

New Jersey Division of Rate Counsel

Consumer's Bill of Rights

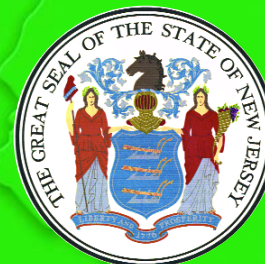
- All consumers must have access to reliable, safe, and affordable energy, telecommunications, and water services.
- All consumers, including low-income consumers, must be ensured affordable energy, telecommunications and water services through appropriate State and Federal policies.
- All consumers must receive the benefits of new services, technological advances, improved efficiency and competitive prices.
- All providers of electric, gas, telecommunications and water services must be required to hold a license as a condition of doing business in New Jersey, and appropriate financial, operational, bond or other requirements must be established and enforced.
- Standards for protecting consumers in matters such as deposit and credit requirements, service denials and terminations, and deferred payment provisions must be applied to all service providers.
- All consumers must be protected from anticompetitive practices of providers of electric, gas, and telecommunications services.
- All consumers must be protected from price increases resulting from inequitable cost shifting.
- Sufficient enforcement resources must be provided to ensure that consumers receive the benefits of this Bill of Rights.
- All consumers must be protected from unfair, deceptive, unconscionable, and fraudulent practices on the part of any provider of electric, gas, or telecommunications services, including practices such as slamming, cramming, pyramid schemes, and deceptive information regarding pricing and terms and conditions of service.
- All consumers must be given unbiased, accurate, and understandable information concerning the price and terms of service, and in a form that allows simple price and term comparisons. This information must include disclosures about the generation resource mix, the environmental characteristics of their energy purchases, and the safety of potable water supplies.
- All consumers are entitled to protection of their privacy and must be protected from use of consumer records or payment history without their express, informed consent.
- All consumers must have access to an independent administrative process that provides a simple, quick, and effective means of resolving complaints about service and bills from all utility service providers.
- Standards must be established to ensure quality safe service, so that all consumers will receive quality service, including high levels of customer services.

Consumer Conservation Handbook

4TH EDITION

A Publication of

Department of the Public Advocate
Division of Rate Counsel



Jon S. Corzine
Governor
State of New Jersey



Ronald K. Chen
Public Advocate

**WHAT IS THE
DEPARTMENT OF THE PUBLIC ADVOCATE
DIVISION OF RATE COUNSEL?**

The Department of the Public Advocate, headed by Commissioner Ronald K. Chen, was created to serve as a voice for the voiceless. In effectively advocating for residents of New Jersey, the Department is comprised of six divisions with the Division of Rate Counsel serving as the primary advocate for utility consumers of New Jersey.

The Division of Rate Counsel represents the interests of all classes of utility consumers. Rate Counsel serves as an active participant in every proceeding whenever New Jersey utilities and providers of essential services by electric, natural gas, telecommunications, cable TV, insurance, water and wastewater companies seek changes in their rates or services. The Division of Rate Counsel also represents consumers when long-range energy, water, insurance and telecommunications policies are decided that will affect the delivery and costs of those services.

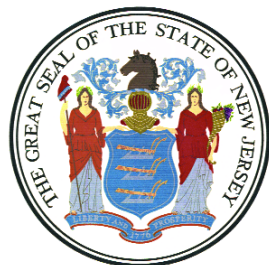
This Consumer Conservation Handbook as well as additional information on this and other information on these essential services can be found at the Division of Rate Counsel's web site at <http://www.state.nj.us/publicadvocate/utility>.

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State of New Jersey
DEPARTMENT OF THE PUBLIC ADVOCATE

JON S. CORZINE
GOVERNOR

RONALD K. CHEN
PUBLIC ADVOCATE

October, 2006

Dear Ratepayers:

As the Public Advocate, I want to assure you that the Division of the Rate Counsel, one of six departments under the Department of the Public Advocate, is dedicated to helping ratepayers.



The Department of the Public Advocate is a principal executive department of the state dedicated to making government more accountable and more responsive to the needs of average New Jerseyans. The Department has six divisions, including, the Division of Citizens Relations, Division of Mental Health Advocacy, Division of Developmental Disability Advocacy, Division of Rate Counsel, Division of Public Interest Advocacy, and the Division of Elder Advocacy. In addition, the Office of the Child Advocate is "in but not of" the department.

The guiding principle of the Department of Public Advocate, as noted in the statute, will be to advocate for those unable to effectively advocate for themselves and need a strong voice to speak up for them. The Division of the Rate Counsel gives a voice to all ratepayers to obtain fair, just and reasonable rates on their utilities.

Yours truly,

Ronald K. Chen
Public Advocate



State of New Jersey
DEPARTMENT OF THE PUBLIC ADVOCATE
DIVISION OF RATE COUNSEL

JON S. CORZINE
GOVERNOR

RONALD K. CHEN
PUBLIC ADVOCATE

Dear Friends,

Energy conservation is an excellent tool to reduce your energy bills and bring more comfort to your home. By taking simple steps to conserve energy—such as switching off a light bulb, lowering your thermostat, or installing weather stripping—you can significantly cut your energy costs.

This handbook provides a variety of simple, easy-to-use tips on ways to conserve energy in the home, using a room-by-room guide. Many of the tips can be done with little, if any, cost to you. These small steps toward conservation will add up to greater savings on your monthly utility bills.

These simple, useful tips will go a long way toward conserving energy and water, lowering utility bills and improving the environment.

My staff and I are working hard to ensure that energy costs and utility services remain affordable for all of New Jersey's residents. Conservation is a positive step in the right direction and will bring many benefits to residents throughout the State.

Thank you.

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CHAPTER I

WHY CONSERVE?

What Does It Mean to Conserve Energy?

In its simplest terms, the conservation of energy means consuming less energy. It means changing your behavior by making energy smart choices. There are many energy conservation strategies available to help you use less energy so you can save more money. For example, you can take

- small, simple and inexpensive conservation actions—like turning off lights you don't need.
- bigger conservation actions—like performing a home energy audit to evaluate possible sources of energy loss in your home or apartment.
- advantage of technologies—like installing time-of-use and load-shaving meters to monitor and control energy consumption and costs.

