GREEN SAVERS PROJECT

DO-IT-YOURSELF

Home Energy & Water Savings

USER GUIDE

The Green Savers Project is designed to help you save money on your utility bills while conserving vital resources.

Virginia Natural Gas

Virginia Natural Gas Foundation

VB | CITY OF VIRGINIA BEACH Public Library

VIRGINIA BEACH LIBRARY FOUNDATION

TABLE OF CONTENTS

DIY TOOLKIT CONTENTS 2

ENERGY

INTRODUCTION TO ENERGY USE 3

PLUG LOADS 4

APPLIANCES 5

LIGHTING 6

HOME 7

WATER

INTRODUCTION TO WATER USE 9

AT THE TAP 10

BATHROOM 11

WATER HEATER 12

LEAKS 13

OUTDOOR WATER USE 15

COOKING 16

FINAL STEPS 17

INTRODUCTION

Green Savers Project
Do-It-Yourself (DIY) Home Energy and Water Savings

Virginia Beach Public Library, the Virginia Beach Library Foundation, and the Virginia Natural Gas Foundation have partnered to bring you the Green Savers Project. This energy efficiency program will help you take charge of your home's energy and water use in order to reduce your utility bills.

The Green Savers Project includes three (3) different toolkits that you can check out for free with your VBPL account, workshops where you can learn about important energy efficiency topics, and free equipment giveaways associated with the workshops. Plus, this user guide will provide additional tips for “going green” in your daily life. Whether your goal is to save money, protect the environment, or embark on a fun home project, we invite you to turn the pages and learn all you can.

This symbol indicates steps where you will use the Toolkit tools and equipment

DIY TOOLKIT CONTENTS

Tools – To Be Returned to the Library Once You are Finished with the Kit

*Available for checkout from the library! Seach our catalog at **virginiabeach.gov/vbpl-catalog***

Energy Effeciency Toolkit

- Kill-A-Watt Electricity Usage Monitor
- Digital Refrigerator Thermometer
- Infared Thermometer
- Indoor Mini 24-hour Mechanical Outlet Timers
- Plug-in Socket Power Meter
- Self-Stick Rubber Foam Weatherstripping
- Compass

Thermal Camera Kit

- Thermal Imaging Camera

Water Conservation Toolkit

- Digital Hygrometer/Indoor Thermometer
- Groove Joint Pliers Set *(2 pieces)*
- Adjustable Wrench Set *(3 pieces)*
- Plumbers Tape *(2 pack)*
- Drip Gauge
- Moisture Meter
- Faucet and Shower Flow Gauge Measuring Bag
- Stopwatch

Equipment – For You to Keep and Install in Your Home

When you attend one of our Green Savers programs at the library you will receive one, or more, of the following:

