e+ Learning

Energy Tips

Handbook

City of Tallahassee
Your Own Utilities℠

e+ ENERGY SMART PLUS℠
SAVE ENERGY SAVE WATER SAVE MONEY

What is Energy Smart Plus?

Energy Smart Plus (**e+**) represents Your Own Utilities commitment to customers and the community to provide products and services to save energy, water and money.

Smart Products:

- Ceiling Insulation Grants
- Energy Efficiency Loans
- ENERGY STAR and Natural Gas Appliance Rebates

Smart Services:

- Free Home Energy Audits
- Solar Net-Metering
- Income-based Assistance

Smart Tools:

- **e+** Online Account Management
- **e+** Energy-Saving Starter Kits
- **e+** SmartBill

Smart Technology:

With an underlying network of advanced technology, the **e+** Smart Grid allows connectivity of a variety of interactive tools, such as Smart Thermostats and **e+** Online. The many **e+** offerings provide customers with choices and flexibility in managing their home energy use.

City of Tallahassee
Your Own Utilities℠

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For more information on products & services designed to help you save energy, water and money, call Your Own Utilities at 891.4YOU (4968) or visit Talgov.com/YOU.

Quick Tips

The following suggestions will help you save energy, water and money:

Tips are categorized by:	
☼/❄	Both Summer & Winter
☼	Summer Only
❄	Winter Only

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1. ☼/❄ **Insulate your attic.** Insulation levels for Tallahassee:

    - R-38 if you have a heat pump or gas furnace.
    - R-49 if you heat with electric resistance "strips" only.

2. ☼/❄ **Cook faster with a lid on the pan.**

3. ☼/❄ **Turn off the burner on electric range tops a little early.** Allow cooking to finish as the burner cools.

4. ☼/❄ **Note your energy usage each month with e+ Online.** Comparing monthly usage gets you thinking, changing habits and using less energy.

5. ☼/❄ **Set your thermostat's fan to "AUTO," not "ON."**

6. ☼/❄ **Close your fireplace damper when not in use.**

7. ☼/❄ **Arrange items in your refrigerator for quick removal.** The less the refrigerator door is open, the better.

8. ☼/❄ **Use energy-saving settings on washing machines, dryers, dishwashers and refrigerators.**

9. ☼/❄ **Use hot water wisely.** Repair leaks. Hot water leaks increase your electric, water and sewer costs.

10. ☼/❄ **If you're away from home for extended periods:**

    - Turn off your water heater at the breaker panel.
    - Turn your AC / Heating unit to "OFF."

11. ☼/❄ **Turn off lights when not in use.**

12. ☼/❄ **Turn down water heater thermostats to 120° F.**

13. ☼/❄ **Use a clothesline.** Dry clothes in the sun's free heat.

14. ☼/❄ **Wash clothes in cold water.** Almost all the cost of clothes washing is in the cost to heat water.

15. ☼/❄ **Clean the clothes dryer lint screen frequently.** Also check and clean the outdoor flapper vent too.

16. ☼/❄ **Seal air leaks around doors and windows with caulk and weatherstripping.**

17. ☼/❄ **Keep all AC supply registers open.** Closing off rooms or registers will not save money and may lead to problems.

18. ☼/❄ **Repair air duct leaks in the attic or under the house.**

19. ☼/❄ **Change the AC filter monthly during heavy use.** Dirty filters slow down airflow and make the unit run longer.

20. ☼ **Set the AC thermostat at 78° F or higher.** Raise it a few degrees when away during the day. Setting the AC at 70° F instead of 78° F can double your operating cost!

21. ☼ **Don't try to speed-cool at a very low temperature when you get home.** Standard single-speed air conditioners cool as fast as they can when on; they can't cool any faster. Choose your normal setting, preferably 78° F.

22. ☼ **Use fans in mild weather.** A ceiling fan at medium speed uses 50 to 100 times less energy than your central AC.

23. ☼ **Set your thermostat a few degrees higher when running a ceiling fan.** You will feel as cool at 80° F as you would at 78° F – but costs are reduced by about 15 - 25 percent.

24. ☼ **Use a microwave instead of the range or oven.** The microwave cooks fast and doesn't heat the kitchen.

25. ☼ **Keep windows and doors closed while air conditioning.**

26. ☼ **Close all shades, drapes and blinds during the day.**

27. ☼ **Wear lightweight clothing, preferably cotton.**

28. ☼ **Vent the clothes dryer to the outdoors.** This prevents heat and moisture from getting into the house.

29. ☼ **Limit oven use and cook outdoors.**

30. ☼ **Plant trees for shade on the east and west sides of your home.** This can reduce air conditioning costs by 30 percent.

31. ☼ **Use as few lights as needed.** Lights put off heat. About 99 percent of a lamp's energy is converted to heat while the remaining 1 percent is converted to light.

32. ☼ **Switch to compact fluorescent lights (CFLs).** They provide the same amount of light for 1/4 the cost and 1/4 the heat output, while lasting 10 times longer than incandescent light bulbs.

33. ❄ **Set your heating thermostat carefully and accurately. Recommended daytime indoor temperature in winter is 68° F.** The night-time setting depends on the type of equipment used:

- Heat pump: At night = 65° F
- Furnaces: At night = 55° - 60° F
- Electric-resistance heating: At night = 55° - 60° F

34. ❄ **Dress warmer and adjust the thermostat lower.**

35. ❄ **Let the sun in.** Open your shades, drapes or blinds to admit the sun's heat on cold days. Close them at night.

36. ❄ **If you have a heat pump, be sure the thermostat is not accidentally set to "EMERGENCY HEAT."** Costs can double in the Emergency Heat mode.

37. ❄ **If you have a heat pump, be sure the big outdoor fan spins when you're heating the house.** If the outside fan doesn't spin when you're heating, you're probably heating with the system's back-up electric "strips" at double the cost.

38. ❄ **If you return from work or school to a cold house, turn the heat up, but no higher than your usual thermostat setting.** It doesn't heat any faster at a higher setting.