Still another method of conservation is to use energy-efficient products in and for your home.

“CONSERVATION” is different from **“ENERGY EFFICIENCY.”** Energy efficiency means the capacity to use less energy to produce the same result. For example, Energy Star appliances are energy efficient—they do exactly the same job as ordinary appliances (refrigeration, air conditioning), but use less energy.

Together, conservation and energy efficiency combine to reduce your energy consumption and your energy costs, while maintaining quality of service to our homes, offices and factories.

Energy efficiency and conservation also help to increase reliability by reducing the demand for energy, which can help reduce the potential for blackouts or brownouts on days of extreme

heat. Electricity and natural gas purchased on the spot market during periods of peak demand are the most expensive power your utility can buy. Those costs are passed through to you. Reducing consumption through conservation can help keep your utility bills down during the important (and costly) air conditioning and heating seasons.

Conservation does not mean you have to sacrifice your family's life-style or your personal comfort. It does mean that you have to make choices.

As described by the Alliance to Save Energy, "energy efficiency is the quickest, cheapest, cleanest way to increase our natural gas and other energy supplies... Energy efficiency must be the foundation of our nation's energy policy... We will virtually never run out of energy efficiency. It is our nation's inexhaustible energy supply."

Why Does Rate Counsel Care?

The Division of Rate Counsel (RC) was created as an independent agency by the New Jersey State Legislature to represent the legal interests of all utility ratepayers. The RC's mission is to represent all ratepayers (paying special attention to residential and small business ratepayers) whenever electric, natural gas, water/wastewater, telecommunications and cable TV companies file a change in rates or services with the New Jersey Board of Public Utilities (BPU).

The RC also participates when state energy policies are decided. Rate Counsel files comments, hires expert consultants, and is a statutory intervenor when utilities petition the BPU for rate changes. That means we participate in evidentiary hearings and provide testimony regarding the position of our office.

Simply put, we represent you—the consumer.

Why Should I Conserve?

The cost of electricity and natural gas is rising.

Electric and natural gas rates in New Jersey are at an all time high. Beginning June 2006, electric rates will rise as much as 13.7% and natural gas rates, already at an all time high during the

2005-2006 heating season, are expected to go up further. There are a variety of reasons for rising energy costs. Some of the factors that have led to higher energy costs, like Hurricanes Katrina and Rita, high demand for energy and the world situation, are beyond our direct control. But ratepayers do have control over how much energy they consume.



Your gas and electric bills will be less if you consume less.

Rate Counsel urges you, the consumer, to take as much control over your utility bills as possible. The most effective way to take control is through energy conservation. If you find ways to use less energy, your actions will have a direct effect on your utility bills. You have the power to control your bills by taking control of your energy consumption!

System reliability will improve.

When distributing electricity through the grid that serves their territories, utilities must exactly match the supply that goes through the wires with the demand of their customers. This is not an easy thing to do! Any fluctuations or disturbances on the grid can have the effect of creating an unintended blackout, or the need for rolling blackouts or brownouts in order to re-balance the load. You may

think that you as an individual don't have any effect on the system—but you, plus all of your friends and neighbors who are also doing their best to conserve, create a critical mass that can mean the difference between the lights going out and the lights staying on. **You** are part of the critical mass!

Benefits to all of New Jersey.

Electricity is generated in many different ways, but the most common way is by the burning of coal. Not only is burning coal harmful to the environment, but burning coal spews toxic fumes and chemical compounds into the air that we breathe. Much of the pollution in New Jersey can be attributed to coal-fired electricity generation in southern Ohio, Indiana and Kentucky! Natural gas is cleaner but drilling for it is environmentally destructive, taking away wildlife habitat and taking away precious open space on land and on the ocean floor.



New Jersey is one of the most progressive states in the nation. We are a technology leader that provides healthy business environments. Important quality of life and health issues are in the forefront of this Administration's priorities, including the preservation of water quality and the Smart Growth initiative to preserve open space and farmland and re-direct development to urban areas. By increasing awareness of conservation and our conservation efforts, we continue the tradition of keeping New Jersey at the cutting edge of important national issues by taking control of our own energy consumption and reducing our dependence on foreign energy sources.

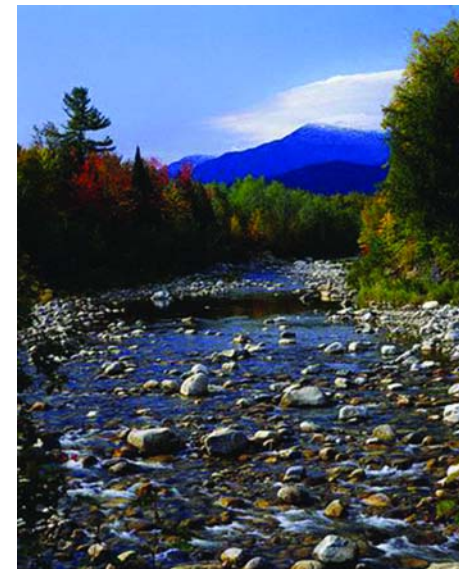
Conservation Doesn't Mean Deprivation!

Some people think that energy conservation means that you

have to freeze, swelter, or sit in the dark. That is far from the truth! You don't need to change much in order to make a difference. You can put as much effort into conservation as you choose. Like anything else, the more effort you put in, the greater your return will be. We have also added a new chapter which will provide you with information about alternate energy sources and how the state of New Jersey is encouraging their use.

You have the power to control your energy consumption!

To help you choose the best conservation strategies to reduce your bills, Rate Counsel has prepared the following ideas and tips so that you can start conserving energy and saving money on your bills today!



CHAPTER II

TIPS FOR SAVING ENERGY

Typical Home Appliance Energy Costs:*

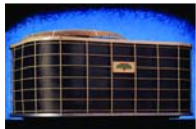
Knowing how much electricity each of your appliances uses will give you a clearer picture of where your energy dollars are going. With this knowledge, you can use energy more efficiently and trim your energy budget. If you are in the market for a new appliance, we urge you to purchase one that is energy efficient. Listed below are common household appliances and estimated operating costs per month.