Light-Emitting Diodes (LEDs) bulbs

Low-Flow Showerhead

Air Filter Whistle

Digital Infared Thermometer

Portable Rain Barrel

Counter Composter

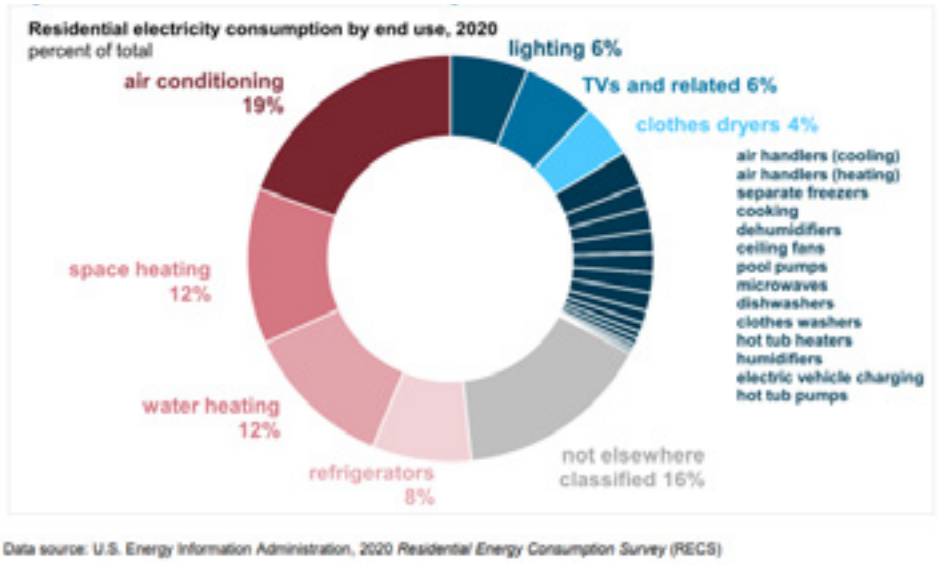
Water Awareness Conservation Kit

Scan the QR with the camera on your mobile device to find a Green Savers program happening at the library or search 'Green Savers' at **vbpl.librarymarket.com**

INTRODUCTION TO ENERGY USE

Average Household Use of Energy in Virginia

Knowing how energy is used in your home will help you take steps to reduce your use. This pie chart shows how the average household in Virginia used electricity in 2020.



How Much Energy Will This Toolkit Help Me Save?

We all use our homes and appliances differently, so predicting the precise amount of energy savings that you can achieve by using this user guide is difficult. For example, EnergyStar® estimates that replacing one incandescent bulb with an EnergyStar® Certified CFL or LED bulb can save you $55 in electricity costs over the bulb's life — the actual amount depends on how often you use the light, your electricity rate, and more.

Energy Literacy: Understanding Units That Measure Energy

Watt (W) - A watt is the basic unit of power used to measure electricity capacity and is equivalent to one joule per second. Incandescent light bulbs are rated on their capacity to produce light — the higher the rating (e.g., 40, 60, 100W), the brighter the light. LED bulbs use far less watts to produce the same amount of light.

Kilowatt (kW) - A kilowatt is 1,000 watts.

Kilowatt hour (kWh) - A kilowatt hour is 1,000 watts used for one hour (power x time). It is the unit of energy most commonly used on household electricity meters. For example, a 100W incandescent bulb left on for 10 hours is equal to 1 kWh (100W x 10 hrs = 1,000 Wh = 1 kWh).

Therm - A therm is the energy equivalent of burning 100 cubic feet of natural gas.

REDUCING ENERGY USE: APPLIANCES

Many small appliances and electronics use energy even when they are turned off. This is known as “vampire” or “phantom” loads, and eliminating them is a great way to save energy and money. The US Department of Energy estimates that these energy vampires can cost the average household between $100-200 per year!

STEP #1: USE THE KILL-A-WATT® METER

The Kill-A-Watt® meter measures the energy drawn by appliances and electronics in both operating and standby modes. Follow these steps:

1. Plug the meter into an outlet and plug an appliance or electronic device you’d like to measure into the meter. You may need to wait a couple seconds for the energy to register.
2. Push the “Reset” button until “Watt” appears on the unit.
3. Measure the wattage when the appliance is both on and off.
4. Check your energy bill to verify your electricity rate.
5. The meter can also help you estimate the cost of electricity used by the appliance or device over time.

Tool: Kill-A-Watt® EZ Meter

Average Energy Consumption of Standard Appliances*

Source: Energy.gov

Appliance	Watts
Clothes Dryer	2,790
Clothes Washer	255
Clothes Iron	1,100
Computer	75- Desktop 25- Notebook
Dishwasher	330
Space Heater	1,320
Microwave	1,500
Refrigerator	225
Toaster	1,100
ED/HD TV >40”	234
Vacuum Cleaner	542
Gaming System	36

*Actual energy usage depends on the age and model of the appliance.