Causes of High Summer Utility Bills

Your Own Utilities' energy auditors have been investigating home energy problems in Tallahassee since 1981. Here are some of the things they found that caused high bills:

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Cooling

1. **Thermostat set too low.** Keep the summer setting at 78° F or raise it two or three degrees higher when you're away. Research in Florida shows that home cooling costs increase 12 percent for each degree setting below 80° F. That means your cooling cost can almost double if you set the thermostat at 70° F instead of 78° F.

2. **Clogged air filter.** Change the air filter monthly during periods of heavy use. Restricted air flow causes HVAC (heating, ventilating and air conditioning) systems to run less efficiently. A clogged filter increases cost, reduces comfort and can lead to costly equipment failures. Ice may form on the air conditioner's evaporator coils, which can lead to total breakdown and costly compressor replacement.

3. **Evaporator coils clogged with dust.** Have a service technician check and clean the evaporator coils annually. Restricted airflow will cause the system to operate less effectively and at a greater cost. Energy efficiency goes down about 5 percent every year as the coils get dirtier. Here's why: With central air conditioning, all the air in the house passes repeated through the filter and then over the cooling (evaporator) coils. Despite the protective filter, the cold and wet cooling coils gather dust and dirt.

4. **Fan set at "ON" rather than "AUTO."** Setting the fan to "ON" means the fan runs constantly. Keeping the fan set to "AUTO" keeps costs and humidity lower and comfort higher.

5. **Heat pump cooling and heating simultaneously.** This is a rare condition that can triple a home's cooling cost. It is caused by a variety of thermostat and wiring problems.

6. **Central heat strips repeatedly turn off and on.** This happens even with the indoor thermostat set to "OFF." Because of a thermostat, control wiring or other wiring problem, the central electric heating strips (10,000 to 20,000 watts) come on even though the distribution fan is off. Without the fan running, heat from the strips builds up but is not distributed. This eventually activates a high-temperature safety switch, which turns off the strips, allows them to cool and then come on again.

7. **Thermostat displays the wrong temperature.** The temperature reading on the thermostat is inaccurate when the system is miscalibrated. For instance, the thermostat may be set on 78° F, but it's really 75° F. This is very common, and some are as much as 10 degrees off. For a simple remedy, place an accurate thermometer on top of the thermostat, note the degrees of inaccuracy and adjust up or down as needed. For a free small thermometer with adhesive backing, call Your Own Utilities at 891.4YOU (4968).

8. **Inadequate return air from the house into the AC air handler.** Return air grills in the floor may be partly or entirely covered by a rug or other obstruction. This can increase operating costs & shorten equipment life due to a reduced volume of return air back to the indoor HVAC cooling coil. Ice may form on the indoor coil – a precursor to system failure.

9. **A "forgotten" HVAC filter located in a return duct under the house.** Older systems may have a filter located in a fairly inaccessible area, such as under the house. If unchanged, it becomes clogged shut. Other problems can occur there. Plastic laundry bags and other items can get pulled into the return air system and get wedged against the filter.

10. **Damaged ductwork due to animals.** Possums & dogs can tear apart ductwork. Possums & mice like to bed in ceiling insulation. Major energy loss occurs when damaged supply or return ducts send cooled air to the attic or outdoors.

11. **Double-wide mobile home has critical air leak at the duct crossover.** New double-wide mobile homes arrive on site pre-assembled in two halves, with air conditioning ductwork factory installed under each half. A critical cross connection joins the ductwork underneath. If that crossover connection subsequently falls loose, enormous amounts of heated or cooled air will escape outside. Cooling equipment runs longer. Operating costs skyrocket.

12. **HVAC system is left on for pets with special cooling needs.**

13. **HVAC air handler, located in a hallway closet, pulls return air from the attic as well as the house.** This may occur in homes where a heat pump replaced a gas or fuel oil furnace in a hallway closet. The original furnace, which pulled combustion air from the attic through an opening in the closet ceiling, was replaced with the heat pump's "blower-coil" unit. The ceiling opening remains. The new blower coil pulls air from the attic as well as the house.

14. **Inefficient air conditioning equipment; inefficient air delivery system.** Central air conditioners over 20 years old are likely to have an original efficiency rating of SEER (Seasonal Energy Efficiency Ratio) 7.5 or less, and the efficiency drops even lower with aging. Today, federal law requires manufacturers to achieve SEER 13.0 or higher for all split-system units and SEER 9.7 for package units.

- What the SEER ratings mean:
  - » If your cooling cost is $600 a summer with a SEER 7.0 unit, your cost would be $300 a summer (for the same amount of cooling) with a SEER 14.0 unit.

- Other factors affecting air conditioning efficiency
  - » Dirty coils - degrade efficiency by about 5 percent each year at normal rates of dirt accumulation;
  - » Duct leaks - account for about 20 percent of air conditioning energy consumption in most Florida homes;
  - » Improper refrigerant charge.

15. **Too much or too little HVAC refrigerant charge.** A 1990 field study of residential air conditioners found 27 percent undercharged and 27 percent overcharged. Overcharging is worse. Cooling is reduced, and power use and system stress is increased.

16. **Continually running AC compressor.** The compressor may run even when the indoor distribution fan is not running. This is a costly problem.

17. **Outdoor condenser located beneath a wooden deck.** Air flow is restricted. Normally, whatever heat is removed from the house by an air conditioning system is released to the outdoors from the backyard "condenser" unit. To work well, it needs plenty of clearance from bushes, decks, folded lawn chairs, etc. The cleaner the outdoor coils, the better the AC works.

18. **Malfunctioning gas combination appliance.** A combination appliance uses a powerful gas water heater to heat the residence in winter, as well as heating the water year 'round. It keeps on sending heat to the house, so in summer, it's

a problem. The cause? It could be the result of faulty or incorrectly installed valves, or faulty electronic controls.

19. **Leaky supply-air or return-air plenums.** The worst duct leaks are often found at the supply-air and return-air plenums. These are the air-collecting boxes on the upstream and downstream sides of the blower-coil unit that distributes air in the house. To find out more and see if your home qualifies for a duct leak repair grant, call 891.4YOU (4968).