Hair Dryer—5 min./day use
\$.33/month



Coffeemaker—30 min./day use
\$1.37/month



Central Air Conditioner
\$46.77/month



Color Television—1 hr./day use
\$.30/month



Personal Computer—1 hr./day use
\$.71/month

Vacuum Cleaner—1 hr./day use
\$3.17/month



Portable Heater—1 hr./day
\$3.90/month



Window Air Conditioner
\$12.47/month



Fan—1 hr./day use
\$.26/month



Stereo System—1 hr./day use
\$1.04/month



Microwave Oven—30 min./day use
\$1.95/month



Toaster Oven—30 min./day use
\$1.60/month

Clothes Iron—30 min./day use
\$1.82/month



Dishwasher
Electric: \$.43/load—\$12.90/month
Gas: \$.19/load—\$5.70/month



Freezer
\$22.61/month

Refrigerator (Frost-free)
16 cu ft: \$14.92/month



Water Heater
Electric: \$54.10/month
Gas: \$27.75/month

Electric Blanket (Double)—1 hr./day use
\$.26/month



Clothes Washer—1 hr./day use
\$1.11/month



Clothes Dryer
Electric: \$15.67/month
Gas: \$8.83/month

*Sources: Wisconsin Public Service Corporation web site: www.wisconsinpublicservice.com
South Jersey Gas web site: www.sjindustries.com.

Energy is a vital element of affordable housing.

Did you know that U.S. families on an average spend close to \$1,500 a year on their home's energy bills?*

Heating and cooling are the largest costs of housing after the monthly rent or mortgage payments. Saving energy can be a good way to lessen the strain on family finances and free up money for other uses.

There are hundreds of things you can do to make your home more energy efficient and cost effective, ranging from simple, free adjustments to major long-term investments. Which ones you should do in your home will depend on a number of factors—where you live, the size and style of your house, how efficient it already is, which direction it faces, and so on.

Saving Money Around the Home

Take the Whole-House Approach

We will start with a simple room-by-room guide on smarter home energy use. In the next section, we will introduce you to the Home Energy Audit, which involves taking slightly more sophisticated steps.



Reminder: The key to achieving the most energy savings is a whole-house energy efficiency plan. To take a whole-house approach, view your home as an energy system with interdependent parts.

Your heating system is not just a furnace. It's a heat-delivery system that starts at the furnace and delivers heat throughout your home using a network of ducts. You may have a top-of-the-line efficient furnace, but if the ducts leak and are uninsulated, and your walls, attic, windows and doors are uninsulated, your energy bills will remain high.

Taking a whole-house approach to saving energy ensures that dollars you invest in energy efficiency are wisely spent.

*Source: eia.doe.gov/kids/energyfacts/saving/efficiency/savingenergy.html

Attic

The attic is a major player in your home's energy efficiency. A few basic steps can help you keep your costs down.



- Ventilate the attic space. Homes built long ago may have little ventilation or original vents may have been blocked by later construction. Vents are needed both high and low in the attic space to promote good circulation for proper ventilation.
- Insulate the attic space. Insulation can be added as loose fill or from rolls. High efficiency building code standards show "R" value recommendations of R-30 in ceilings, R-16 in walls and R-19 over crawl spaces. The "R" value is a measure of how well insulation traps heat.
- Check the fit of your attic access door or pull-down stairs. Weather-strip and insulate the door where needed.
- If you're having a new roof installed, consider adding a ridge vent.



Bedroom

A good night's sleep depends on a comfortable bedroom. You can still get all the comfort you want and cut back on energy use with these steps.

- Close heating vents or radiators in rooms you don't use. However, if you have a heat pump system, leave all doors and vents open to ensure proper airflow.
- Use draft guards at the bottom of any doors that open into un-airconditioned or unheated areas.
- Use ceiling fans for cooling.
- Lower your thermostat at night and use more blankets in the

winter. However, if you have a heat pump system, you'll save more on energy costs if you keep the thermostat at a comfortable setting day and night.

Family Room

The family room is a favorite hang-out. It is also a place where you can save energy.



- Keep your fireplace damper closed when there is no fire in the fireplace. If you have glass fireplace doors, keep them closed as well.
- Use fans instead of air conditioning for cooling whenever you can.
- Put on more layers of clothing to keep warm. You can take off a sweater when you are active, then put it back on when you are not.
- Turn off televisions sets, stereos and other electric appliances whenever you are not using them.
- Use draft guards at the bottom of doors that open into un-airconditioned or unheated areas.

Kitchen

While daily chores like cooking, washing dishes and keeping foods cold, by themselves, are not large consumers of energy, they add up. Before you buy kitchen appliances, always look for **EnergyGuide** labels to compare energy efficiency and yearly operating costs with other appliances in the same category. Remember, appliances with a superior efficiency rating may cost more initially, but over the lifetime of the appliance, you will save on operating costs.



- Grime from cooking, smoking and dust can make a light bulb dirty, reducing the light it gives off. Inspect and clean bulbs regularly.

- Use stove exhaust fans that vent to the outdoors as little as possible during the winter to limit sending heated air outdoors.
- Run your garbage disposal with cold water instead of hot.

Dishwasher



- Studies show electric dishwashers use less hot water than washing and rinsing dishes by hand. When you purchase a dishwasher, look for one with a short or light cycle. They require fewer fills and less hot water. Some dishwashers use up to 40% less hot water per load, and others allow you to reduce the temperature setting on your water heater. Both can save you money.
- Check the condition of your dishwasher filter screen. Clean or replace it when necessary.
- Save energy by air drying your dishes and only running full loads.
- Washing dishes by hand may not save energy or money. In fact, you can probably save energy using the dishwasher since hand-washing usually requires more water.
- Take advantage of the energy saving control on many dishwashers. It turns off the heat during the drying cycle. Opening the dishwasher after the rinse cycle is another way to save energy.

Oven/Stove

- Don't open the oven door to check on food any more than necessary. Every time you do so, 25% of the heat escapes. Turn off the oven about 15 to 20 minutes before the end of the cooking time. The left-over heat will finish the job.
- Avoid cooking during the hottest times on a summer day. Cook outdoors when you can.

