Together We Save!

Plug in to energy savings.

Cost-cutting solutions for your home

GREYSTONE POWER CORPORATION

Your Touchstone Energy® Cooperative

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Energy savings booklet author and GreyStone Residential Marketing Manager Rudy Echols

We do not have to be told the cost of energy is on the rise. It can be seen at the gas pumps, on our utility bills, and we hear about it from media sources every day. Many of us are becoming concerned when we open our utility bills and find that energy costs are increasing more and more.

How we respond to this issue will determine our ability to save energy in our homes.

The GreyStone Power Corporation Board of Directors and management team works hard to keep the cost of energy as low as possible for its member-owners. Our rates remain among the lowest in the state. The demand for our product, electricity, continues to grow at a rapid pace. By providing this guide, GreyStone wants to help ensure that our members have the knowledge to understand and control their home energy usage. GreyStone encourages the use of electricity in a wise and efficient manner.

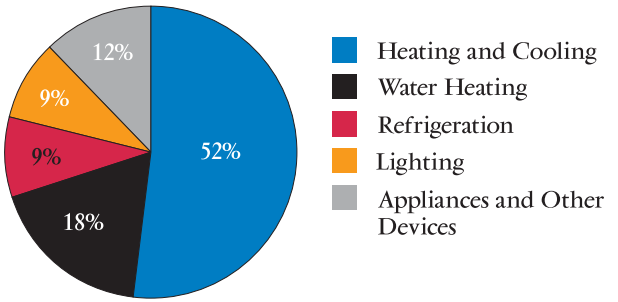
It is easy to mistakenly blame increased electric bills on our **electric meter** by assuming it is not accurate. In fact, electric meters are very accurate and are not to blame. Electric meters simply measure the amount of electricity that your home uses during a specific period of time. Although meter misreads happen on a rare occasion, the accuracy of an electric meter (within parameters) is near 100 percent.

Comparing your electric bill is also not realistic. No two houses or households are exactly the same. From an exterior perspective, no two houses have the same thermal envelope characteristics.

From an interior perspective, no two households have the same heating and cooling system requirements with related duct system design and installation issues, family comfort requirements, appliance and other electrical product usage patterns and maintenance issues, or family demographics.

It is important to remain focused on possible solutions for your particular situation by asking questions such as, "What can I do to save energy dollars in my home?" In order to answer this important question, we must educate ourselves about energy usage in our homes. We need to understand where the major energy users are located and then take measures to save, and not waste, energy dollars.

WHERE ENERGY DOLLARS GO IN A TYPICAL HOME



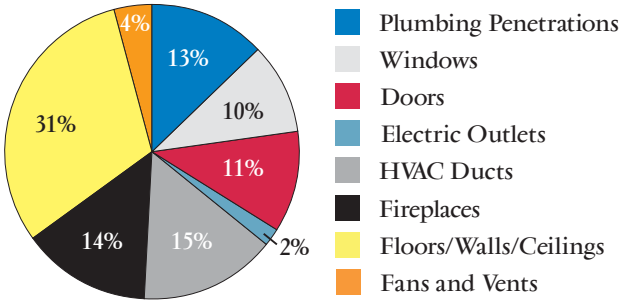
This guide is meant to provide information you need to know in order to become aware of potential energy drains and will also provide solutions to help reduce your energy costs. By addressing these issues, you will realize a safer, healthier, more comfortable home environment. Take a moment and review the chart above.

Then, read this guide to find information that will help you reduce your home's energy consumption. Plug in to energy savings.

Your home's insulation and air tightness

Checking your home's **insulation value** is important in determining the level of energy waste through your attic, windows, doors, floors, walls, and fireplaces. Insulation is measured in R-Value, and the higher the R-Value, the better insulation will resist the flow of heat. It is equally as important to seal all air leaks in the home that go to unheated areas such as the attic, basement, or crawlspace.

AIR LEAKAGE IN THE HOME



Attic: Typically, 40 percent or more of your home's energy is lost through the attic, making this area the highest priority. A minimum R-Value of 38 is recommended for your attic. The local building codes have been requiring an R-Value of 30 since the early '90s. If your home is older, you probably need to add additional insulation. The insulation type existing in your attic is probably **fiberglass** or **cellulose**; you can add either to raise your insulation to the proper level. The information below will help you determine existing insulation levels:

Blown fiberglass, usually pink or white: R-2.4 per inch
(approx. 15-16 inches needed for R-38)

Blown cellulose, usually brown: R-3.6 per inch
(approx. 10-11 inches needed for R-38)

Batt or quilted type insulation will be marked and is usually available in R-11, R-13, R-19, R-25 and R-30 sizes.

It is recommended that an **insulation contractor** be contacted to discuss the insulation needs of your attic.

All accesses to and from the attic **(attic access door, knee wall doors)** should be weatherstripped and insulated where possible. The attic access door especially represents a significant energy drain. It is also important to use **caulk** or **foam** to seal all air leak penetrations (plumbing, electrical, heating and air, and vent bypasses) from the attic to conditioned areas. If your home has a **whole house fan** installed in the hallway, it is important to insulate the fan in the heating months. This can be done by simply laying a batt of insulation on top of the fan. The louvers don't seal tight, making it a prime energy drain area. If this fan is no longer used in the summer months, it should be taken out and/or sealed and insulated permanently.

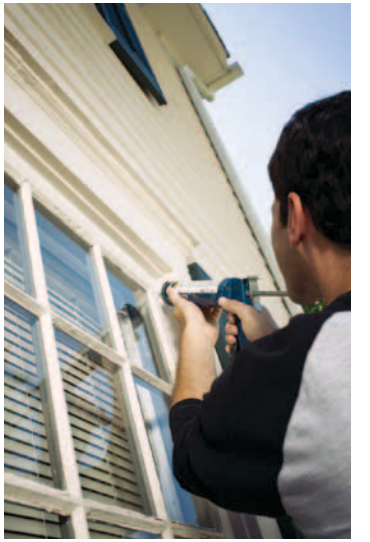
For **attic ventilation** purposes, **power attic ventilator fans** are not recommended. Power attic ventilation can create negative pressures in the home, pulling conditioned air from the home through ceiling air leaks. They can pull pollutants such as mold, radon and other gases from outside the house, crawl space, or basement. Attic ventilation should be accomplished by natural means, not mechanical. Proper attic ventilation is important to remove heat and control moisture.