20. **Air conditioner's indoor component (the blower coil that distributes air to rooms) is located in a small closet, directly over the electric water heater.** In some older apartments and townhomes, the water heater and its uninsulated pipes heat the passing air on its way to the AC cooling coils and fan in the summer. It helps to lower the water heater's two thermostats to the lowest appropriate temperature (usually 115° – 125° F (in homes with dishwashers) and insulate the water heater and the hot and cold pipes atop the water heater.

21. **The HVAC system has moisture in the refrigerant.** Efficiency is reduced 5 - 15 percent. Worse yet, it's probably heading for an expensive compressor failure.

22. **The HVAC system draws warm, moist outdoor air through an unsealed PVC pipe (chase) that protects refrigerant lines in the slab.** Costs rise as the air conditioner works to cool and dry outdoor air admitted to the system by this and other routes. The best remedy is usually an application of spray-expanding foam caulk to seal those airways.

23. **The clothes dryer vent shoots lint onto the air conditioner's outdoor condenser coils.** Unable to release

heat, the AC system runs longer.

24. **The small pump on a water heating waste-heat-recovery unit runs non-stop.** It stays on whether the air conditioner is running or not. This increases costs dramatically, especially if the water heater is far from the air conditioner's outdoor condenser.

25. **The air conditioner's outdoor condenser bakes in the sun.** This increases operating costs. The optimal position for the unit is on the home's north side, in shade with 4 feet of clearance (plenty of "breathing room").

26. **The house is very large.** Larger homes usually have larger cooling (and heating) costs.

27. **Garage converted to a family room.** This uninsulated room may become the family room. To maintain comfort, it's necessary to lower the thermostat setting for the entire house. Cooling costs then rise.

28. **Oversized air conditioner way too big for the house.** A grossly oversized air conditioner cycles on and off a lot, removes less moisture and wastes energy. The unit cools powerfully but doesn't run long enough to dry the air. The result is a cool, damp interior, higher operating costs, lower comfort and the likelihood of mold and mildew problems. Lowering the thermostat a few degrees will cause the system to run longer and will dry the air a bit, but will over-cool the house and increase relative humidity.

29. **Open or nonexistent fireplace damper.** This lets outside air in or lets indoor air escape. Costs rise in either case, especially if HVAC ducts leak, which is usually the case. An informal survey by energy auditors showed that among

customers who thought their fireplace dampers were closed, about 50 percent were wrong; they were open.

30. **Air conditioning supply registers are closed off.** If you have a central air conditioner or heat pump, don't close off room vents. When you do, the house becomes negatively pressured compared to the outside, and warm, moist outdoor air gets pulled in. What's more, airflow across the HVAC cooling coil is reduced, which lowers the system's energy efficiency and cooling capacity. The system runs longer and operating costs rise.

31. **Bedroom doors are closed, with no way for air supplied to the rooms to circulate back to the air conditioner.** Each closed-off bedroom becomes positively pressured, while all other rooms become negatively pressured with respect to the outdoors. This causes more air leakage from the inside to the outdoors and vice versa. Air can leak through bathroom vents, fireplace vents and dampers; around windows and doors; through recessed ceiling light fixtures; around attic hatches or pull-down attic doors; through electric plug and light switch-plates, etc. Consequently, the air conditioner runs longer to keep the house cool and dry.

32. **An air conditioning supply duct leads to the garage.** It wastes energy to cool the garage. It's uninsulated; it's "outdoors."

33. **The air conditioning system's return air grill is situated low on a wall and blocked by furniture, or it's at floor-level and covered by a rug or other object.** This results in poor return air flow, higher operating costs and other problems.

34. **A small pool or spa is situated in-**

side the house. Phenomenal moisture problems result, not to mention high air conditioning costs. Remember, the air conditioner works to remove moisture as well as remove heat. Even in normal circumstances, about 38 percent of the air conditioner's work (and operating cost) is devoted to moisture removal.

35. **The entire house is cooled with a variety of old, inefficient window air conditioners.** Customers with window air conditioners usually have significantly lower bills than those with central cooling systems. This is because only one or two rooms are cooled some of the time, rather than the whole house all of the time. However, if four or five old window units are operating all summer to cool the whole house, then costs get high. Older window units often have energy efficiency ratings around 5 EER; newer central systems are at least twice as energy efficient.

36. **A large ceiling fan with incompletely closed louvers is located in the hallway.** This provides a major path for air leakage to or from the attic. If you have one of these big fans and don't use it, then seal it to reduce air leakage and cover it from above with blankets of insulation. Just make sure it can't be turned on!

37. **The air conditioner's thermostat is near a source of heat.** An uninsulated attic hatch for instance, can radiate heat onto the hallway thermostat below. Remember, small thermostat adjustments make a big difference to your cost. If your system cools to 73° F instead of 78° F, your cooling cost can increase by 60 percent.

38. **The hallway wall behind the thermostat is hot.** The air-conditioner's distribution fan pulls air down from the attic

through that wall cavity, whenever the air conditioner runs. This tricks the thermostat into calling for more and more cooling. Finding the pathway of air leakage and sealing it cures the problem. Usually this involves stuffing paper-backed insulation and / or spray expanding caulk at the top of the wall cavities that open into the attic.

39. **The eating area is heated by morning or afternoon sun streaming through a sliding glass door.** This common situation causes the customer to cool the entire house to a lower temperature in order to achieve acceptable comfort levels at that spot. This can be costly.

40. **A tree shading the house was removed from the yard.** This can increase air conditioning costs up to 30 percent a year.

41. **Air conditioning ductwork in a hot attic is poorly insulated.** Attic heat transfers to the cool air moving through the ducts. The AC system runs longer to cool the house and costs rise.

42. **The air conditioner's return air plenum box, constructed of sheetrock, is uninsulated, leaky and located in a hot garage.** This is fairly common and increases costs.

43. **All the components of the air conditioning distribution system, including the air handler, supply ducts and a long return duct, are located in a hot attic.** Many older homes have air conditioning systems configured this way. The equipment and its air ducts gain heat from the attic, causing the system to run longer to cool the house.

44. **The air conditioner's thermostat mounted on the hallway wall is not level.** If you look behind the cover plate of an old-style thermostat, there are

typically one or two mercury-containing glass bulbs that tip left or right as the temperature adjustment lever is moved. When you adjust the lever down for cooling, the bulb tilts and a small blob of mercury rolls over to make an electrical connection. If the thermostat is not level, the mercury rollover and thermostat's calibration are affected.