- Cook in oven-safe glass or ceramic pans when you can. They allow you to set your oven temperature 25 degrees lower than called for by the recipe.
- Keep pots and pans covered and use the right size pot or pan for the size of your stove's burner. Use properly fitted lids to hold in heat.
- Begin a self-cleaning cycle while your oven is still hot from cooking.
- Do summer cooking in the evening so your home stays more comfortable during the day.
- Cook several dishes in the oven at the same time. Prepare double recipes when you can and freeze what you don't eat for future use. Re-heat with the microwave.
- Keep the door closed when broiling in a gas-stove to keep in high temperatures. The gas flames will consume smoke and grease.
- A microwave oven is an energy efficient alternative to a conventional electric oven. It cooks food more quickly, and it uses 70%–80% less electricity than a regular electric oven.
- Although often recommended, it is not really necessary to preheat the oven for foods with a cooking time over one hour.



Refrigerator

- Check the door seal on your refrigerator to see if it needs to be cleaned or replaced. A door leak allows cool air to escape, forcing your refrigerator to use more energy to keep food cold.
- Cleaning the condenser coils found in the back or bottom of the refrigerator will maximize its efficiency. A brush or vacuum can be used. Be sure to unplug the refrigerator before you start cleaning.



- Keep the refrigerator away from heating appliances (ovens and dishwashers), windows and heating ducts. Direct exposure to heat forces the unit to work harder and use more energy.
- When purchasing a new refrigerator consider a high-efficiency model. Compare yellow **EnergyGuide** labels and choose the unit that uses the least amount of electricity.
- A freezer's efficiency is increased when its compartment is full. Be careful not to block the fan that allows cold air to circulate.
- Even though automatic defrost refrigerators are convenient, defrosting features use a lot of electricity. A manual defrost refrigerator typically uses 36% less energy.
- Check temperature settings for the most efficient appliance operation. Refrigerator temperature should be 36–38° F. and freezer temperature should be 0–5° F.



Laundry Room

Ninety percent of the energy your clothes washer uses goes toward heating water. You can save energy dollars by using hot water only for heavily soiled laundry. Most laundry can be washed in warm water and lightly soiled loads can be washed in cold water. You can also save by using cold-water rinses for each load. The temperature of the water used during the rinse cycle will not make your clothes any cleaner.



- Run the washer only when you have a full load of laundry to save energy and water.
- If you have more than one load of clothes to dry, try to do each load immediately after the one before to use the heat left over from the previous cycle and increase the efficiency of the dryer.

- If you are in the market for a new clothes dryer, consider purchasing one with a “moisture sensing” device that shuts off automatically when your clothes are dry so the dryer doesn’t run longer than needed.
- You can reduce drying time and energy use by setting your timer carefully. Over-drying your clothes uses more energy than necessary.
- Drying heavy and light fabrics separately will also keep drying time to a minimum. Mixing different weight fabrics causes the dryer to run longer than necessary.

Remember to check the lint filter before each load. Lint buildup blocks air flow and lengthens drying time, costing you energy dollars.

**Here’s What These Appliances
Cost You in Energy Usage***
(per month)

Water Heating
Electric \$54.10 Per Month • \$649.00 Annually
Natural Gas \$27.75 Per Month • \$333.00 Annually

Clothes Drying
Electric \$15.67 Per Month • \$188.00 Annually
Natural Gas \$ 8.83 Per Month • \$106.00 Annually

*Source: South Jersey Gas web site: www.sjindustries.com

Lighting

One of the easiest and least expensive ways to start saving energy is lighting. Lighting accounts for about 10% – 15% of a home’s electric use.

Did you know that one 18-watt fluorescent bulb will last the same number of hours as 10 75-watt incandescents, resulting in a savings of up to \$80.00 over the life of the bulb?



- Turn off the lights whenever possible!
- Incandescent light should always be turned off when not in

use. Fluorescent lights work optimally when they are not turned off repeatedly, so only turn them off when you plan to be away for 30 minutes or more.

- Replace your most frequently used incandescent bulbs with compact fluorescent lights.

Start with the lights you leave on for long periods, such as those which illuminate front and back doors and porches and the bulbs outside and inside the garage. Then change the bulbs in your laundry, utility and storage rooms, basement, attic, and shed.



- Compact fluorescent light bulbs use only about one third as much electricity as standard incandescent light bulbs.

Although fluorescent bulbs are slightly less expensive, a compact fluorescent will easily pay for itself by lasting up to 10 times longer than regular bulbs and by using much less electricity. These bulbs now come in smaller sizes (called subcompacts) that fit into any lamp.

- If you prefer incandescent bulbs, try to use “energy saver” bulbs.

These bulbs use halogen gases that allow the filament to burn brighter while consuming less electricity.

- Replace outdoor lighting with motion-detector lighting.

Outdoor lights that are left on all night can add unnecessary costs to your power bill. Using a bulb or fixture with a motion detector solves this problem. Installing a new fixture may require some professional assistance, but it’s worth the cost.

- A lot of energy can be saved by matching as closely as possible light bulb wattage to lighting needs.

A high wattage reading light in a hallway or alcove is not energy efficient or useful. Keep this practice in mind for your outdoor fixtures too. Fixtures that cast their light downward help to

reduce the effects of light pollution and provide more light where you need it. Be mindful of the impact outdoor lighting can have on your neighbors and the environment.

- Consider using task lighting (lighting directed at a specific area) instead of overhead or general lighting, which may light unused areas of the room.

Savings in the cost of bulbs and energy can be made by using “task” lighting.

- Turn 3-way bulbs to lowest settings.
- Clean or repaint small rooms every year and larger rooms every 2 to 3 years. Dirt on surfaces reduces the amount of light walls reflect.
- Use dimmers to reduce the wattage and output of light bulbs. Dimmers also significantly increase the life of incandescent bulbs.



Keeping lights and fixtures clean can improve efficiency as much as 20%. Take advantage of reflected light by keeping portable fixtures as close as possible to light colored walls or other surfaces.

These easy steps may reduce the number and wattage of bulbs you need and help you save on your electricity bills.



Windows

Windows can be one of your home’s most attractive features. Windows provide views, daylight, ventilation, and solar heating in the winter.