Attics require ventilation at the top of the roof (roof vents, gable vents) and at the low area of the roof (eve, soffit vents). Fresh air enters the attic through the lower vents, mixes with attic heat buildup, rises and leaves the attic through the higher vents. An attic should not be saddled with an energy-wasting and problem-creating attic ventilation fan.

Windows: Typically, windows will be the next highest priority for saving energy dollars. Single pane windows are an energy loser, especially in winter months, and have not been installed in new homes since the early '90s, when double-pane windows became the standard.

You will certainly save energy dollars by adding storm windows or replacing old inefficient windows with insulated, low E (emission) windows with a recommended SHGC (solar heat gain coefficient) rating of .30 or less and U-Factor rating also of .50

or less. All windows should be properly caulked and weather-stripped. In summer months, east and west facing windows will add a great deal of heat to your house. Shades and drapes will help keep this heat out.



Doors: Doors, like windows, should be properly caulked and weather-stripped. Storm doors are recommended, especially if outside doors are not solid wood or insulated. Remember that doors leading to an unfinished basement, garage, or attic also need to be sealed and weather-stripped.

Floors: It is recommended that floors over unconditioned areas such as garages, basements and crawl spaces be insulated with batt type insulation rated at R-19. It is also recommended that 6 mil plastic be installed properly (overlapping several inches, covering 100 percent of area) on the dirt floors of crawl spaces. The plastic will protect the insulation and the home from excess ground moisture and pollutants such as radon gas. As in the attic, it is important to seal all air leak penetrations in the floor with caulk or foam.

Walls: Walls in existing homes are normally insulated with R-11 or R-13 batts. Typically, nothing more can be done in this area. Older houses (30 + years in age) may or may not have wall insulation.

It is usually not cost effective to try to insulate them. You can, however, ensure that all air leaks (electrical outlets/switch

boxes, seal plates, other penetrations) are sealed with caulk or foam.

Fireplaces: Be aware that fireplaces are one of the most inefficient heat sources you can possibly use. It literally sends your energy dollars right up the chimney along with volumes of warm air, especially if other heat is being utilized at the same time. When not in use, keep the damper closed. A glass screen is also recommended.

Your home's heating and cooling system

As you have already seen, summer cooling and winter heating, followed by water heating, are typically the major users of energy in your home. These items will usually have the biggest impact on your energy bill. Summer air conditioning usage can increase your energy bill significantly.

Heating and Cooling: Heating and cooling your home typically uses and drains more energy dollars than any other source in your home. Think of your heating and cooling system as you would your car. Just as a tune-up for your car improves gas mileage, a tune-up for your heating and cooling system can improve efficiency and comfort. It is important to understand that the cost of heating and cooling your home is based on the actual operating time of your system.

Many factors determine the operating time needed in order to maintain the comfort you desire in your home. These factors include:

The weather: The colder or hotter the weather, the more your system operates. In summer, keep window curtains drawn during the day to block out summer sunlight. Keeping east and west windows shaded is particularly important as they get the most sunlight during sunny summer days.

The thermostat setting: A setting of 78 degrees or higher in the summer and 68 or lower in the winter is recommended. Each degree setting lower in summer or higher in winter can result in 3-5 percent more in energy costs. Setting your thermostat back at night or when you are away by several degrees will save energy dollars. If you have a heat pump, it is recommended that your summer and winter setback temperatures be no more than 2-3 degrees.

Programmable thermostats, also called setback or clock thermostats, help you save energy dollars while keeping your home comfortable by automatically adjusting your temperature settings when you are asleep or away. Please be aware that if you have a heat pump, you should look at the manufacturer's specifications before considering a programmable thermostat. Most makers of heat pumps offer setback thermostats specifically designed for their units. An improperly used or mismatched programmable thermostat can actually increase the cost of operating your system.

Fans, especially **ceiling fans**, will increase your comfort level, especially in warm weather. Remember, however, that in order to save energy dollars with ceiling fans, turn your air conditioner thermostat up several degrees (this will cause the air conditioner to operate less) and turn the fans on only when you are in the area of the fan's air flow.

Whole house fans, located in the hallway, pull cooler outside air through open windows and send warmer inside air out through the attic. This fan will cool your home much cheaper than air conditioning, but be aware that whole house fans also bring uncomfortable high humidity and other pollutants inside the home from the outside.

These fans should only be operated when outside humidity is lower than the inside. They should not be used when the air conditioning is on.

The filter: Many people do not realize the importance of keeping filters clean. Dirty or stopped up filters will cause the heating and cooling system to use significantly more energy. They will also decrease the comfort level of your home. Additionally, filters that are stopped up may cause damage to your equipment.

The less effective filters include standard fiberglass (least efficient) and washable/reusable (not much better) types

that are designed to only block large dust and dirt particles in order to protect your furnace. These filter types should be checked, replaced, or cleaned on a monthly basis. Most people would benefit by using a disposable pleated filter. This type filter has much more surface area and will trap very small particles, including allergens such as pollen and mold. Pleated filters should be checked every month and changed when dirty or approximately every three months. A pleated filter with a MERV rating of 8 to 12 is recommended. If the rating is more than 12, the thickness of the filter can add some resistance to the air flow, so if this filter is used, make sure it is rated for the blower capacity of your furnace.

The coils: Dirty coils will cause an increase in energy costs. There are two coils on a typical central air or heat pump system: the outdoor coil located inside the outdoor unit and the indoor coil located inside the indoor air handler/furnace.