For example, if you set the lever to 78° F but the thermostat isn't level, the system may cool to 75° F. Cooling costs can rise by 25 to 35 percent. (Level the thermostat easily using adjustment screws behind the faceplate, or have it leveled during the unit's next professional servicing).

45. **The house has a package-unit central air conditioner at one end, long supply and return ductwork beneath the house and a garage converted to an uninsulated TV / family room at the farthest distance from the air conditioner. A couple of ducts are added to the air distribution system to supply cool air to the family room.** This is a recipe for high bills in summer, but even higher ones in winter. The ductwork has the longest possible run, both ways, to cool the room that gets the most evening use. The walls and ceiling of this former garage lack insulation. The air conditioner's delivery fan is probably not powerful enough to handle the additional area, and the add-on ducts result in an imbalanced system that no longer delivers the requisite 400 cubic-feet-per-minute (cfm) of air across the air conditioner's evaporator coils (per ton of cooling capacity). It all adds up to high cooling and even higher heating costs.

46. **The air conditioning components are mismatched.** For example, a new "high efficiency" outdoor unit (the condenser) is mismatched to the original 15-year-

old indoor unit (the indoor fan and evaporator coil). The original copper refrigerant lines connect the outdoor and indoor units. This results in low efficiency and high operating costs. A new outdoor condenser matched with an old indoor fan / coil may cool the house but rarely achieves the rated efficiency posted on the new condenser.

47. **A newly added room is hot, so the customer lowers the thermostat setting for the whole house.** The air supply duct in the attic for the new room is laid out and connected to the "boot" above the register, but it is never connected into the main system. No cooled air is delivered to the new room. Instead, hot air enters from the attic. Surprisingly, unconnected air ducts in attics are common to find.

48. **The ductwork boots behind the registers are loose, or ducts under the house have fallen off of the register boots.** In this case, the AC system is cooling the crawl space.

    A good tip: When you shine a flashlight down into a floor register, you shouldn't see the earth under the house!

49. **Flex duct in the attic is kinked, pinched, folded or flattened, restricting air supply to particular rooms.** The thermostat setting for the whole house is lowered to compensate. This common problem is especially significant if the rooms having insufficient air supply are the kitchen or family room.

50. **The air delivery system includes some length of panned floor joists, which are leaky.** The spaces between floor joists are sometimes modified for use as return air ducts. This cavity is made into a duct by attaching sheet metal over the bottom of the joists and by capping the

ends of the joist cavity. A leaky panned floor joist draws in air from the crawl space or basement. To remedy this problem, seal with mastic or a comparable substance.

51. **A floor register was closed by accident, and the cooling temperature for the entire house was lowered in order to feel cool enough in that one room, or cool enough in one particular place in that room.** Floor registers are easily kicked shut. If you're not cool enough in a room that was comfortable the previous summer, check to make sure the air registers are still open.

52. **Ceiling fans run all day – even with no one at home.** Only run fans when you're there to feel the breeze. Fans cool your skin but not the room. In a vacant room, a fan's energy is wasted.

53. **The ceiling fans run backward, breezing upward.** They should breeze downward, allowing you to feel the breeze. Otherwise it's wasted energy.

54. **A package-unit central air conditioner was connected to a mobile home's existing furnace ductwork.** In summer, cool air that breezes from the furnace feeds to a nearby return-air grill. This causes poor air distribution and high operating costs.

55. **A stand-alone AC fan coil box under the house was tapped into the supply and return ductwork that originally distributed heated air from an old oil furnace.** With no directional damper, the air can recirculate in the ductwork without much effect on the house above. In summer, the air conditioner runs a long time to accomplish very little cooling.

56. **The "Takeback Effect"** This is also known as "The Conservation Effect."

There's an occasional but well-documented human tendency to follow-up home energy efficiency improvements with lowered summer thermostat settings that "take back" the potential energy savings.

57. **The "Roommate Effect"** This happens to college students in off-campus housing. Each roommate has a different level of thermal comfort and concern for energy conservation. The energy practices of the least concerned and least conserving person often become the norm for all roommates.

58. **The central air-conditioning system has an unknown filter that never gets changed.** Here's how this can happen: A customer finds a filter-backed grill mounted in the hallway ceiling or low on an interior wall. The grill has a hinge and opens easily. It's obviously designed to hold a filter, and air is pulled through it. Consequently, the customer places a filter in it – not realizing that there is already an air filter in the air handler a few feet away. It's hard on the system to pull air through two filters like this. It gets worse if one of the filters (like the one at the air handler) is out of sight, never changed and clogged shut with dust. Air flow is restricted, operating costs rise and equipment can become damaged.

    To avoid the mechanical problems noted above, have your central heating system installed and serviced by a licensed, qualified HVAC service professional.

Water Heaters

59. **Hot water leaks.** It may be hard to determine if faucet leaks are hot or cold. Here's a common situation: The water heater is located at one end of the house

and there's a leaky tub faucet at the far end of the house. The leaking water feels cold. Interestingly, even though the water feels cool, it could be hot water that cooled as it flowed through the lengthy piping system. **Here are a few leak tests in order of ease:**

- Tighten the hot side handle and see if the leak diminishes.
- Put a screwdriver tip to the hot water pipe where it exits the water heater and press the handle end against your ear; the sound of running (hot) water is magnified.
- Feel the cold water supply pipe where it enters the water heater; if no hot water has been used in the previous half hour, the cold pipe should feel warm. (Heat from the water heater conducts to that pipe and warms it). If the cold-water pipe is cold where it approaches the water heater, and you ran no hot water recently, there may be a hot water leak. That pipe would be cold because cold water is entering the tank (and cooling the inlet pipe) to make up for hot water being lost to a leak.