Unfortunately, windows can also account for 10% to 25% of your heating bill.

- Did you know that during the summer, sunny windows can make your air conditioner work two to three times harder?
- Did you know that in the winter an average window can lose six to 10 times as much heat as the same area of wall?

That’s why proper installation of energy-efficient windows is such an excellent idea.

Here are some tips on improving or replacing your windows.

- Single-pane windows are the most inefficient, but it is possible to increase their efficiency. You can install storm windows to reduce air leaks and reduce heat loss by 25% – 50%. Storm windows should have weatherstripping at all moveable joints and be made of strong durable materials.
- Repair and weatherize your current storm windows, if necessary.
- Look for dirty spots around your window. These often indicate a hole where air leaks into your house.
- Install tight-fitting, insulating window shades on windows that feel drafty after weatherizing.
- In the winter, close your curtains and shades at night and open them during the day to let the sun warm the room.
- Low-cost options for improving windows are caulking, weather stripping, retrofit window films and window treatments.



- Moveable insulation, such as insulating shades, shutters, and drapes can be used on the inside of windows to reduce heat loss in the winter and reduce heat gain in the summer. Shading devices such as awnings, exterior shutters, or screens can be used to reduce unwanted heat gain in the summer. In some cases, these window treatments are more cost-effective than energy efficient window replacements and should be considered first.
- Tinted glass and tinted window films have long been used in commercial buildings to reduce heat gain through windows. Improved, lightly tinted windows are becoming more common for homeowners. These new glazings reduce the solar heat gain without reducing too much visibility.

HOME ENERGY AUDITS

Home Energy Audits*

A home energy audit will tell you how much energy your home consumes. It is the first step to evaluating what measures you can take to make your home more energy efficient. By pinpointing where your house is losing energy, an audit will identify where you can save significant amounts of money over time by correcting problems. Audits also determine the efficiency of your home's heating and cooling systems and show you how to conserve hot water.



You can perform a simple energy audit yourself or check with your utility to see if it offers audit services. You can also have a professional energy auditor carry out a more thorough audit. A professional auditor uses a variety of techniques and equipment to determine the energy efficiency of a structure. Thorough audits often use equipment such as blower doors, which measure the extent of leaks in the building envelope, as well as infrared cameras, which reveal hard-to-detect areas of air infiltration and missing insulation.

The following is a discussion of do-it-yourself as well as professional audits.

Do-It-Yourself Audits

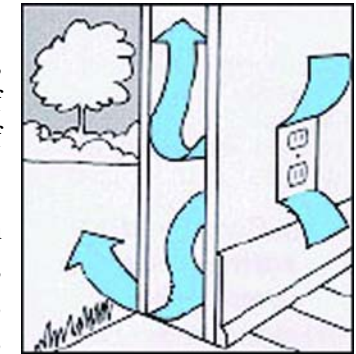
You can conduct a basic home energy audit yourself. With a simple, but diligent “walk-through,” you can spot many problems in any type of house. When auditing your home, keep a checklist of areas you have inspected and problems found. This will help you prioritize your energy efficiency upgrades.

Locating Air Leaks

First, make a list of obvious air leaks — drafts. The potential energy savings from draft reduction may range from 5% to 30% per year, and the home is generally much more comfortable afterward.

Check:

- Indoor air leaks such as gaps along the baseboard or edge of the flooring and at junctures of the walls and ceiling;
- To see if air can flow through electrical outlets, switch plates, window frames, baseboards, weather-stripping around doors, fireplace dampers, attic hatches, and wall- or window-mounted air conditioners;
- Gaps around pipes and wires, electrical outlets, foundation seals, and mail slots;
- To see if the caulking and weather-stripping are applied properly (no gaps or cracks), and are in good condition;
- Windows and doors for air leaks. See if you can rattle them, since movement means possible air leaks. If you can see daylight around door and window frames, then the door or window leaks. You can usually seal these leaks by caulking or weather-stripping them;
- The storm windows to see if they fit and are not broken.



You may also wish to consider replacing your old windows and doors with newer, high-performance ones. If new factory-made doors or windows are too costly, you can install low-cost plastic sheets over the windows during the cold months.

On the outside of your house, inspect all areas where two different building materials meet. For example, inspect

- all exterior corners;
- where siding and chimneys meet;
- areas where the foundation and the bottom of exterior brick or siding meet.

You should plug and caulk holes or penetrations for faucets, pipes, electric outlets, and wiring.

* Information from the U.S. Department of Energy web site at www.eere.energy.gov

Look for cracks and holes in the mortar, foundation, and siding, and seal them with the appropriate material.

Check the exterior caulking around doors and windows, and see whether exterior storm doors and primary doors seal tightly.

Caution: When sealing any home, you must always be aware of the danger of indoor air pollution and combustion appliance “backdrafts.”

Backdrafting is when the various combustion appliances and exhaust fans in the home compete for air. An exhaust fan may pull the combustion gases back into the living space. This can obviously create a very dangerous and unhealthy situation in the home.

Warning: In homes where a fuel is burned (i.e., natural gas, fuel oil, propane, or wood) for heating, be certain the appliance has an adequate outside air supply. Generally, one square inch of vent opening is required for each 1,000 Btu of appliance input heat. When in doubt, contact your local utility company, energy professional, or ventilation contractor.

Insulation

Heat loss through the ceiling and walls in your home could be very great if the insulation levels are less than the recommended minimum.

Check to see if the level of the attic and wall insulation of your home is at least at the minimum amount recommended. When your house was built, the insulation recommended at that time was installed. Given today’s energy prices, and the likelihood that future prices will be higher, the level might be inadequate, especially if you have an older home.



Attic

If the attic hatch is located above an air-conditioned space, check to see if it:

- Is at least as heavily insulated as the attic;
- Is weather stripped;
- Closes tightly.

In the attic, determine whether openings for items such as pipes, ductwork, and chimneys are sealed. Any gaps should be sealed with an expanding foam caulk or some other permanent sealant.

If you have recessed light fixtures, determine if they are IC rated fixtures which are designed for direct contact with insulation. It is strongly recommended that only air-tight IC rated fixtures be used. Other types allow large amounts of your heating dollars to escape into the attic.