The outdoor coil is easier to clean because it is easy to access. Keep the area around it clear of shrubs, trees, and weeds to ensure proper air flow. The indoor coil, however, is often difficult for the heating and cooling contractor to access and does not get cleaned on a regular basis in many cases.

Over a period of time, the indoor coil collects dirt, dust and other pollutant particles and becomes very inefficient, causing additional energy usage. Many indoor coils and indoor fan blower compartments have not been cleaned for long periods of time, if ever. If you have dirty or dusty return air grills inside your home on a consistent basis, then you more than likely have filters that get dirty fast and your indoor coil probably needs to be cleaned. It is highly recommended that both outdoor and indoor coils be cleaned on a timely basis, which is typically every one to two years.

Refrigerant level: Refrigerant **(Freon)** levels that are too high or too low will cause an increase in energy costs. Refrigerant issues, including leaks (often very small, hard to find) will cause air conditioning temperatures to rise, causing the system to operate longer to satisfy the thermostat setting, resulting in higher energy costs.

Conversely, during the heat pump heating season, temperatures will decrease, causing the auxiliary heat to operate longer, causing an increase in energy costs. Refrigerant levels should be checked by a licensed heating and cooling contractor.

Duct system design: One reason it is not logical to compare one utility bill with another is the fact that every duct system is designed and installed differently, many improperly. Non-insulated ducts in unconditioned areas, inadequate return ducts, incorrect duct and system sizing, or disconnected ducts can significantly affect the amount of energy you use to keep warm in the winter and cool in the summer.

Seal with mastic or caulk (do not use tape) at:

- Air Handler;
- Plenums;
- Takeoffs;
- Boots, registers, and grills;
- Refrigerant and condensate lines;
- All metal ductwork corners and seams; &
- Around filter door at air handler and return plenum.

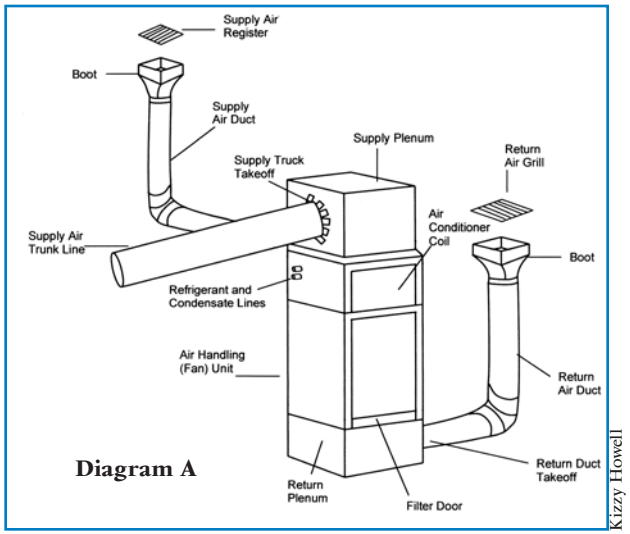


Diagram A

Kizzy Howell

If the duct system is located in the attic, hot attic summer temperatures will cause duct heat gain, which in turn produces warmer air to the home. This causes the system to operate longer in order to satisfy the comfort needs of your family.

Most homes built in the last 20 years have flex duct systems and many times the ducts are long and winding, crimped, and improperly installed. Many new homes that have duct systems in the attic have these problems.

Inefficient duct systems not only cause higher energy costs but comfort problems as well. Many **comfort issues** in the home are caused by duct system air flow problems. One problem that affects both comfort and efficiency is that many homes do not have air return vents in bedrooms where doors are usually closed, making it difficult to return air to the furnace properly. In bedrooms where no return vents exist, leave the door open so the return air has a pathway to the nearest return vent, usually located in the hallway. It is important also to ensure that inside air vents are not blocked by rugs, furniture, or other obstructions.

Duct system air leaks: The vast majority of duct systems have air leaks, many of these are significant. In some cases, ductwork joints pull completely loose, causing severe energy losses.

All duct leaks increase energy costs, especially those in unconditioned areas such as attics, basements, and crawl spaces. The more severe duct leaks are found in high pressure areas around connections to the air handler, the plenums, and trunk takeoffs. Leaks around filter doors and filter racks are also prevalent.

These leaks should be sealed with **mastic** (a duct sealing paste) — not tape — as outlined in Diagram A (see page 14). Tape has a tendency to let go over a period of time, resulting in duct leakage. Some duct systems lose 15 to 25 percent of the conditioned air due to these leaks. Duct leaks in unconditioned areas can affect comfort, health, and safety levels by bringing additional dust, humidity, and other harmful pollutants into the conditioned areas. Properly sealing duct leaks can cut heating and cooling costs in many homes by 20 percent or more.

Is **duct cleaning** a good idea for your system? If your duct system is the sheet metal (hard type), and you feel it may have dirt, dust, moisture or mold issues, than having it cleaned will certainly help improve the efficiency of the system, reduce energy bills, and improve comfort. At the same time, make sure the air handler, blower, and coil are also cleaned. If your duct system is the duct board or flex duct type, having them cleaned is questionable at best. These types of ducts are hard to effectively clean without damaging them and risking causing more problems, such as putting fiberglass fibers into the air stream, or creating breeding places for future contamination. It may make more sense, in some cases, to replace the ducts rather than having them cleaned. One thing you can do yourself to clean your ducts is to take the grille cover off all warm air supply and return vents located on the floor and low side walls. Use a vacuum cleaner and clean inside the vent down to the elbow, being careful not to puncture the duct. You may find and remove building materials such as sheetrock dust and sawdust, mold, household items, pet hair, and other contaminants. Then clean the vent area with a mixture of bleach and water, household cleaner, or household detergent and water.

It is highly recommended that a licensed **heating and cooling contractor** service your heating and cooling system annually with emphasis on correct refrigerant levels, cleaning coils, inspecting duct system issues, etc. This contractor is best equipped to find and fix any heating and cooling problems you may have.

