strip to seal against drafts.

Insulated doors can look as good as wooden ones and there is a large selection of colors and styles from which to choose. In cold climates, consider a storm door for added protection and to reduce air leakage.

Door Comparison (R-Value)

Door Construction	R-Value	Cost Index
Hollow-Core Wood	1.0	1.0
Hollow-Wood	1.5	1.6
Solid Wood	2.3	2.0
Metal, Urethane Core	2.6	2.6
Solid Wood, Storm	3.5	2.3

INFILTRATION CONTROL

◯ **Best** – Continuous infiltration barrier, all cracks and penetrations sealed, tight windows/doors, vents/fans dampered, recessed lights sealed, no combustion air from indoors, no duct leakage.

Fireplace - Outside combustion air, tight glass doors and damper.

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◯ **Average** – Partial infiltration barrier, major cracks and penetrations sealed, average windows/doors, vents/fans dampered, lights/fixtures not sealed, combustion air from indoors, intermittent ignition and flue damper, some duct leakage to outside.

Fireplace - Combustion air from indoors, light doors or damper.

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◯ **Poor** – No infiltration barrier, no attempt to seal cracks and penetrations, poor windows/doors, vents/ fans not dampered, lights/fixtures not sealed, combustion air from indoors, standing pilots, no flue damper, considerable duct leakage to outside.

Fireplace - Combustion air from indoors, no glass doors or damper

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Air leaks are often the single largest cause of heat loss in the home. Even small leaks can greatly impact comfort and heating/ cooling costs.

Sealing the many air leaks that penetrate the exterior envelope of your home is extremely important. Anywhere leaks can be found should be sealed. Sealing these leaks greatly improves the performance of your home and ensures improved comfort levels.

1. Caulk and seal leaks around plumbing and piping holes.

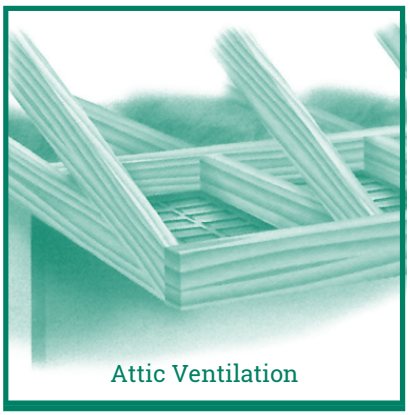
2. Seal holes in ceiling and floor.

3. **Seal HVAC Duct Systems** - air tight with mastic, not tape alone.

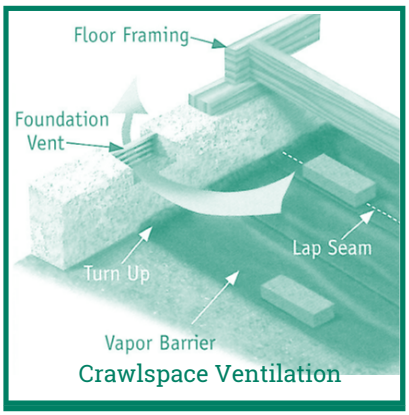
4. Caulk and seal leaks around windows and doors.

5. Close fireplace dampers and stove flues, when not in use.

VENTILATION



Attic Ventilation



Crawlspace Ventilation

To avoid straining your cooling system, use ridge, soffit and gable vents to let out hot air and moisture.

Heat builds up in the attic. A series of soffit vents at the roof overhangs, along with a continuous ridge vent, make it easier for this hot attic air to get out. Other options such as gable or standard roof vents may also be effective in some cases.

Many experts suggest that crawlspaces should be encapsulated.

Be sure to protect water pipes from cold winter air. Install pipes within the heated spaces whenever possible.

◯ Gable

◯ Turtle Vents

◯ Power ◯ Turbine ◯ Soffit

◯ **Continuous Ridge and Soffit**

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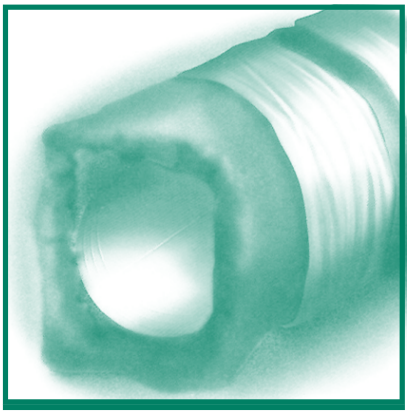
***Fact** - Good ventilation is important. However, ventilation of attic and crawl spaces can increase infiltration if leaks in ceilings and floors are not well sealed.*

DUCT SYSTEMS



Duct systems deliver heated and cooled air where it belongs - in the living area of your home.

Air ducts must be sealed and completely air tight for the proper performance of the cooling and heating system!

Never seal ducts with tape alone. High quality duct mastic should be used.

A properly insulated duct pipe helps keep your cooling and heating system from wasting energy and money.