TIPS:

- Unplug small appliances (toasters, coffee pots, etc.) when not in use.
- Unplug phone and battery chargers once they are fully charged.
- In your entertainment and computer areas, plug equipment into a Smart Strip, which will shut off equipment when in standby mode. NOTE: Unplugging your cable box may reset the system; be sure to consult the operation manual.
- Always look for the EnergyStar® logo when buying new appliances.

Smart Strip

Major appliances may account for a quarter of your household energy costs, and your refrigerator is likely to be the single biggest plug load in your home. Using the Kill-A-Watt® meter, you can compare the energy use of your appliances to the average use as outlined in the table on page 4. Then follow the tips below.

STEP #2: MEASURE THE REFRIGERATOR TEMPERATURE

Use the Refrigerator Thermometer to help set optimum temperatures for your refrigerator and freezer:

1. Place thermometer in refrigerator between several food items. After 20 minutes, check thermostat reading.
2. Look and test for cracks using an incense stick. Pass a lit incense stick around the edges of the refrigerator. If the smoke gets sucked into the fridge or blown out, there's a draft.
3. Repeat these actions with the freezer.
4. Adjust temperatures if they are outside the target range:
   - 36-40°F for refrigerator
   - 0-5°F for freezer

Did you know?

You Can Save With EnergyStar® Appliances!

EnergyStar® appliances typically use up to 50% less energy and water than standard models. Look for the EnergyGuide label; it provides an estimated yearly operating cost and the range of operating costs for similar models.

Rebates! Rebates!

Check for rebates for replacing your old appliances with EnergyStar® appliances at https://www.energystar.gov/rebate-finder.

TIPS:

REFRIGERATOR

- Regularly clean the coils on your refrigerator.
- Leave your refrigerator plugged into a Kill-a-watt meter (included in the kit) for 24 hours.
- Keep contents organized so you can quickly get what you need; minimizing the amount of time the doors are open will save energy.
- If you have a second refrigerator, consider donating it or having it properly disposed of by your waste hauler.

WASHER & DRYER

- Wash full loads and use short wash cycles for mildly dirty laundry.
- Use cold water whenever possible.
- Use the washer's high spin cycle to reduce drying time, and try a clothesline instead of the dryer, which is a big energy user.
- Clean the lint trap after every use to ensure safe, efficient drying.

HEATING & COOLING SYSTEMS

- Do not rely on space heaters, which are very inefficient.
- Clean and replace filters regularly.
- Install a programmable thermostat in your home and set it to adjust itself 7-10 degrees for eight hours a day when the sun is at its highest, you could save 10% a year on heating.
- Use window coverings to prevent heat gains during the summer and heat loss during the winter.
- Circulate air with ceiling or portable fans.
- Replace older A/C units (more than 10 to 15 years) with EnergyStar® appliances that could reduce your costs by nearly $140 per year.

REDUCING ENERGY USE: LIGHTING

You can reduce your energy bill significantly by switching to energy-efficient lighting. LEDs use less energy than an incandescent bulb and last 15 times longer. While LEDs are slightly more expensive than incandescent, they more than pay for themselves over time because of the savings on your energy bill.

STEP #3: SWITCH LIGHTBULBS TO LEDS

LED Light Bulb

LEDs screw into place the same as incandescent bulbs. Follow these steps as you set out to switch over to LEDs:

1. When shopping, choose an LED with the same amount of lumens as the old bulb. You should be able to find the number of lumens on the packaging.
2. Read the packaging to see where the bulb should be used; not all EnergyStar® qualified LEDs are designed to work in every socket.
3. First replace the incandescent bulbs in fixtures that have the highest use; this will result in the greatest savings for you.

TIPS:

- If you want a dimmable light, look for the “dimmable” label on your LED.
- Pay attention to the color you are getting. LEDs are available in a variety of colors from warmer to cooler as indicated on the package. The higher the temperature listed on the bulb, the cooler the light.
- Make sure to dust your bulbs at least every six months; a dirty bulb is an inefficient bulb.