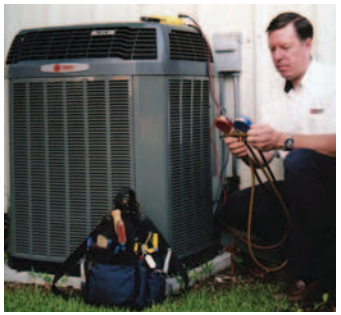
Choosing a reliable heating and cooling contractor is a very important decision-making process. Remember the old saying, "You get what you pay for ..."? A contractor who truly cares about you as a customer and has the expertise to handle all your heating and cooling needs can save you significant energy dollars and ensure your comfort level.

When you have the need to replace your existing heating and cooling system, remember that the higher the **SEER rating** for the air conditioner or heat pump, the more energy savings you will experience. A SEER rating of 15 or higher is recommended. As an example, a system with a SEER rating of 15 is approximately 15 percent more efficient than the standard minimum 13 SEER.

It is also important for the heating and cooling contractor to properly size and install your new system correctly. A properly sized and installed system will not only save you energy dollars, but will help ensure a more comfortable indoor environment.

The cost of heating & cooling your home

The cost of heating and cooling your home represents the largest portion of your utility bill, 52 percent or even more in many cases. In the summer months, the cost of air conditioning can significantly affect your electric bill.



The electric **heat pump** represents the most energy efficient heating and cooling system available today. It simply pumps heat. In summer, it moves heat from inside your house to the outside. In winter, it moves heat from the air outside to inside your home. This is done using the refrigerant that is pumped by the compressor through the indoor and outdoor coils.

Heat Pump and Central Air Conditioning Monthly kWh Usage

10 SEER (minimum efficiency installed in homes from 1992 to 2006

Operating hours per day

Size	4 hrs.	8 hrs.	12 hrs.	16 hrs.	24 hrs.
2 ton	288	576	864	1152	1728
2 1/2 ton	360	720	1080	1440	2160
3 ton*	432	864	1296	1728	2592
3 1/2 ton	504	1008	1512	2016	3024
4 ton	576	1152	1728	2304	3456
5 ton	720	1440	2160	2880	4320

*most common

13 SEER (minimum efficiency installed in homes beginning in 2006)

2 ton	222	444	666	888	1332
2 1/2 ton	277	554	831	1108	1662
3 ton*	332	664	996	1328	1992
3 1/2 ton	368	736	1104	1492	2208
4 ton	443	886	1329	1772	2658
5 ton	554	1108	1662	2216	3324

Heat Pump Auxiliary / Emergency Heat

Operating hours per day

Size	4 hrs.	8 hrs.	12 hrs.	16 hrs.	24 hrs.
5 kW	600	1200	1800	2400	3600
7.5 kW	900	1800	2700	3600	5400
10 kW*	1200	2400	3600	4800	7200
15 kW	1800	3600	5400	7200	10800
20 kW	2400	4800	7200	9600	14400

*most common

Dual fuel heat pump system

A dual fuel heat pump works in conjunction with a gas furnace that provides the homeowner with two separate heating systems. The heat pump portion of the dual system also provides central air-conditioning in the cooling season. During the heating season, each system operates independently of the other and will only operate at their optimum efficiency. Should one malfunction, the other unit is in place and can be used until a repairman can respond.

Basically, the heat pump will satisfy your home's heating needs until the outdoor temperature drops to around 30-35 degrees. At that point, the heat pump shuts down and the

gas furnace engages to supply your heat. Once the outside temperature increases back to 30-35 degrees and above, the gas furnace shuts down and the heat pump begins operating again. The constant switching is done automatically and is inherent in the dual fuel system itself. This system has the potential to cut your annual heating bill significantly.

The cost of using space heaters & window air conditioners

Electric space heaters are not recommended for use as the primary heating source of your home. They have the potential to use significant energy dollars. Electric space heaters are most effective when used as supplemental heat or for heating small areas of the home.

During the summer keep your window air conditioners operating at their best. Operating costs are lower when the unit and filter are cleaned on a regular basis.

Electric Space Heater Monthly kWh Usage
Operating hours per day

Size	4 hrs.	8 hrs.	12 hrs.	16 hrs.	24 hrs.
750 watt	90	180	270	360	540
1000 watt	120	240	360	480	720
1500 watt*	180	360	540	720	1080
2000 watt	240	480	720	960	1440

**most common*

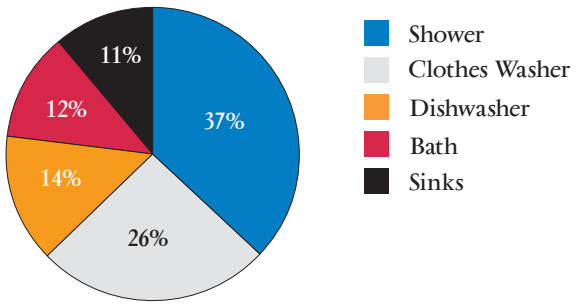
Window Air Conditioner Monthly kWh Usage
9.5 EER (minimum efficiency)
Operating hours per day

Size	4 hrs.	8 hrs.	12 hrs.	16 hrs.	24 hrs.
5,000 btu	63	126	189	252	378
7,500 btu	95	190	285	380	570
10,000 btu	126	252	378	504	756
15,000 btu	189	378	567	756	1134
18,000 btu	227	454	681	908	1362
5 ton	554	1108	1662	2216	3324

Your home's electric water heater

After the cost of heating and cooling your home, your water heater is typically the next largest energy user. Your water heating usage can vary greatly based on many things, including where your water heater is located, how many people are living in your home, and personal habits.

TYPICAL U.S. HOMEOWNER'S WATER CONSUMPTION



Four ways in which you can save energy dollars include turning down the thermostat, insulating the tank and hot water pipes, considering a high efficiency water heater when replacing an existing unit, and by conserving your use of hot water. Maintenance issues, especially burned out elements, can cause significant energy increases, and will require repair by a **licensed plumber**.