Insulation for ducts located in unconditioned spaces must be at least R-6. Ducts exposed to outside air in attics and crawl spaces should be insulated to R-8 or even R-11 if possible.

Whenever possible, the ducts should be installed within the conditioned areas to eliminate losses altogether.

◯ No Insulation ◯ R-2

◯ R-4 ◯ **R-6** ◯ R-8+

◯ Basement ◯ Attic

◯ Crawlspace ◯ Conditioned Space

◯ Air tight ◯ Sm Leaks ◯ Lg Leaks

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Duct sealing to eliminate leaks can significantly reduce heating and cooling energy use and greatly improve overall comfort.

Only qualified technicians who are trained in proper safety and testing procedures should complete duct-sealing work.

APPLIANCE ENERGY MANAGEMENT CHART

KITCHEN APPLIANCES (per year)

APPLIANCE	kWH	COST
Dishwasher	472	$44.46
Range with Oven	1,129	$106.35
Freezer – Upright, Manual Defrost	1,113	$104.84
Freezer – Chest, Manual Defrost	894	$84.21
Freezer – Upright, Frost Free	2,646	$249.25
Microwave Oven	193	$18.18
Refrigerator	1,460	$137.53
Toaster Oven	428	$40.32

LAUNDRY (per year, family of 4)

APPLIANCE	kWH	COST
Clothes Washer	124	$11.68
Clothes Dryer	2,348	$221.18
Iron	199	$18.75

WATER HEATING (per year)

APPLIANCE	kWH	COST
Electric Water Heater	4,928	$464.22

COMFORT CONDITIONING (per year)

APPLIANCE	kWH	COST
Ceiling Fan	110	$10.36
Dehumidifier	3,298	$310.67
Whole House Fan	1,825	$171.82
Window Fan	438	$41.26

CONSUMER ELECTRONICS (per year)

APPLIANCE	kWH	COST
Computer	460	$43.33
Plasma TV	875	$82.43
LCD TV	329	$31.00
LED TV	279	$26.28
Stereo	161	$15.16

MISCELLANEOUS (per year)

APPLIANCE	kWH	COST
Clock Radio	88	$8.29
Curling Iron	3	$0.28
Electric Blanket (8 hrs/day)	511	$48.14
Hair Dryer	110	$10.36
Vacuum Cleaner	36	$3.39
18-Watt Compact Fluorescent Bulb	39	$3.67
100-Watt Fluorescent Light Bulb	219	$20.63

Energy use adopted from Apogee Interactive, Inc. These figures are based on standard use and standard wattage calculations. If you'd like specific numbers for your home, please visit carrollemc.com/energy-efficiency-programs

Appliance Energy-Use Calculators can only compute approximate energy-use values. This is due to varying conditions of climate location, actual versus run watts, "hidden" loads, and use patterns that change from day-to-day within any given home.

Not all appliances actually go "off" when turned off. These "hidden" loads are appliances that, when turned "off", still use power (timer, clock, remote control, etc.), even though they appear to be off or not in use. "Hidden" loads are included where typically applicable.

Figure Your Own

You may want to figure exactly what it costs to operate your specific appliances or any appliances and equipment around your home that are not listed above. All you need to know is the **WATTAGE** of the appliance or equipment…that can be found on the appliance itself…and your local utility's **COST PER KILOWATT-HOUR (kWh)**, which is approximately $9.42 cents. Since you know how many **HOURS** you use your appliances you will have the information to figure how much it costs to run each one. Simply follow this formula:

Wattage	Hours		Average Cost		Operating Cost
(per appliance) x (used per month)		x	Per kWh	=	Per Month
1,000					

For Example:

1200 (fry pan) x 12 hours = 14,400 = 14.4
1,000

14.4 x .09 (cost per kWh) = $1.30

You can also visit our online appliance calculator at carrollemc.com/energy-efficiency-programs

ENERGY TERMS

ACCA - Air Conditioning Contractors of America

AFUE - (Annual Fuel Usage Efficiency) - An efficiency rating for a furnace measuring the amount of heat delivered by the furnace compared to the amount of heat put into the furnace and then averaged for average winter conditions. AFUE is expressed as a percentage.

Air Barrier - A continuous surface designed to block the flow of air.

Air Change - A method of expressing the amount of air leakage into and out of a building or room. One air change would mean the volume of air in a home has been replaced one time.

ACH - Air Changes per Hour

Air Conditioning - A term usually associated with summer cooling of indoor air for comfort. More correctly, and originally, referred to as "Refrigerated Air."

ASHRAE - American Society of Heating, Refrigeration, and Air Conditioning Engineers

Boiler - A device to heat water, which is then used to condition the occupied spaces of a building.

Btu - (British Thermal Unit) - A measure of heat equal to about one wood match stick. Technically, it is the amount of heat required to raise the temperature of one pound of water one degree Fahrenheit.