60. **The water heater's thermostat malfunctions, the tank overheats, tank pressure builds and the pressure-and-temperature relief valve opens to release a flood of very hot water.** It could be under the house, where no one sees it. In one case, the pressure / temperature relief pipe was sending scalding water from the under-the-counter water heater to a connection with the drain pipe beneath the kitchen sink. A steamy hot mist was rising from the sink drain hole; the electric usage had recently doubled. In many cases, the pressure-and-temperature valve simply fails, for unknown reasons. When the valve fails, hot water flows from the water heater 24

hours / day, leading to high electric, water and sewer costs. In most single family detached homes, the pressure / temperature relief line from the water heater emerges as a little down-spout low on the back side of the house or garage. If you find hot water plunging from that spout, call a plumber.

61. **The cats always nap on a particular spot in the middle of the kitchen floor.** This clue can mean that a hot water leak under the slab is warming the spot.

62. **The customer has a so-called "combination appliance" that uses a powerful gas water heater to heat the residence, as well as the water, in winter.** It should only heat the house during the winter. It may heat the house during the summer too, as a result of faulty valves, good valves installed incorrectly or faulty electronic controls. Summer electric and gas costs both increase; and the electric air conditioning (cooling) cost typically doubles. Higher than expected summer gas cost is often a telling clue.

63. **The small pump on a water heating waste-heat-recovery unit runs non-stop.** It happens whether the air conditioner is running or not and can become very costly, especially if the water heater is a long way from the air conditioner's outdoor condenser.

64. **The water heater thermostats are set too high.** Each 10 degrees downward adjustment cuts water heating energy consumption by 3 to 5 percent. We recommend setting the thermostat(s) at 115° - 120° F. If you have an electric water heater, set both thermostats to the same temperature. If you use a dishwasher that has no booster heater, set your water heater thermostats at 140° F. If your dishwater heats its own water, you

can lower your two water heater thermostats to 120° F or less.

65. **Water heater's lower element burned out.** Electric water heaters typically have two heating elements: upper and lower. The lower element works longest, and tends to fail first. The result: Only the top 1/3 of the tank is heated. The water is just as hot as it was before, but it quickly runs out. If left that way, operating costs actually go down. But if the upper element's thermostat is dialed to a much higher temperature to compensate, operating costs go up.

66. **There's hot water in the toilet: six words that mean trouble.** Rare but memorable. Call a plumber.

67. **Plumbing / pumping reversed on a large solar water heating system.** Water heated electrically in 80-gallon basement storage tanks, then pumped backwards through the system to cool at the rooftop, and returned to reheat in basement tanks with continual circulation. This is costly.

Pool Pumps

68. **The customer has a swimming pool and the pool pump runs 24 hours-a-day.** The high cost of pool pumping is a surprise. Most residential pool pumps are 3/4 horsepower output. Operated all day every summer day, the monthly energy cost is about $66; operated continuously year around, the annual energy cost is about $793. A timer for the pool pump is well worth the installed cost and usually pays for itself through energy cost savings within a few months.

    The National Spa and Pool Institute recommends that the pool be "turned over" (one complete circulation of water) once

a day. Full turnover of a typical 20,000 gallon pool, requires four hours pumping at 85 gallons per minute, six hours at 55 gallons per minute or eight hours at 40 gallons per minute. Most pool pump systems are sized to accomplish a full turnover in four to six hours. Pumping year around for six hours a day instead of 24 hours a day saves about $595 a year!

In the Attic

69. **The ceiling lacks adequate insulation.** Heat from the attic is conducting through to the house below. Improving ceiling insulation is one of the best investments you can make towards lowering your air conditioning costs during the summer. The older your home, the more likely its original level of insulation would now be considered inadequate. Some older homes have no insulation at all.

    If you're not sure how much insulation you have, call 891.4YOU (4968) for a free home energy audit. City of Tallahassee electric customers can participate in a grant program that pays 80 percent of the installed cost to add ceiling insulation, up to a maximum City of Tallahassee Utilities contribution of $400.

    Insulation target level in this program: R-38 (about 15 inches of blown white fiberglass). If your residence is heated with electric-resistance "strip" heat, the insulation target level is R-49 (about 20 inches of blown white fiberglass). This program is available to both home owners and renters.

70. **A rooftop power ventilating fan pulls hot air from the attic on summer days.** The fan's thermostatic control is set too low (i.e. 95° F instead of 115°

F), so the fan runs more than it should. The fan motor itself is costly to run and eats up any potential savings for having cooled the attic. Moreover, most ceilings are imperfectly ceiled against air leakage from house to attic. A fan pulling air from an attic may also pull air (expensively cooled air) from the house into the attic.

Typically, well-insulated attics don't need power ventilation. Passive ventilation devices such as high ridge, off-ridge, turtleback or gable vents, together with low soffit vents, are adequate. The optimum design is usually a ridge vent (internally baffled so that rain doesn't bounce in) and soffit vents at the eaves.

Refrigerators and Freezers

71. **The refrigerator that served for 20 years in the kitchen still works, and now it's in the garage.** Garages get very hot. Those old refrigerators are not very energy efficient, and can run almost continuously in a hot environment. The new refrigerator in your kitchen is probably three or four times as energy efficient as a very old model. For instance, a new, 25 cubic foot high-efficiency refrigerator in the kitchen costs about five or six dollars a month to operate. An old, inefficient unit in a hot garage can cost $25 to $50 a month in the summer.

72. **The refrigerator door won't seal when it's shut, the door is askew or the gasket is damaged.** Cold air loss occurs. Years ago the standard advice was to properly align the door on its hinges and / or replace the gasket. However, replacement gaskets now cost $50 to $80, can be hard to find and may not fit well.

So if your refrigerator is 10 or 15 years old and in poor condition, it's probably best to replace it with a new one rather than undertake gasket repairs. Since 1993, new refrigerators are three times (or more) as energy efficient as similar-sized units 10 years earlier. And refrigerators manufactured after 2001 are 30 percent more efficient than those of 1993. A new, 25 cubic foot energy efficient refrigerator costs $5 or $6 a month to operate whereas an older model could cost up to 10 times as much to operate.

If your shopping for a new refrigerator, consider an energy-efficient ENERGY STAR-qualified model and get a rebate from Your Own Utilities. Visit Talgov.com/YOU for more information.