The thermostat setting: Water heater thermostats today arrive from the factory set at 120 degrees. This temperature will generally meet most household needs. Check your thermostat settings, if they are set higher than 120 degrees, consider lowering them. Thermostats set at 140 degrees (older models were typically set at 140 degrees) will increase water heating costs an estimated 25 percent.

The majority of electric water heaters have two thermostats and two heating elements. Both thermostats should be set at the same temperature to prevent one element from doing all the work and wearing out prematurely.

Insulate the tank: Insulating the water heater with a thermal wrap (jacket) can be cost effective in reducing tank losses, especially when it is located outside of conditioned spaces (garage, crawl space, and basement). If the tank is older and warm to the touch, it is losing heat and probably needs to be insulated. Remember that the top of the tank will also need to be insulated, as that area loses significant heat. Newer, energy efficient models do not need additional insulation.

Insulate the hot water pipes: Insulating the hot water pipes is inexpensive and will reduce temperature losses from the tank to the faucets, showers, dishwasher, etc. It is also a good idea to insulate the cold water inlet pipes as well, as some heat is lost in that area. If you feel that it takes excessive time for your pipes to heat in certain areas of your home, insulating your hot water and cold water pipes will help.

Replace unit with a high-efficiency electric water heater: Consider a high efficiency electric water heater when replacing your existing unit. For example, if you purchase a .94 efficient model vs. the lowest efficient model, the energy saving payback is typically less than three years.

The higher-efficiency models will also have better warranties, additional insulation and other features, including thicker or larger corrosion-fighting metal rods (anodes) that will help ensure a longer life. An electric water heater efficiency rating of .92 or higher, a minimum 50 gallon tank, and a limited warranty of nine years or more is recommended.

Use less hot water: To use less hot water, consider installing low-flow showerheads, which may cut your hot water use for showers in half. Operate your dishwasher and clothes washer at full load capacities or with water and energy saving settings.

Wash clothes in cold water when reasonable to do so. Be aware and avoid wasteful habits in all areas of hot water usage. Also be aware that a leaky hot water faucet, leaking one drop of water a second, can waste about 60 gallons of water per week.

Burned-out element: If you are experiencing a shortage of hot water, or there has been a significant increase or decrease in hot water temperature, then you may have an element problem. Also be aware that manufacturers of electric water heaters recommend that a gallon or so of water be drained from the tank a minimum of once per year in order to remove sediment from the bottom of the tank. This sediment prevents heat transfer and lowers the efficiency of the unit.

Hot water circulating systems: Hot water circulating and recirculation systems are pumps and systems that circulate water through the water piping so that obtaining hot water is nearly instantaneous and conserves water in doing so. These

systems generally provide convenience and save water but at the same time can waste large amounts of energy and cost the home owner a great deal of money. In most cases, the additional cost of heating the water to insure convenience outweighs the water savings benefit. If the convenience of this type of system is important to you, use a timer-controlled system that will send hot water into the water supply lines during programmed times only.

Conventional electric water heating costs

Typical Electric Water Heater Monthly kWh Usage			
Family size	Gallons used	Average daily running time	Monthly kWh
2	40	1.42 hrs.	193
4	80	2.87 hrs.	387
5	100	3.58 hrs.	483
6	120	4.29 hrs.	580
7	140	5.00 hrs.	676
8	160	5.72 hrs.	773

Assuming your household has no water heater issues (maintenance or other), uses 80 gallons of hot water per day (a typical family of four), your water heater efficiency rating is .90 (ratings range from a low of .86 to a high of .96) and your water is heated to 120 degrees from an inlet water temperature of 60 degrees (average inlet temperature), your water heating costs should average approximately $35-$40 per month. This cost is based on an average cost of 9.0 cents per kWh.

Heat pump water heaters

A heat pump water heater is an appliance that uses an air-source heat pump to heat water. It includes an insulated tank with an electric element that provides backup heat whenever hot water demand exceeds the capacity of the heat pump. It lowers the temperature and humidity of the room in which it is installed. The heat pump takes the heat from surrounding air and transfers it to the water in the tank. This system can save approximately 50 percent of the cost of heating water with a standard electric water heater. It is best installed in a warm location with unconditioned air such as basements, garages, attics or a conditioned space at least 10x10x10 to ensure the height requirements and the volume of air needed. The cost of this type of system typically exceeds the cost of a standard electric water heater by 100 percent or more. Your plumbing contractor or big box stores will have more information on this product.

Solar thermal water heating

Solar thermal water heating systems capture renewable energy from the sun and use it to heat water. Today's available systems use the most efficient techniques for harnessing the sun's heat with modern components and could produce 60 to 70 percent of a home's hot water needs. A conventional electric water heater acts as an auxiliary heater to provide the energy required to heat hot water during periods of low or no sun. The savings you may receive from your particular system can vary greatly depending on the quality of your system, the installation process, and other factors.

Systems typically will include solar collectors/panels, heat exchangers, small circulation pumps, and connecting piping from the collector/panel on the roof to the heat exchanger located at the water storage area. Homeowners with interest

in this product should call GreyStone at 770-370-2070 for additional information.

Your pool & its operating costs

The size and operation time of the filter pump motor determines the electrical operating cost. Pool pumps can use a significant amount of energy. As an example, a one horse-power pump running 24 hours a day for one month can use 800 kWh at a cost of $85 - $90 or more (based on average summer electric rates).

To save energy dollars, don't overdo circulation time (eight hours or less is recommended — check with your pool maintenance professional to determine the proper number of filter hours needed for your pool), keep filters clean, and consider a cover for your pool (it will keep debris out of the pool, reduce evaporation, and keep water warmer).