1,000 Kelvins **10,000 Kelvins**

Next Steps

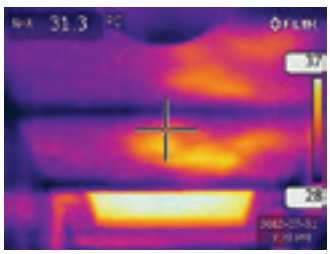
- As your less efficient lightbulbs burn out, replace them with LEDs. You can find LEDs in many sizes and shapes at any major hardware store.
- Replace your outside lights as well. LED flood lights are available.

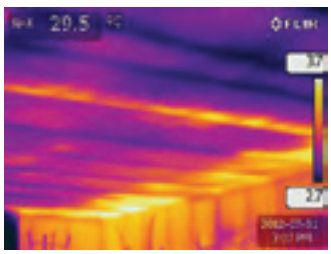
REDUCING ENERGY USE: HOME

Improving the insulation in your home can be the single most effective action you can take to save energy. Improvement to insulation can help you stay warmer in the winter and cooler in the summer while reducing your home energy costs by an average of 11%. The Infrared Laser Thermometer will help you detect where you may be losing or gaining heat through windows, lighting fixtures, outlets, vents, door jambs, and heating and cooling systems.

STEP #4: USE THE INFRARED LASER THERMOMETER

The Infrared Laser Thermometer detects heat gain and loss. Turn on and point the thermometer at potential trouble spots in your home. Note any temperature fluctuations that may be caused by air leaks.





These images (taken from an infrared camera) show examples of a home with a poor thermal envelope. The spots in yellow are places where little or no insulation are present. On a warm day, heat is being conducted through the ceiling and walls, making these areas hot.

TIPS:

In most homes if you add up all the air leaks, the impact on your energy use is similar to leaving a window open. Sealing air leaks is one of the most cost-effective measures you can take to improve your home's comfort and energy efficiency--you can save up to 20% on your heating and cooling costs. Take these steps to reduce leakage in your home envelope:

- Caulk windows.
- Schedule a professional audit or contact a local contractor to address insulation needs around your light fixtures, vents, or other spots.
- Insulate ceilings, walls, attics, floors, crawl spaces, and basements to recommended standards for optimum savings.
- Common types of insulation are fiberglass, cellulose, rigid foam board, and spray foam.

You pay for heating your home, so don't just let that heat leak out through gaps in your doors, windows, and outlets. Follow these steps to stop those leaks!

STEP #5: INSTALL WEATHERSTRIPPING

Weatherstripping

Use weatherstripping to seal gaps in your doors and window jambs.

1. Check for drafts around external doors and window jambs. Use the Infrared Laser Thermometer, or if you can see light or slide a piece of paper through an area, then it needs weatherstripping. The entire door or window usually doesn't need weatherstripping focus on the sections where you feel air or can see light.
2. Clean the application area to ensure a good seal.
3. Cut a length of weatherstripping to match the length of door or window where the strip will be applied. Peel back adhesive strip and apply.
4. If using a DIY Toolkit from the library, please return whatever you do not use.

TIP:

A door without weatherstripping may not look like a problem, but the amount of exposed area from different locations can add up to a big hole! Consider installing a door sweep to help keep out drafts; you can pick one up at your local hardware store.