If you do not wish to purchase new IC rated fixtures, be certain to allow a three-inch space around any recessed lights. This will prevent the recessed light from overheating.

While you are inspecting the attic, check to see if there is a vapor barrier (retarder) under the attic insulation. The vapor barrier might be tar paper, kraft paper attached to fiberglass batts, or a plastic sheet. If there does not appear to be a vapor barrier, you might consider painting the interior ceilings with vapor barrier paint. This reduces the amount of water vapor that can pass through the ceiling. Large amounts of moisture can reduce the effectiveness of insulation and promote structural damage.

Make sure that the attic vents are not blocked by insulation. You also should seal any electrical boxes in the ceiling with flexible caulk (from the living room side or attic side) and cover the entire attic floor with at least the recommended amount of insulation.



Basement

If your basement is unheated, determine whether there is insulation under the living area flooring. In most areas of the country, R-25 is the recommended minimum level of insulation. The insulation at the top of the foundation wall and first floor perimeter should have an R-Value of 19 or greater. If the basement is heated, the foundation walls should be insulated to at least R-19. Your water heater, hot water pipes, and furnace ducts should all be insulated.

Heating/Cooling Equipment

Inspect heating and cooling equipment annually, or as recommended by the manufacturer. If you have a forced air furnace, check your filters and replace them as needed. Generally, they should be changed about once every month or two, especially during periods of high usage. Have a professional check and clean your equipment once a year.

If the unit is more than 15 years old, you should consider replacing it with one of the newer, energy-efficient units. This would go far to reduce your energy consumption, especially if the existing equipment is in poor condition.

Check your ductwork for dirt streaks, especially near seams. These indicate air leaks, and they should be sealed with a duct mastic. Insulate any ducts or pipes that travel through unheated spaces. An insulation R-Value of 6 is the recommended minimum.

Lighting



Energy for lighting accounts for about 10% – 15% of your electric bill.

Examine the wattage size of the light bulbs in your house. You may have 100-watt (or higher) bulbs where 60 or 75 watts would do.

You should also consider compact

fluorescent lights for areas where lights are on for hours at a time. Retailers may offer rebates or other incentives for purchasing energy-efficient light bulbs.

Perform Your Own Online Audit

You can perform your own home energy analysis by logging onto the New Jersey Clean Energy Program's website at www.njcleanenergy.com/home_analysis.html. The online Home Energy Analysis is a customized energy audit designed to help you stop losing energy and start saving money. Logon today and today to save money and learn how to make your home more energy efficient and comfortable!

Professional Energy Audits

How to Find and Select an Energy Auditor

There are several places where you can locate professional energy auditing services. Your local government energy or weatherization office may help you identify a local company or organization that performs audits. In New Jersey, you can contact the New Jersey Board of Public Utilities. Your electric or gas utility may also conduct residential energy audits or recommend local auditors. Also check your telephone directory under headings beginning with the word "energy" for companies that perform residential energy audits.

Before contracting with an energy auditing company, you should take the following steps*:

- Get at least five references, and contact all five. Ask if they were satisfied with the work.
- Call the Better Business Bureau and ask about any complaints against the company.
- Make sure the auditor uses a calibrated blower door.
- Make sure they do thermographic inspections or contract with another company to conduct one.

* Source: Department of Energy web site at

www.eere.energy.gov/consumer/your_home/energy_audits/index.cfm/mytopic=11180

All professional energy audits should, at a minimum, include a “walk-through” similar to the one above and a blower door test (*discussed below*). Most will also include a thermographic scan (*also discussed below*). Professional audits generally go into great detail. The auditor should do a room-by-room examination of the residence, as well as a thorough examination of past utility bills.

Before the auditor visits your house:

- Make a list of any existing problems such as condensation and uncomfortable or drafty rooms.
- Have copies or a summary of the home’s yearly energy bills. You can request this information from your utility.

The auditors use this information to establish what to look for during the audit.

The auditor first examines the outside of the home to determine the size of the house and its features (i.e., wall area, number and size of windows). The auditor then analyzes the occupants’ behavior:

- Is anyone home during working hours?
- What is the average thermostat setting for summer and winter?
- How many people live here?
- Is every room in use?

Your answers may help uncover some simple ways to reduce your household’s energy consumption.

Walk through your home with the auditors as they work, and ask questions. They may also use equipment to detect sources of energy loss, such as blower doors, infrared cameras, furnace efficiency meters, and surface thermometers.



Blower Door Tests

A blower door is a powerful fan that mounts into the frame of an exterior door. The fan pulls air out of the house, lowering the air pressure inside. The higher outside air pressure then flows in through all

unsealed cracks and openings.

The auditors may use a smoke pencil to detect air leaks. These tests determine the air infiltration rate of a building.

Reasons for establishing the proper building tightness include:

- to reduce energy consumption due to air leakage;
- to avoid moisture condensation problems;
- to avoid uncomfortable drafts caused by cold air leaking in from the outdoors;
- to make sure that the home’s air quality is not too contaminated by indoor air pollution.

There are two types of blower doors: “calibrated” and “uncalibrated.” It is important that auditors use a calibrated blower door. This type of blower door has several gauges that measure the amount of air pulled out of the house by the fan. Uncalibrated blower doors can locate leaks in homes, but provide no method for determining the overall tightness of a building. The calibrated blower door’s data allows the auditor to quantify the actual amount of air leakage and the effectiveness of any air-sealing job.

Thermographic Inspection

Energy auditors may also use thermography— infrared scanning — to detect thermal defects and air leakage in building envelopes.

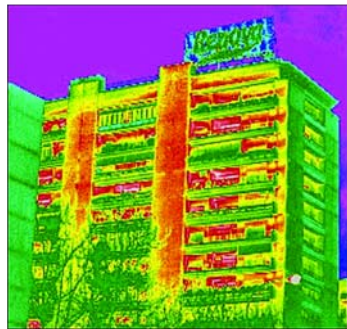
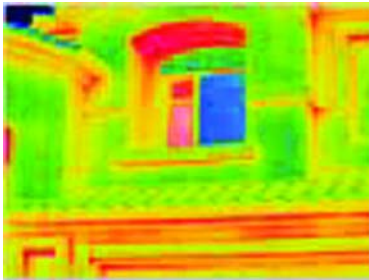
Thermography measures surface temperatures by using infrared video and still cameras. These tools see light that is in the heat spectrum. Images on the video or film record the temperature variations of the building’s skin, ranging from white for warm regions to black for cooler areas. The resulting images help the auditor determine whether insulation is needed. They also serve as a quality control tool, to ensure that insulation has been installed correctly.