The following chart shows the estimated energy used by different sized standard pump motors operating for different lengths of time. The horsepower (HP) wattage on your pool pump can be more or less efficient than the examples shown. *(The consumption figures are in k Wh per month.)*

Hours per day	1/2 HP 580 watts	3/4 HP 872 watts	1 HP 1111 watts	1 1/2 HP 1537 watts	2 HP 1989 watts
4	70	105	133	184	239
6	105	157	200	276	358
8	140	209	267	368	477
12	209	314	400	552	716
24	418	628	800	1104	1432

Your spa (hot tub) & its operating costs

Spas can use a significant amount of energy, the vast majority going for heating and filtering water. Factors that affect operating costs include size, operating temperature, filtering, and the condition of the spa.

Size: The average spa is 6 ft. by 6 ft. and holds 500 gallons of water. It typically has two pumps, ranging from 2- to 6-horsepower (HP) each, to filter water and provide aeration. The water is heated with an electric heater rated at 4,000 watts (4 KW).

Operating temperature: The majority of the operating cost comes from initially heating the water and keeping the water hot. A 4000 watt electric heater operates at a cost of approximately 50 cents per hour (based on average summer electric rates). Typical suggested water temperature is 102 degrees or lower.

Filtering: Filtering represents another cost of operating a spa. The average spa requires one to two hours of filtering each day. If you have a pool/spa maintenance service, be sure to check with them before reducing filtration hours.

Condition of spa:
The overall condition and quality of the spa can affect energy costs. Old spas not

insulated properly, spas with wet insulation, and spas with inefficient covers can increase operating costs significantly.

Estimated Monthly kWh Usage Based on Daily Hours Use of Heater, Filter Pump, and Aerator Pump					
Hours per day	2	4	6	8	10
4000 watt heater-kWh used:	240	480	720	960	1200

Hours per day	1	2	4	6	8
2-HP filter pump - kWh used:	60	119	239	358	477

Hours per day	1	2	4	6	8
1-HP aerator pump - kWh used:	33	67	133	200	267

Example of monthly cost of typical spa:

4000 watt heater operating 4 hrs. per day = 480 kWh
2 HP filter pump operating 2 hrs. per day = 119 kWh
1 HP aerator pump operating 1 hr. per day = 33 kWh
Total = 632 kWh

Operating at average summer electric rates = $70.00 or more per month operating cost

To reduce your spa's operating costs:

Keep it covered with a tight fitting insulated cover when not in use.

Heat the spa only when you plan to use it, allowing time for warm-up, and keep the temperature at 102 degrees or lower.

Check the accuracy of your spa's thermostat. An inaccurate thermostat can cost you significant energy dollars.

Reduce the number of hours you filter. The average spa requires one to two hours of filtering per day. Have your filtering pump checked periodically to ensure it is operating properly. When it is not needed, switch off your aerator.

The electrical cost of "base usage" household items & how to save energy when using them

Your home's **electrical base usage** is the average consumption of a household — not including heating, cooling, or other seasonal items such as pools, dehumidifiers, spas, etc. Base usage includes the household electrical load that operates 12 months a year, such as water heating, refrigeration, drying clothes, lighting, dishwashing, cooking, TV, etc.

Also note that most electronic appliances will draw a small amount of power when they are actually switched off. These **phantom loads** occur in appliances such as VCRs, computers, televisions, stereos, and other kitchen appliances. Up to 75 percent of the electricity used to power home electronics is consumed while the products are turned off, but plugged in.

Consider the use of a power strip and using the switch on the power strip to cut all power to the appliance, or simply unplug the appliance when not in actual use.

Every household is different, and there are other items that may be considered base usage. Items such as pumps, motors, workshop tools, fans and other household electrical items used 12 months a year should be considered base usage. Use the following chart and the lighting and appliance energy saving tips to understand and possibly lower your base usage.

The following chart will give you estimated average monthly kilowatt hour (kWh) figures. Newer Energy Star rated models will use much less and some older models may use more. To determine more accurate usage of any electrical item, use the following formula:
Amps x volts = watts, watts x monthly hours of usage divided by 1000 = monthly kWh usage.

KITCHEN	MONTHLY kWh
Refrigerator 14 cu. ft. upright frost free	160 ____
Refrigerator 18 cu. ft. upright frost free	190 ____
Refrigerator 21 cu. ft. upright frost free	200 ____
Refrigerator 21 cu. ft. side by side	200 ____
Refrigerator 24 cu. ft. side by side	220 ____
Freezer 15 cu. ft. upright frost free	165 ____
Freezer 20 cu. ft. upright frost free	190 ____
Freezer 12 cu. ft. chest	100 ____
Freezer 15 cu. ft. chest	140 ____
Freezer 20 cu. ft. chest	160 ____
Range with oven	90 ____
Microwave oven	20 ____
Toaster/convection oven	20 ____
Fry pan, deep fat fryer	10 ____
Crock pot (slow cooker)	5 ____
Coffee maker	10 ____

Dishwasher (with drying cycle), hot water not included	35 ____
Dishwasher (drying cycle not used)	20 ____
LAUNDRY / BEDROOM / BATH	
Washer (hot water not included)	20 ____
Dryer (30 loads)	120 ____
Iron	15 ____
Waterbed heater (can vary greatly)	200 ____
Electric blanket	40 ____
Curling iron	10 ____
Hair dryer	10 ____
Whirlpool jetted tub (hot water not included)	30 ____
LIVING AREA	
Television (6 hrs. per day usage)	
25-27" solid state	25 ____
49" or less LCD	75 ____
50" or more LCD	100 ____
49" or less DLP	100 ____
50" or more DLP	115 ____
49" or less Plasma	150 ____
50" or more Plasma	200 ____
VCR/DVD	10 ____
Video game (4 hrs. per day usage)	25 ____
Cable converter box (24/7)	10 ____
Answering machine	10 ____
Computer (6 hrs. per day usage)	50 ____
Color monitor	15 ____
B & W monitor	10 ____
Laser printer	70 ____
Scanner	10 ____
Modem	10 ____
Stereo (6 hrs. per day usage)	15 ____
Radio (24 hrs. per day usage)	20 ____