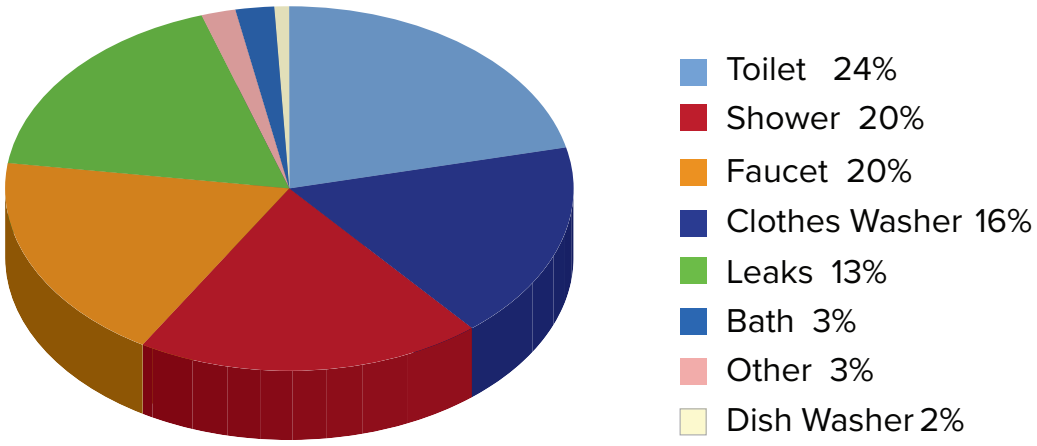
INTRODUCTION TO WATER USE

In Virginia Beach, we get our primary water supplies from the Lake Gaston Water Supply Pipeline leading from Lake Gaston in New Brunswick County, North Caroline, to Lake Prince, a reservoir located in Suffolk but owned and operated by North Carolina.

When you save water, you also save energy.

Water heating accounts for 20% of home energy use in Virginia.

Indoor Water Use in a Typical Single Family Home



Source: Watercalculator.org

Fun Fact: On average, the American family uses more than 300 gallons of water at home every day. About 70% of this is indoors. That's 109,500 gallons a year!

Source: https://www.epa.gov/watersense/how-we-use-water

REDUCING WATER USE AT THE TAP

STEP #6: MEASURE THE FLOW RATE OF FIXTURES

Using the water flow rate bag, you will measure the rate that water flows from your faucets and showerheads.

1. Determine if your existing fixture is already low-flow; this should be printed on the side of the device. Low-flow fixtures are marked as follows:
   Bathroom sink: 0.5 gpm
   Kitchen sink: 1.5 gpm
   Showerhead: 2.0 gpm

If the existing fixture is not marked as above, utilitize the Water Conservation Toolkit from the library and continue with the following steps.

2. Turn on faucet to the extent you normally do and fill water flow rate bag for 5 seconds.
3. If the flow rate is greater than noted in the 1st step, then install one of the Toolkit fixtures (see below).
4. Test the flow rate again after the installation and note your findings.
5. Dry the bag with a towel before putting it back in the Toolkit.

*Think before you dump leftover water; make the most of it by giving it to your indoor or outdoor plants.

STEP #7: REPLACE THE SHOWERHEAD

Check the imprint on the showerhead for flow rate, or use the flow rate bag to measure. If the showerhead flows at more than 1.5 gpm, then you should replace with the showerhead provided.

1. Close or plug your drain.
2. Unscrew old showerhead counterclockwise; if needed, use the pliers to loosen the aerator. Wrap the teeth of the pliers with a rubber band or a towel to avoid scratches to the existing equipment.
3. Clean and dry water pipe threads (grooves at end of faucet).
4. Wrap provided pipe thread seal tape around pipe thread.
5. Screw on new aerator clockwise by hand.

Turn on faucet to test for leaks, and tighten with pliers if necessary.

REDUCING WATER USE: BATHROOM

STEP #8: USE THE TOILET LEAK DETECTION TABLETS

Leaking toilets can contribute to high water bills if undetected. The Detect-A-Leak Toilet Tablets are a simple and inexpensive way to test for leaks on a regular basis.