A thermographic inspection can be either an interior or exterior survey. The auditor decides which method would give the best results depending on weather conditions.

Interior scans are more common, because warm air escaping from a building does not always move through the walls in a straight line. Heat loss detected in one area of the outside wall might originate at some other location on the inside of the wall. Also, it is harder to detect temperature differences on the outside surface of the building during windy weather.

Because of this, interior surveys are generally more accurate, as they benefit from reduced air movement. Thermographic scans are also commonly used while the blower door is running. The blower door helps exaggerate air leaking through defects in the building shell. Such air leaks appear as black streaks in the infrared camera's viewfinder.

Most energy audits take from four to eight hours and cost between \$300 and \$500. Any retrofit work would, of course, cost additional money.



CHAPTER IV

HOW TO READ YOUR METER

Our energy needs vary widely — by season, day of the week, even hour of the day.

This information about how to read your electric and gas meters will be useful in showing how to measure your consumption. It will give you greater control of your energy budget through an understanding of the ways your use of energy affects your monthly bill.

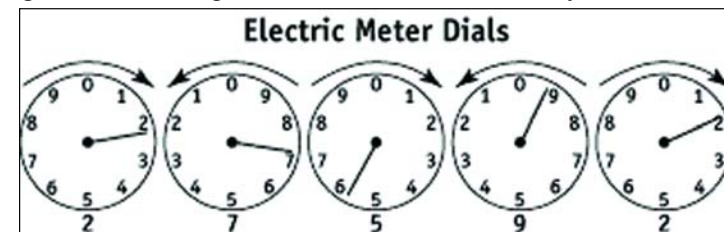
How Your Meters Measure Electricity and Gas

Your electric meter has either four or five dials that register the amount of electricity you have used in kilowatt-hours (kWh). Your gas meter will have either three or four dials that register the amount of gas you have used in Therms. The way both your electric and gas meters work is similar to the odometer in your car. When the hand on one dial makes a complete circle, the hand on the dial to its left moves up one number. As you can see in the diagram below, the hands and numbers on the dials run clockwise or counterclockwise.

Here Is How to Read Your Meter

To get the most precise reading, start with the dial on the right. Always record the number the hand has just passed (remembering that the dial might be going counter-clockwise) and not the number it is approaching.

In the example below, beginning with the right dial the hand is directly on the 2, so you would record 2. The next dial to the left has the hand between the 9 and 0, so you would record 9. Continue reading the remaining two or three dials this way.





Once you have recorded all of the numbers, you then read them from right to left.

In our example, the meter reads 27592. This is your current meter reading. To determine the amount of electricity you have used since the last time you recorded your meter reading, you should subtract your previous meter reading from the current reading.

For example, if your last reading was 26521, then the amount of kwh used is 1,071 kWh. Divide the kwh used by the number of days between readings to calculate the kwh per day. Remember, your gas meter works the same way.

Keep in mind that when the power company representative reads your meter, they do NOT set it back to zero. Therefore the dials keep turning until the next time the meter is read.

REMINDER

Tampering with an electric or gas meter to make it show less consumption, or bypassing the meter entirely, is illegal and dangerous. When someone uses electricity or gas without paying for it, others pay more.

CHAPTER V

CAULKING AND WEATHERSTRIPPING



Even if your home is well insulated, it is important to stop heat loss and eliminate drafts caused by air leaks.

If you add together all the small cracks, crevices and holes in your home, you may find they let in as much cold air in the winter as an open window. They also provide a route for warm air to escape.

Cracks or crevices that allow heated air to leak through and pass your home's insulation are known as bypasses. Bypasses are found in interior and exterior walls, vents, recessed light fixtures, plumbing and electric wire passages, stairways and the space around your chimney.

Finding Air Leaks

You can weatherize your home and substantially reduce air infiltration by caulking and weather-stripping. It only takes a few relatively inexpensive materials and some time, and the payback period is usually within one season.

The first step is to check for air leaks inside and outside your home. For the best results, do this on a cool windy day, or a very cold winter day, making sure that all exhaust fans, the furnace and the clothes dryer are running.

To detect air leakage, hold a smoking object like an incense stick or a thin thread near doors, windows and vents. Thread or smoke movements from air currents indicate drafts. Move the thread or smoke around window and door edges, electrical outlets and other possible sources of air leaks. Mark drafty spots with chalk. The following information will help you determine whether caulking or weather-stripping will work best to seal the leaks.



Caulking

Building materials found in your home such as wood and plaster will expand and contract with changes in temperature and moisture. As this happens, cracks and openings may occur in both interior and exterior walls. These areas either need to be caulked, or the current caulking may have hardened and need to be replaced.

Select caulk based on how well it will bond to the surface to which you are applying it. Below is a checklist of areas inside and outside of your home that should be caulked:

- Around door and window frames
- At the point between the foundation and the floor
- Cracks in brick or foundation
- Where chimney flashing meets the wood framing
- Around exterior openings including utility outlets, phone lines, outside plumbing faucets, vents and fans
- Openings around the chimney stack in the attic
- Where heating and/or air conditioning ducts pass through unfinished attics or basements
- Cracks where woodwork meets walls and floors
- Around a room air conditioner
- Between a porch and the main body of the house
- At corners formed by siding
- Openings around drain pipes in bathroom and kitchen
- Opening around the plumbing vent in the attic



Interior Cracks

Because humidity found in warm air can leak into the wall cavities and condense and cause damage, it is important to caulk on the inside of your home. You can caulk indoors at any time of year.