73. **There is a refrigerator in the kitchen, an older refrigerator in the pantry and a freezer in the pantry.** Costs rise. If the newest refrigerator was manufactured after July 2001, it's far more energy efficient than older refrigerators or freezers. Consolidate stored foods into the newest unit if possible.

Lighting

74. **All the lights in the house are on.** In most homes, lighting only accounts for about 6 percent of the annual electric cost, but these costs can add up. Keep up the habit of turning off lights when you leave a room.

More than 99 percent of the electric energy provided to incandescent lights is converted to heat and less than 1 percent to light. Switching from incandescent to compact fluorescent lights (CFLs) reduces heat output from each light to about 1/4 the former level. Reducing heat helps a lot in the summer. If you're

reading by a lamp in a room cooled to 78° F, you'll feel noticeably cooler sitting under a CFL.

75. **Outdoor area lights are on all through the day.** This is probably caused by a bad photocell.

In the Laundry Room

76. **Someone's doing a lot of clothes drying every day.** This is done during the heat of the day, with a dryer located in an air-conditioned utility room, and the dryer is vented to the outdoors. A clothes dryer has a powerful fan that whips air past the damp clothes at the rate of 150 to 200 cubic feet per minute (cfm). In a 1,500 square foot house with 8-foot ceilings, a 200 cfm dryer can empty one house load of air every 60 minutes of operation.

    In summer, that results in a lot of expensively cooled house air being heated by the dryer and blown out. Just as bad, the lost house air will be replaced by hot, damp outside air leaking in fast wherever it can: through kitchen and bathroom vents, fireplace vents and dampers, around windows and doors; through recessed ceiling light fixtures, electric plug and light switch plates, etc. It's best to locate the dryer in an uncooled utility room or garage.

77. **The clothes dryer vent shoots lint onto the air conditioner's outdoor condenser coils.** The AC system, hampered in its ability to release heat, runs longer and longer.

78. **The dryer vent hose or outdoor vent flap is clogged with lint.** It takes longer and longer to dry a load of clothes. With the vent clogged, the clothes get a hot,

damp tumbling, the dryer runs a longer time with poor results, and costs rise.

79. **The customer uses hot water for washing cloth diapers.** This increases costs for a couple of years.

Other Appliances

80. **Plasma TVs and other digital electronic equipment.** This has been an emerging concern that has gained national recognition. Big plasma TVs can use 100 to 200 percent more electric power than standard small screen TVs. Altogether, TVs, DVDs, computers, chargers and other home electronics account for as much as 10 percent of a family's annual electric bill. And they produce a lot of heat, adding to summer air conditioning costs.

81. **A dehumidifier runs nonstop, draining through a hose to the outdoors.** The basement area being "dried" is itself wide open to the outdoors. Dehumidifiers remove water from the air just as an air conditioner does. But a dehumidifier heats the room in which it sits, like your refrigerator does. For some homes it reduces mildew. Dehumidifiers all seem to have about the same size pan for water collection, but have widely different rate of water removal. The capacities are usually expressed as pints of water removed in a 24-hour period at some standard temperature and humidity. A "bigger" dehumidifier, with a larger compressor and higher operating cost per minute of run time, removes water from the air faster, but generally less efficiently. If you're catching the water in the pan underneath, you'll need to empty it more frequently to keep up. If you're draining via a hose, there's no pan emptying necessary. Be sure the area you're attempt-

ing to dry isn't open to the outdoors. Also be sure the drain hose is routed to empty water away from your house, or into a drain.

82. **Office in the home.** Here's the power draw of some selected home office accessories:

Equipment Type	Power Draw (Watts)	
	Idle	*Active*
Copier	6	400
Personal Computer	62	62
Video Monitor	62	62
Laser Printer	80	200
Fax Machine	14	30
Totals	**224**	**754**

How much this costs depends on activity levels. Suppose the copier, printer and fax machine are idle 23 hours and active 1 hour each day: With the computer and monitor (active 24 hours / day), the operating cost is over $25 / month.

83. **Hot tubs.** Unless careful attention is paid to a tub's cover, insulation and pumping, the added monthly cost can be $20 to $40 or more.

Cooking

84. **There's a whole lot of cooking going on.** Meanwhile the air conditioning runs nonstop to cool the kitchen. To avoid this, cook outside in the summer, eat later in the evening or use a microwave oven. A microwave oven cooks twice as fast and doesn't heat the kitchen.

Here's a comparison of costs to cook

a meatloaf, from a study by Northeast Utilities:

Oven Type	Cost (per hour)
Electric Oven	29 cents
Electric Convection Oven	22 cents
Gas Oven	20 cents
Electric Frying Pan	14 cents
Electric Toaster Oven	15 cents
Electric Crockpot	12 cents
Electric Microwave Oven	6 or 7 cents

Windows

85. **Windows on the southwest or west side are fully exposed to the setting sun.** In newer Florida homes, sunlight heating through windows accounts for about 20 percent of the air conditioning load. In older homes, it can be as much as 30 percent. Use interior shades, drapes or blinds to reduce heat through windows by about 20 percent. External shade (from trees, awnings and sun screens) works even better.

    Some newer, high-tech windows have special tints or films that reduce the amount of heat transmitted across the window into the house. Most window manufacturers now offer high-tech windows with low E coatings. This is a microscopically thin, virtually invisible, metal or metallic oxide layer deposited on a window.

    In a double-paned window, the coated surface may be either the outer side of the inner glass or the inner side of the outer glass.

In Florida, the latter design works better. The coating acts to suppress radiative heat movement across the window by reflecting heat back into the home during cold weather and back to the outdoors during warm weather.

86. **The house has awning or jalousie windows designed for cross ventilation.** The house is closed up for air conditioning. These window types are notoriously leaky. In summer, the air conditioner must toil to dry as well as cool the air, and major air leaks cause major cost increases.

87. **Old casement or awning style windows are deformed out of alignment and will not seal shut.** Warm moist air leaks in, or cooled air leaks out, resulting in higher utility costs.

88. **Windows lack inside shading devices (shades, drapes or blinds) or these devices are not adjusted properly.** Venetian blinds and other shading devices are tremendously important. Use them to block heat entry on summer days.