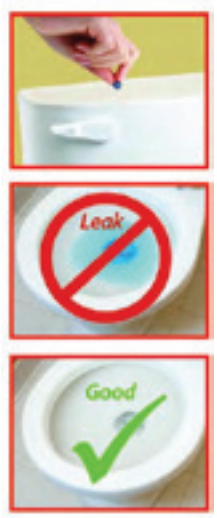
1. Carefully remove tank lid.
2. Drop 1-2 tablets into exposed tank.
3. Wait 20-30 minutes. Do not flush the toilet during this time.
4. If blue color appears in the toilet bowl you have a toilet flapper leak. Typically, a leaky flapper is the cause for toilet leaks and needs to be replaced.

Toilet Leak Detecting Tablets

This is relatively simple and inexpensive and may not require a plumber.

WATER SAVINGS TIPS

- Avoid running water while brushing your teeth and shaving.
- A constantly running toilet can waste up to 200 gallons of water per day. That can cost you $250 over the course of a year! If you think you may have a leak, visit **virginiabeach.gov/highbill** for tips on how to find and fix leaks, and how to contact Virginia Beach Public Utilities.
- Replace your old toilet with a low-consumption toilet. You may qualify for a $75 rebate through the Public Utilities' Toilet Rebate Program. Visit **pu.virginiabeach.gov/conservation-education/toilet-rebate-program** for more information and to determine if you're eligible.
- Make use of a shower timer, which helps you use less water and save energy at the same time. Try to set it for five minutes or less.



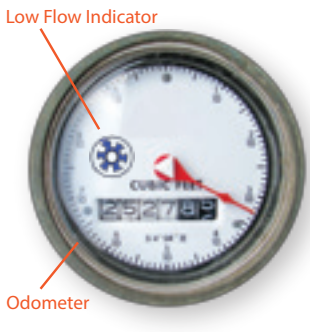
REDUCING WATER USE: WATER HEATER

STEP #9: ADJUST THE WATER HEATER

1. Locate your water heater.
2. Locate adjustment dial and mark current setting with a pencil or masking tape.
3. Locate the faucet closest to the water heater.
4. Run water until hot and capture a cupful in a mug. You can catch cold water in a bucket for outdoor use while waiting for the water to get hot.
5. Insert thermometer and wait for it to reach its highest point.
6. Adjust setting so that your hot water runs at 120°F. If your water heater does not have specific temperature settings, this step might take a few tries.

TIPS:

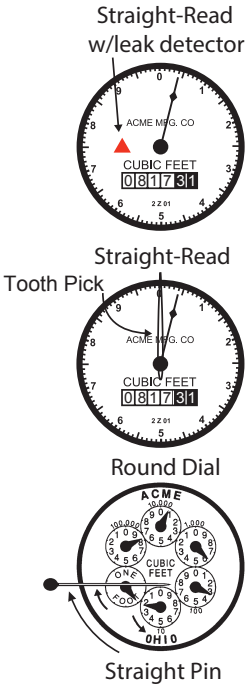
- Insulate the hot water pipes leading from the water heater. This helps conserve energy.
- Set your water heater to “Vacation Mode” when you are away for long periods of time to conserve energy.
- Check the EnergyGuide® sticker when purchasing a new hot water heater. It provides the estimated cost to run the equipment.



How to read your water meter

Water meters in the U.S. typically measure volume in gallons or cubic feet. One cubic foot = 7.48 gallons and 100 cubic feet = 748 gallons. Water charges are typically based on 100 cubic feet or on 1000 gallon units. Finding your water meter can be a challenge. Look for it near the sidewalk or even in the sidewalk. The cover is often labeled “Water.”

LOOKING FOR LEAKS



You may routinely put new washers in the faucets and fix any leaks you can see, inside the house and around the yard but do you have any invisible leaks? It's time to check inside your meter box. It's usually in front of the house near the curb. Lift the cover aside to expose your water meter. Flip open its hinged lid. You'll find either a straight-reading or round-reading dial.

On straight-reading meters, the large needle on the dial is used for testing. On round-reading dials, the test dial will either be labeled "one foot" or will have no markings.