MEDICAL EQUIPMENT

Oxygen concentrator (460 watts, operating 24/7)	330	_____
Nebulizer (1035 watts, operating 2 hours a day)	60	_____
Sleep Apnea Machine (200 watts, running 8 hours a day)	50	_____

FANS

Ceiling fan (24/7)	75	_____
Attic fan, located on roof (12 hrs. per day usage)	110	_____
Whole house fan, located in hallway (12 hrs. per day usage)	180	_____
Window or table fan (12 hrs. per day usage)	75	_____
Furnace fan (24/7)	250	_____
Furnace fan (8 hrs. per day usage)	85	_____

MISCELLANEOUS

Dehumidifier (12 hrs. per day usage)	225	_____
Humidifier (12 hrs. per day usage)	72	_____
Tanning bed	15	_____
Room or central air cleaner (24/7)	100	_____
20 gallon aquarium	50	_____
Vacuum (central or regular)	10	_____
Well Pump (900 watts, operating 1.5 hrs. per day usage)	50	_____
Sump Pump (500 watts, 1 hr. per day usage)	15	_____

Lighting (average family)	150-300	_____
Treadmill (1 hr. per day usage)	60	_____

SEASONAL ITEMS

Central air conditioning - pages 18-19	_____
Central heating with heat pump - pages 18-19	_____
Electric water heating - page 24	_____
Electric space heater - page 20	_____
Window air conditioners - page 21	_____
Pools - page 26	_____
Spas /hot tubs - page 28	_____
Total Estimate of Monthly kWh Use	_____

Lighting and appliance energy-saving tips

You can save energy dollars by using household lighting only when needed and replacing high wattage bulbs with lower wattage bulbs (replacing a 100 watt bulb with a 60 watt bulb will save 40 percent).

Using lights in summer when not necessary will also add to air conditioning cost. Switching from incandescent light bulbs to compact fluorescent can save energy dollars. While incandescent bulbs are inexpensive to purchase, they are inefficient and more costly to operate.

Compact fluorescent bulbs cost more to buy than incandescent, but the energy savings and the fact that they usually

last 10 times longer than incandescent makes them worthy of consideration. In most cases, the light from fluorescent bulbs is just as bright and offers comparable colors and light quality.

For example, a 19-watt fluorescent bulb typically gives off the same amount of light as a 75-watt incandescent bulb. The 19-watt fluorescent bulb will cost approximately $1.25 per month in electrical costs running 24 hours per day, compared to a cost of approximately $4.85 for the 75-watt incandescent bulb. Fluorescent bulbs have the same screw-in base as incandescent and are slightly larger, but fit in many different types of fixtures.

Refrigeration: The most effective way to reduce refrigeration energy costs is to remove or unplug unneeded refrigerators or freezers. An extra refrigeration unit will increase your electrical costs.

Also check to make sure your doors seal properly. Check temperature settings. Your refrigerator should be set between 37 and 40 degrees and your freezer should be set between 0 and 5 degrees. Keep coils clean. Dirt and dust restrict airflow around the outdoor coils and cause the unit to work harder.

Fully loaded refrigeration operates more efficiently. Keep the door closed as much as possible. When replacing refrigeration, consider purchasing high efficiency Energy Star rated models.

Cooking: The typical cost of electric cooking with standard electric stove top burner (eyes) is usually so low for a family that it is difficult to justify new, more expensive options solely on the value of energy saved. There are many new types of electric stove tops on the market, but while they may save energy, the main advantages are ease of cleaning, greater heat control, and other amenities.

To save energy and increase comfort, consider using microwave and convection ovens. They will also release less heat into the home, helping lower air conditioning needs.

Dishwashing: Over 80 percent of the energy used by a dishwasher can be for heating water (see electric water heating). Models that use less water will save energy. A model with a booster heater will allow you to set the water heater temperature to 120 degrees yet still have the water temperatures in the dishwasher of 140 degrees. Using the air-dry feature and operating the unit at full load capacity will save energy and water. Overall, dishwashers fully loaded are a better and more efficient way to clean dishes than hand washing.

Washers: Approximately 90 percent of the energy used by clothes washers is for hot water *(see electric water heating)*. Models that use less water, use less energy. Remember to wash full loads. Use cold water settings as much as possible to reduce the energy used to heat water. Today's detergents are designed for cold water washing.

Dryers: Remember to clean the filter after every load and periodically inspect the vent to ensure it is not blocked. Make sure the outside dryer vent door closes when the dryer is not in use. This requires cleaning away

lint accumulation periodically. These practices will reduce the possibility of fire, increase air-flow, and decrease drying time, which will save energy. Dry a full load of clothes. The dryer uses nearly the same amount of energy to dry a few items as it does to dry a full load.

Saving energy while on vacation

If you are to be away for several days, considering the following:

Heating and cooling: Set your thermostat to 55 degrees in the winter (to prevent pipes from freezing and bursting). In summer, set your thermostat to 80-82 degrees. Do not leave fans running.

Water heating: If you have an electric water heater, cut the power at the breaker or fuse in the electrical panel. It is not necessary to drain the tank. When you return from your vacation, turn power back on and give tank time to heat up before using.

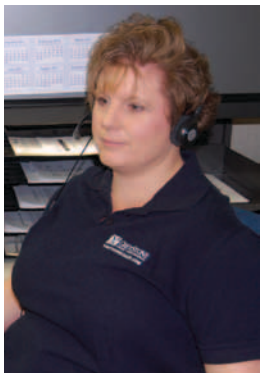
Refrigeration: If you will be gone for several weeks, empty out the refrigerator and unplug it. If that's not practical, take out easily spoiled items like milk products and consider turning the thermostat up a notch but no higher than 40 degrees. Do the same for freezers and turn the thermostat up but no higher than 5 degrees.

Washer and dryer: Unplug.