89. **Windows and doors are open while the air conditioner runs.**

90. **Southwest sun exposure floods the home with radiant heat in the fall.** Some homes have southwest windows that are well shaded by overhangs through the middle of the summer, when the sun passes overhead. But in the fall, afternoon sunlight (radiant heat) pours in as the sun's path passes lower in the sky. Air conditioning costs may soar unexpectedly in late September and October.

In the Bathroom

91. **Some of the worst water leaks are at toilets.** You can lose 100+ gallons every day without knowing it. Listen care-

fully for the faint, high whine of a toilet leak. Find out if tightening the water supply shutoff beneath the tank will stop the noise. Or, put some food coloring in the toilet tank. If the color appears in the bowl without flushing, you have a leak.

Have you ever seen a toilet with mechanism that catches in mid-flush and water rushes continuously out the drain? If you ever discover a toilet in your home that occasionally does this, don't put off having it repaired. It can flush hundreds of dollars worth of water while you're away.

92. **There's hot water in the toilet.** This rare but expensive problem requires rerouting pipes. Call a plumber.

93. **Bathroom power vents are left running.** This sends expensively cooled air up the vent and to the outdoors. Run these bathroom fans only as long as needed to clear that one room of its moisture. If the bathroom is 10 feet by 12 feet with an 8-foot ceiling, it only takes 19 minutes of fan operation to send out one roomful of air.

Outside the Home

94. **Dry periods typically occur in the spring.** Water bills can spike during spring and fall droughts. Water bills rise as a result of unnecessary lawn watering. Excessive watering increases cost and can harm the grass.

Here are a few tips:

- Water your lawn in the early morning when the sun and wind are low. About 30 minutes of water twice a week is all your lawn needs. Grass roots will grow deeper and less watering will be needed over time.
- Remove weeds, which take up pre-

cious water.

- Mow regularly, removing one-third of the grass length. Leave clippings on the lawn to help retain moisture.

95. **Gardening and landscaping activities increase water use.** This may cost more than expected.

96. **The home has a hot tub.** Unless careful attention is paid to a tub's cover, insulation and pumping, the added monthly cost can be $20 to $40 or more.

97. **Vines, bushes, tall grass, leaves, litter or lawn chairs cover the air conditioner's outdoor condenser unit.** The heat can't be released, and cooling costs rise.

Miscellaneous Findings

98. **Teenagers can cause high bills in the summer.** As most parents know, teens can use extraordinary amounts of water and electricity for showering and personal grooming. Small children, on the other hand, require less energy and are relatively comfortable in warmer environments.

99. **Humid outdoor air is leaking into the house.** Air leaks through cracks around doors and windows, electrical outlets, ducts, vents, recessed lights in the ceiling, or fireplace dampers that don't seal tightly. In Florida homes, about 38 percent of the air conditioner's work (and operating cost) is drying out this moist air leaking in from the outdoors.

    Leaks in the ducts that supply cooled air to rooms will make this situation much worse because the overall house air pressure becomes "negative' with respect to the outdoors whenever the air conditioner is running. In this condition

the house sucks in warm, moist air – especially attic air – whenever the air conditioning system runs. The system runs longer to compensate. Even more warm air is drawn in, which needs to be cooled and so forth in a vicious cycle. Costs rise significantly.

100. **A resident requires the use of oxygen.** Unfortunately, the energy cost to run these compressor systems is surprisingly high – about $35 / month for continual use of oxygen.

101. **The resident's City of Tallahassee Utilities energy loan payment on the utility bill makes the total bill in summer higher than it was the previous summer.** It turns out to be higher than when they still had their old, inefficient equipment. New air conditioning equipment almost never pays for itself through energy savings in less than five years. Since the term on Energy Loans is five years, and 80 percent of the loans are for HVAC equipment, almost all loan program participants are saving less each month than the monthly loan payment amount. After the fifth year, bills are lower.

102. **Relatives come to visit.**

103. **Kids come home from college.**

104. **Children are home from school.**

105. **While the family is away during weekdays, a housekeeper works at the house.** He or she drops the thermostat to the low 70s.

106. **College students living away from home for the first time move into an off-campus house or apartment in August.** Their second utility bill has a way of getting high (the first billing is often for a partial month). A high bill seems to relate to a whirlwind of initial

activity that happens to coincide with brutally hot weather: moving in, cleaning, entertaining, having doors opened or the thermostat set too low, etc.

107. **Someone else other than the resident pays the utility bill.** Someone else pays, maybe a parent living elsewhere and this leads to high electric usage and high bills.

108. **A room, wing or extension was added to the house, or a garage or porch was enclosed.** The overall cooling costs go up. Larger homes cost more to heat and cool.

109. **The residents left town for a summer vacation and were expecting the next utility bill to be low.** The bill was high because they left the air conditioner set at 78° F and the unit ran a lot. It is best to set the air conditioner's thermostat at 83° F or 84° F when away. The system runs occasionally, reduces humidity a little, and lowers costs significantly. Findings by the Florida Solar Energy Center offer a clever strategy utilizing a programmable thermostat: Set the AC system to cool to 71° F for one hour a night, from 3 a.m. to 4 a.m. In older leakier homes, cool for two hours, from 3 a.m. to 5 a.m. The AC runs efficiently in the cool of the night, costs are low and humidity is kept low.

Weatherstripping and Caulking

110. **Doors need weatherstripping.** Weatherstripping prevents significant air leakage. The crack around all four edges of a standard door is 20 feet long. If the crack is 1/12" wide, the total "hole" size is 20 square inches, roughly the equivalent of a softball-sized hole in the door. If

the house is negatively pressured whenever the air conditioner runs because of supply duct leakage, that size hole emits a lot of warm, moist air for the air conditioner to cool and dry.

Choose from a wide variety of weatherstripping materials at local hardware stores and home supply centers. You'll often find good instructions there too, either from staff or from how-to booklets.

111. **Windows and doors need caulking.** Caulking prevents air leakage. This is do-it-yourself work. Caulk is cheap. Applying it is easy, but it takes time. Caulk the cracks in and around window and door frames; cracks where masonry walls meet wood siding or trim; wall penetrations by pipes, meter box, clothes dryer vent or exhaust vents, etc. Some all-purpose caulks are silicon, silicon-acrylic and siliconized acrylic latex.