With all of the faucets (inside and outside) shut tightly, mark the test-needle by laying a straight-pin or toothpick exactly on top of it.

- A half hour later, check the dial again. If the test needle has moved – and no one has used any water – you probably have a leak and should do some more investigating.
- To determine if the leak is inside or outside the house, locate the main shut-off valve (usually at the front of the house underneath an outside faucet). If the dial moves while the main house valve is turned off, you may have an underground house line leak. Inspect along a straight line between the meter and the house valve for surface water or a wet or super-green spot.

Leaks can hide outside

Look for Bright Green or "Soft" Areas

Whatever irrigation equipment you have – manual, sprinkler or drip – be aware that not all leaks are obvious. First check for overly green or soggy spots, where broken spray heads or bubblers or underground pipe cracks will tell on themselves. Buried pipes, hoses or drip lines leaking into sandy, porous soil may not show up clearly. Automatic sprinkler and drip systems that generate a hissing sound are likely leaking. Also, remember to check drip systems for damage from foot traffic or gnawing pets or pests. Got leaky hoses? Repair them with waterproof tape. Dribbling spray nozzle connection? Wrap the hose threads with Teflon tape.

Read Your Meter – Often! One way to find out the 'why' of high water consumption is to determine the 'what' and 'when' consumption is occurring. Read your meter every day or every week and keep a log of the readings. Is your consumption consistent or is it higher on some days? If your sprinkler system has a timer, read the meter the day before and the day after an irrigation cycle. How much water is going into the garden? How does that compare to the days without irrigation?

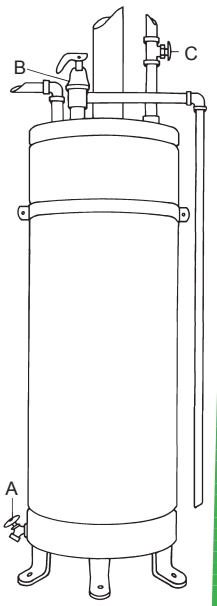
Intermittence

Leaks that may occur intermittently (like a running toilet, irrigation system leak or faulty swimming pool fill valve) will not always continuously register at the meter. These are all early steps you can take to locate the problem yourself before calling a plumber or leak detection specialist.

Water heater leaks

Little Leaks Can Mean Big Problems

A: Drain Valve; B: Pressure relief valve;
C: Cold-Water inlet valve



Most people visit their water heaters only if the hot water stops. Check yours. If you notice a puddle of water around the bottom of the tank, it probably indicates a leak caused by corrosion – a sure sign of old age, and the most common reason for replacing the tank. If the tank wall is corroding, more problems are coming, and it's time to retire the tank and get a new energy saving model.

Water heaters last about 15 years with proper care. To clear out any sediment, flush a few quarts of water from the drain valve at the bottom of the tank into a bucket about every six months – maybe when you change fire alarm batteries around the house. Also operate the pressure-relief valve at the top of the tank. Don't worry if a little water leaks out; that means it's working. Also close and reopen the cold-water inlet valve at the top, so you're sure it's easy to operate in an emergency.

Shower diverter leaks

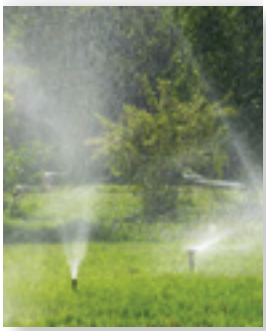
An Overlooked Water and Energy Waster

If you have water coming out of a tub spout when the shower is running, your diverter is no longer working properly and you have a leak. This wastes both water and the energy used to heat water.

Studies have shown that 34% of the diverters leak more than 0.1 gallons per minute (gpm). Some diverter leaks can be as high as 3.0 gpm. The average diverter leak, 0.8gpm can waste 7,200 gallons annually per family of three (8 minute showers). If you add the cost to heat the water, diverter leaks can cost up to $100 per year. Check with your local hardware store or your plumber for a replacement. This may require a plumber or handy person.