Other appliances: Turn off and unplug any appliance or electronic device that doesn't stay on. Remember that many items draw power even when they're not being used (**phantom loads**). Unplugging appliances will also help prevent damage in case of a storm or power surge.

Pool and Spas: Turn heaters off and reduce filtering time to a minimum (per maintenance professional's guidelines).

Energy efficient rebates and incentive information



Currently, GreyStone Power offers incentives to members for replacing inefficient gas/fossil appliances with energy efficient electric appliances, including the following:

- Dual fuel heat pump program: Replacing existing gas/fossil heating systems with high efficiency heat pumps
- Water heater replacement program: Replacing existing gas/fossil water heating systems with high efficiency electric systems
- Solar thermal water heating program: Replacing existing gas/fossil or electric water heating systems with high efficiency solar thermal water heating systems with electric back-up
- Photovoltaic (PV) rebate program: Install a qualifying photovoltaic system on a new or existing home or business.

Call GreyStone Residential Marketing at 770-370-2070 for up-to-date information on these and other programs that may be currently offered, or view information by using the GreyStone website *www.greystonepower.com.*

For current federal and state energy efficiency incentives, view *www.dsireusa.org* or *www.ase.org/taxcredits*.

Levelized billing plan

To help budget fluctuating power bills, GreyStone offers a levelized billing plan. The plan lets residential members level out their monthly electric costs over a 12-month period. A member's account must have a zero balance and have a minimum of twelve (12) months' history with no more than two late payments. A member's monthly bill will be an average amount based on actual usage for the current month and the previous 11 months. By paying the average amount billed each month, members don't have to worry about sharp seasonal increases which come with extreme weather changes. For more information, call GreyStone member services at **770-942-6576** or email us at *memberservices@greystonepower.com*.

Websites that will help you save energy

www.greystonepower.com Click on the "Together We Save" link near the top of the page and get connected with valuable tools to help you get the most out of your energy dollar.

www.togetherwesave.com An online source offering valuable energy-and-money-saving advice to members of GreyStone Power. Many videos are offered to show firsthand the correct way to complete energy saving projects.

www.southface.org For more than 30 years, Southface Energy Institute has promoted comfortable, energy-, water-, and resource-efficient homes, workplaces, and communities throughout the Southeast.

www.energy.gov/yourhome.htm This U.S. Department of Energy site provides many links that help you save energy in your current home, or when designing and building a new energy-efficient house.

Whether you choose no/low cost improvements or invest in long-term energy saving strategies, these sites can help you choose what is best for your energy picture.

Electrical surge protection for your home

A power surge can find its way into your home through your meter box, your phone lines and even your cable or satellite connections. The most recognized cause for a power surge is lightning, but other surges are caused by birds, auto accidents involving utility poles, neighbors using major power equipment, faulty home wiring and many other factors. These surges are capable of damaging central heating and air equipment, appliances, computers, cable/satellite equipment, telephones, stereo/sound systems and other electrical items.

The SurgeMaster Plus program minimizes your risk of loss against unexpected power surges. For **$9.99** per month and a one-time **$60** installation charge you're provided with:

- Electric service entrance protection
- Protection for telephones and satellite/cable lines
- State-of-the-art starter kit equipment valued at over $100 from TESCO, the nation's leading surge protection provider
- TESCO's warranty, should a surge go through a TESCO device and it fails to protect your equipment

For additional information on this program, call GreyStone at **770-370-2070**.

Home Security

EMC Security offers advanced burglar and fire alarm systems to residential customers that provide 24-hour watch over your family, home and possessions. Protect against burglary, fire and even power failure. Monitoring service is provided on a monthly basis, as low as $16.95, which means you are never obligated to long-term monitoring contracts. Central station monitoring is offered by a 24-hour state-of-the-art facility that's approved by Underwriter's Laboratory for both intrusion and fire alarms. EMC Security can also monitor most security systems that were installed by other companies.

EMC Security also provides security systems for small business, commercial and industrial customers as well. Applications range from intrusion to fire protection, access control to video surveillance.

For more information on EMC Security, call **770-963-0305**.

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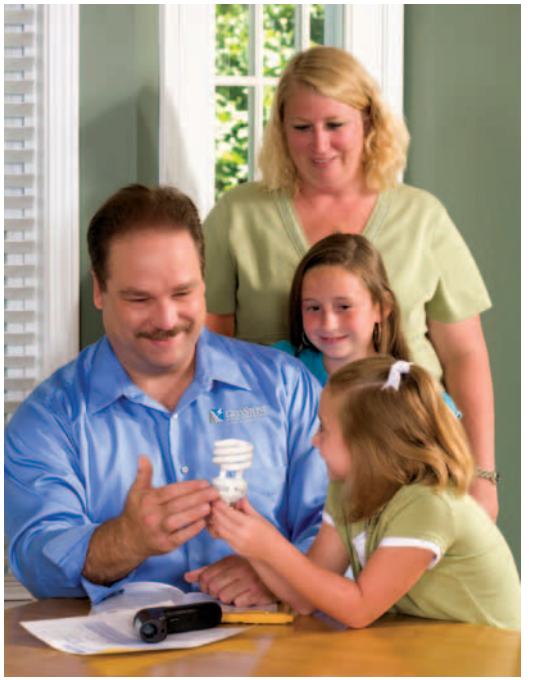

GreyStone offers free energy audits for residential members. Call 770-370-2070 for more information.

GREYSTONE
POWER CORPORATION
Your Touchstone Energy® Cooperative

When buying new heating and air equipment or appliances, look for the ENERGY STAR® label to save energy and money.

When buying an appliance, remember that it has two price tags: what you pay to take it home and what you pay for the energy it uses. ENERGY STAR qualified appliances incorporate advanced technologies that use 10 to 50 percent less energy than standard models. The money you save on your utility bills can more than make up for the cost of a more expensive, but more efficient ENERGY STAR model.

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Together We Save!

www.greystonepower.com
www.togetherwesave.com

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