Causes of High Winter Utility Bills

Your Own Utilities' energy auditors have been investigating home energy problems in Tallahassee since 1981. Here are some of the things they found that caused high bills:

For more information on products & services designed to help you save energy, water and money, call Your Own Utilities at 891.4YOU (4968) or visit Talgov.com/YOU.

Heating

1. **Central heating thermostat setting is too high.** The rule for thermostat settings in winter is: The lower the better. 68° F is recommended. Lower the thermostat overnight (to 65° F if you have a heat pump, or to 55° F if you have gas, oil, or electric strip heating). Dress warmly. If you heat your house to 75° F, expect high bills.

2. **Central heating system duct leaks and duct breaks.** Leaks in the supply-air ducts push warm air into the attic or into the crawl space under the house. Leaks in return ducts draw in cold air from the attic or crawl space. Major duct leaks and disconnections can double your heating costs.

3. **Clogged filters, overly thick filters, two filters, clogged coils and restricted airflow.** Air flow restrictions reduce equipment operating efficiency, which causes higher operating costs and can lead to other equipment problems. Having a second filter can be a real problem, especially if only one filter gets replaced while the other is tucked away out of sight in the air handler, clogged shut with years of dust.

4. **The home is heated with 10,000 or 15,000 or even 20,000 watts of central electric resistance or "strip" heat.** What is strip heat? Picture a super-sized glowing red toaster element that warms the passing air in your central ductwork. "Strip heating" systems are cheap to install but costly to operate. Winter after winter, this is the most common cause of acute high electric bills in Tallahassee. The strip-heat operating costs, based on August 2013 utility rates and applicable taxes, are as follows:

- 10,000 watts, typical in smaller apartments: $1.16 per hour (nonstop operation).
- 15,000 watts, typical in larger apartments, homes to about 1,500 square feet, and many mobile homes: $1.74 per hour (nonstop operation).
- 20,000 watts, found in some larger apartments, some homes from 1,000 to 2,000 square feet, and some mobile homes: $2.32 per hour (nonstop operation).

5. **Heat pump thermostat accidentally set to Emergency Heat.** A common finding, and it can be a costly mistake that leads to higher winter bills. Set on Emergency Heat, the energy efficient heat pump isn't enabled. Only its 10,000 or 15,000 watts of backup heat strips are on. Operating cost doubles.

6. **Heat pump stuck in defrost mode.** Stuck in defrost mode, the system heats and cools simultaneously, heating with backup strips. Operating cost triples.

7. **Heat pump thermostat wired incorrectly.** When set to "HEAT", it cools at first, then heats with both the heat pump and its backup strips. Or it heats-and-cools simultaneously, heating with backup strips. This sometimes happens when a new heat pump is mismatched to an old thermostat. Operating cost doubles or triples.

8. **Heat pump configured or wired so that backup strips operate during every heating cycle; or the heat pump has an incompatible thermostat.** Similar to above cause, but in this case whenever the heat pump operates, its backup strips operate as well. The customer feels warm, but at twice-the-normal operating cost.

9. **Heat pump condenser failed or locked out.** The outdoor fan doesn't spin. The primary energy-efficient heat pump isn't functioning. Only the backup strips are operating. Operating cost doubles. A common finding. Uncorrected, it can create high bills all winter.

10. **Heat pump condenser circuit shut off at the breaker panel.** The outdoor fan doesn't spin; only the backup strips are operating. Operating cost doubles. If undetected, it can cause high electric consumption and high bills all winter.

11. **Heat pump defrost controls are faulty.** The unit switches to defrost mode every five minutes or so. It shouldn't defrost so often. While in defrost mode it heats-and-cools simultaneously, heating with expensive backup strips, at triple the usual operating cost.

12. **Heat pump low on refrigerant or has too much refrigerant.** Either too much or too little is a problem. The system runs longer to provide adequate heat, and costly electric strips come on more frequently. Operating costs can double.

13. **Heat pump backup electric strips operate silently On/Off, On/Off even when the thermostat is set to "OFF."** Several causes were found, including accidental metal-to-strip connections in the air handler. For example, electrical connection made in the air handler by a peel of metal foil off the duct insulation. This can also occur in 10,000- to 20,000-watt central electric strip heating systems that are not heat pumps, and results in an astonishingly high electric bill. While uncommon, it can be alarming when it happens.

14. **Heat pump tripped its pressure / temperature high-limit switch, so that only the backup electric strips are**

used. Operating costs can double. This is not a concern with most newer heat pumps. Various causes including dirty filter, clogged evaporator coils behind the filter and refrigerant over-charging. The problem may begin at the first fall defrost cycle and continue all winter undetected.

15. **Two-story house with two heat pumps: The upstairs heat pump fails and now the downstairs one works longer in the winter.** The downstairs working heat pump will try to maintain the temperature selected at its downstairs thermostat. Because the system is too small to heat the entire house on colder days, it activates its backup heat strips sooner, and strips operate longer. Operating costs can almost double.

16. **The gas furnace has a poor flame adjustment.** There is too much or too little primary air (the air pre-mixed with gas prior to combustion). Operating cost increases.

17. **Gas furnace with insufficient secondary air.** The furnace operates at lower efficiency if there is too little secondary air (air supplied to the burner flame at the moment of combustion).

18. **Gas furnace is short-cycling.** The furnace operates in short, inefficient bursts. This can be caused by equipment oversizing, or sometimes by problems with thermostat location. Increased operating cost.

19. **Multiple plug-in space heaters.** For about 17 cents per hour, a single plug-in, 1,500-watt electric space heater heats a room quickly and effectively if you close the door to keep the heat from escaping to the rest of the house. The hourly cost seems low, but it can add up, especially where multiple heaters are used to heat

the entire house. Use plug-in electric heaters cautiously.

In the Attic

20. **Inadequate ceiling insulation.** Some older Tallahassee homes lack ceiling insulation, and many other homes have insufficient insulation. Call for a free energy audit if you're not sure what level of insulation is in your attic. In Tallahassee, our target value is R-38 "R-Values" of insulation, which is about 15 inches of blown white fiberglass.

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