REDUCING WATER USE: OUTDOOR

WATER SAVINGS TIPS



- Regularly check for and fix leaks in your irrigation system; leaks can waste thousands of gallons of water annually. Run each station of your automatic irrigation controller and do a visual inspection. Water shouldn't be running into the gutter and should only be spraying the landscaping.
- Install water-efficient drip irrigation systems for your landscape.
- Water at the right time of day. Watering when the sun is low, winds are calm and temperatures are cooler minimizes evaporation by as much as 30%. The best time to water is during early morning hours.
- Add organic materials, like compost, to planted beds to improve water and air holding capacities.
- Choose plants native to our area. They have lower water requirements, fewer pest problems and need less fertilizer than exotic or non-native plants.
- Plan your landscape for the most efficient water use by grouping plants with similar watering needs.
- Install a rain barrel to collect rain water, and use it to water your lawn and garden or wash your car.

Collecting Rain Water

Save water and money by using a rain barrel to collect water. Although the water is nonpotable, which means it is not safe to drink or use for cooking or bathing, it can be used for watering plants, washing cars, and other outdoor activities. Rain barrels connect to your house's downspout and collect runoff from the roof. The Virginia Beach Master Gardeners hold rain barrel workshops from March - October each year. Visit **http://www.vbmg.org/rain-barrels.html** to learn more about rain barrels and rain barrel workshops.

COOKING AND EATING

Kitchen activities often require large amounts of energy. Use these tips to reduce energy use:

Efficient Cooking Habits

- Thaw frozen meats and seafood in the fridge to reduce cook times.
- Double your recipe, freezing half for later.
- Heat only as much water as needed.
- Cover pans to reduce cook time and energy.
- Use fewer pots to reduce dish washing needs.
- Use your toaster oven or microwave for small items; unplug appliances when not in use.
- Avoid opening the oven door.

Efficient Dishwasher Habits

- Dishwashers use less water than washing by hand.
- Scrape, don't rinse, dishes.
- Use the short cycle.
- Air dry dishes by turning off the heat setting and opening the door.
- Upgrade to an EnergyStar® model.
- Use during non-peak utility rate times.

Compost

Composting not only provides healthier soil and plants but can save you money by not having to buy soil conditioners, mulch, and fertilizer. Home composting also reduces yard trimming collection and processing, keeps kitchen waste out of the landfill, and turns organic material into a valuable product for gardens and house plants.

FINAL STEPS FOR DIY TOOLKIT USERS

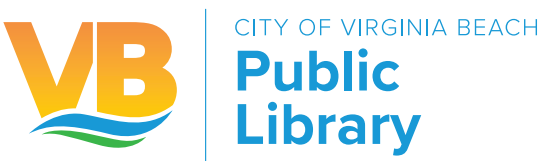
Return the DIY Toolkit(s) to the Library

Now that you've used the Toolkit and accomplished the steps to a more energy-efficient home, you have just a few things left to do:

1. Make sure all tools (see list on page 2) are in your kit before returning it to the library. Please return the Toolkit as soon as you can so other library customers can make use of it.
2. Want more energy saving tips? Visit **www.virginianaturalgas.com/residential/ways-to-save/energy-saving-tips.html**
3. Want more water saving tips? Contact the Virginia Beach Department of Public Utilities at **pu.virginiabeach.gov** or call 757-385-4948.
4. Thinking about going solar? Visit **www.energy.gov/eere/solar/homeowners-guide-going-solar**
5. Spread the word about this DIY User Guide.
6. Enjoy the savings from all of your DIY actions!


Virginia
Natural Gas


Virginia Natural Gas
Foundation


VB
CITY OF VIRGINIA BEACH
Public
Library


VIRGINIA BEACH
LIBRARY FOUNDATION