Btuh - (Btu/Hour) - A unit used to express the rate of heat flow, heat loss, and heat gain of a structure. Capacity of heating equipment and cooling equipment is also expressed in Btuh.

CFM - (Cubic Feet per Minute) - A flow rate to measure the quantity of air moving through a fan or air duct or the amount of air delivered to a room.

Conditioned Space - An enclosed space that is mechanically heated and/or cooled.

Duct System - The series of pipes or other channels to deliver conditioned air from the HVAC fan to the rooms or other areas of the home

EER - (Energy Efficiency Rating) - The cooling efficiency of an air conditioner in an exact set of conditions. The higher the EER rating, the more efficient the unit.

Furnace - Refers to a wide variety of heating systems incorporating a blower (fan) and heating unit, which is either connected to an air distribution (duct) system or may blow directly into the space to be heated.

GPM - (Gallons Per Minute) measurement of liquid now

Heat Gain - The increase in the amount of heat contained in a home as a result of solar load, infiltration of warm air, and the heat transmitted through the walls, ceilings, floors, doors, and windows when it is warmer outside the home than inside.

Heat Loss - The decrease in the amount of heat contained in a home resulting from heat flow through walls, windows, and roof, and air leakage when it is colder outside the home than inside.

Heat Pump - A system that provides both summer cooling and winter heating. In the winter a heat pump extracts heat from the outside and transfers it to the inside of your home. It is able to "move" this heat at a much lower cost than an electric furnace would "make" the heat. In the summer, a heat pump works just like an air conditioner.

HVAC - Heating, Ventilation and Air Conditioning

Infiltration - The uncontrolled movement of air into and out of the conditioned space through cracks and holes in the building envelope.

Infiltration Control - Any method of reducing unwanted infiltration and/or controlling the amount of infiltration air by quantifying the exact amount of air coming into a home through mechanical means. (See ventilation)

Kilowatt - 1,000 watts

Kilowatt Hour - The unit used to meter electricity. One kilowatt used for one hour = One kilowatt hour.

NFRC - (National Fenestration Rating Council) - A national energy rating council that administers a system for testing windows, doors, and skylights.

Natural Gas Measures:

Cubic foot - A volumetric measure to quantify natural gas (or any other material) and equal to a cube measuring 1 ft wide, 1 ft long, and 1 ft high. Abbreviation in natural gas industry is cf.

1 cf = 1 cubic foot 1 ccf = 100 cf 1 mcf = 1,000 cf

Natural Gas Heat Content:

1 cf = approx. 1,000 Btu 100 cf = approx. 1 therm
1 therm = 100,000 Btu 10 therms = 1 Dekatherm (Dth)

R-Value - (Thermal Resistance) - A measure of a material's resistance to the flow of heat. Higher R-values mean better insulation (more resistance to heat flow).

Return Ducts - The ducts that gather the air from the areas of a home and return it to the HVAC fan.

SEER - (Seasonal Energy Efficient Ratio) - The average efficiency of an air conditioner when the climate conditions of an average summer are applied to the EER ratings.

Supply Ducts - the ducts that deliver air from the HVAC fan to the remote areas of a home.

Ton of Air Conditioning - 12,000 Btu's of total cooling capacity equals "one ton" of air conditioning.

U-Factor - The measure of how many BTUs of heat pass through one square foot of a composition of materials, measured in a one-hour time period. The lower the heat transfer, the better the material(s) are in terms of insulation.

Vapor Barrier - A moisture impervious layer applied to the surfaces to prevent moisture travel to a point where it may condense due to lower temperature.

Vapor Retarder - Similar to a barrier, a retarder resists the migration of vapor but still allows some migration to eventually dry a space.

Ventilation - The controlled movement of outside air, through the conditioned space and eventually outdoors again. Ventilation systems may include such devices as fans, heat recovery systems, dehumidification equipment and filtration.

Window Efficiency - The rating of a window for energy conservation as found on NFRC label. The NFRC label on a window, door or skylight will identify the properties of the window in terms of heat flow (U value), solar heat gain coefficient (SHGC) and air infiltration.

Watt - (abbreviation - W) - A unit of electrical measurement or work performed. Wattage quantifies electrical current usage with both voltage and amperage considered. See related Watt definitions:

1 watt equals 1 Ampere at a pressure of 1 volt (electric current), or 3.413 Btus (heat current), or 1 watt used for one hour equals 1 watt hour.

Need help conducting a home energy audit?

We can help!

Rolando Benitez, Carroll EMC Member Advocate

770-830-5721

rolando.benitez@carrollemc.com

Rebates

As a member of Carroll EMC, you may be eligible for rebates on energy-saving products and services.

Learn more at **carrollemc.com/energy-efficiency-programs.**

NOTES/COMMENTS/RECOMMENDATIONS

Carroll Electric Membership Cooperative

Community Built. Community Builder.

Home Energy Survey

Member Workbook

Your guide to an **Energy Efficient Home**

3/22