Exterior Cracks

Exterior cracks allow cold outside air to penetrate insulation and chill the inside of your walls. This resulting moisture can penetrate structural components and cause deterioration. Be sure to read the manufacturer's instructions on the recommended temperature for caulking application. Generally, the outside temperature should be at least 40° F for caulking to adhere correctly. For best results, plan to caulk during cool, dry weather.



| <u>CAULK TYPE</u> | <u>DURABILITY</u> | <u>APPLICATION</u> |
|---------------------------|--|--|
| Rope or cord caulk | Temporary filler, 1 to 2 years | <ul style="list-style-type: none"> • Specialized product for filling in small gaps • Easy to apply and remove • Excellent seal |
| Oil/resin base | High quality, 5 to 10 years Low quality, 3 to 5 years | <ul style="list-style-type: none"> • Will bond to most surfaces • Very low elasticity • Forms a hard surface when dry • Solvent clean-up |
| Latex base | Up to 10 years | <ul style="list-style-type: none"> • May be applied to brick and wood • Will not bond to metal • Forms a hard surface when dry • Clean up with water |
| Butyl rubber | Up to 10 years | <ul style="list-style-type: none"> • Good adhesion to unpainted metal and masonry • Can be painted • Flexible when dry • High moisture resistance |

| <u>CAULK TYPE</u> | <u>DURABILITY</u> | <u>APPLICATION</u> |
|-----------------------|------------------------|---|
| Silicone | 20 years or more | <ul style="list-style-type: none"> • Excellent adhesion to most surfaces • High moisture resistance • Flexible when dry but can't be painted |
| Polyurethane | 20 years | <ul style="list-style-type: none"> • Specialized product for large gaps • Difficult to apply • Excellent elasticity • Flammable — must be covered by a fire-retardant wall on interior |
| Polymeric foam | 20 to 30 years or more | <ul style="list-style-type: none"> • Excellent adhesion to a wide variety of materials • Available in pressurized cylinder • Excellent for sealing sill plates, rough openings for doors and windows, and other large openings.* |

Weather-stripping

Like caulking, weather-stripping is a low-cost way to cut energy costs. Unlike removable caulks, weather-stripping allows you to open and close your windows year-round without replacing sealing material. Weather-stripping is applied at joints where two surfaces meet and move relative to each other, such as windows and doors. Properly installed weather-stripping provides an airtight seal around doors and windows.

Tests show that tubular weather-stripping provides the best seal. However, if doors and windows will be used by children or anyone

*Source: CenterPoint Energy Minnegasco web site: minnegasco.CenterPointEnergy.com

who is disabled or elderly, use silicone or rubber strips because they require less pressure when closing doors and windows.

| <u>MATERIAL</u> | <u>DURABILITY</u> | <u>APPLICATION</u> |
|--|-------------------|---|
| Tape | Up to 1 year | <ul style="list-style-type: none"> • Use on windows or doors that will not be opened • Can dry out and loosen within one heating season |
| Felt | 1 to 2 years | <ul style="list-style-type: none"> • Use on top or side of door or window frame • Use for sealing gaps of uniformly narrow width |
| Foam | 1 to 2 years | <ul style="list-style-type: none"> • Use on friction free areas such as: <ul style="list-style-type: none"> – bottom of window sash – frame of trap door – frame of warped or loose-fitting door |
| Tubular gasket & vinyl tubing | 5 years | <ul style="list-style-type: none"> • Can be used on windows or doors • Provides a moderate seal • Visible when installed |
| Thin metal strip | 5 years or more | <ul style="list-style-type: none"> • Nail to top and sides of door jamb • Somewhat difficult to install* |

*Source: CenterPoint Energy Minnegasco web site: minnegasco.CenterPointEnergy.com

HEATING AND COOLING TIPS

Heating Tips

Heating is the single biggest energy use in your home. Here are some conservation steps you can take. Remember, a well-maintained heating system will hold down fuel costs and provide reliable comfort.

- Check the filters in your heating system monthly and replace or clean them when they become dirty.
- Have your heating system checked periodically by a licensed professional.
- Proper insulation in walls, ceilings and floors will significantly reduce the loss of heat to the outdoors. Insulation will pay for itself in fuel cost savings and home comfort.
- Storm windows and doors are big energy and money savers. They can reduce heating costs by as much as 15% by preventing warm air from escaping to the outside.
- Double glazed and thermopane windows or even clear plastic across windows can minimize heat escape.
- Put extra blankets on the bed and cuddle up.
- The many small openings in a home can add up to big heat losses. Caulking and weather-stripping cracks in the walls, floors, windows and doors will save fuel and money.
- Close your closet doors and the doors to rooms when they are not being used.
- Dry air makes you feel colder than moist air at the same temperature. Maintaining home humidity will produce personal comfort at a lower thermostat setting and save



money. Shallow pans of water on radiator tops or near warm air vents or a room humidifier will help raise humidity levels and save you money.

- Keep heating registers and air vents clear of obstacles.
- Roll up towels and put them at the bottom of doors to stop drafts.

Four Myths About Heating:

Myth: If you turn down your thermostat at night or when you are gone, you will use more energy to warm up the house again than what you saved.

Fact: You always save by turning down your thermostat no matter how long you will be gone. The one exception is an electric heat pump. When you turn it up in the morning, the electric back-up elements kick on to bring the house up to temperature faster. You can purchase a special setback thermostat that compensates for this and will provide savings.

Myth: You should leave your pilot light burning during the summer to keep moisture from accumulating in your heat exchanger and rusting it out.

Fact: When gas burns, it gives off a considerable amount of water vapor. Leaving the pilot burning can actually cause the heat exchange to rust more.

Myth: You can warm up the house faster if you turn the thermostat up to 75–80 degrees initially.

Fact: The house warms up at the same rate no matter what temperature you set the thermostat. Setting it higher can cause the furnace to overshoot the desired temperature, wasting energy.

Myth: Installing a ceiling fan on an eight-foot ceiling will keep warm air from accumulating near the ceiling and save considerable energy.

Fact: If you have a forced-air furnace and/or a tight, well-insulated house, there will be little if any difference in air



temperature from the floor to ceiling. Running a ceiling fan creates a draft that could cause you to turn up your thermostat to feel comfortable. The only exception might be a vaulted ceiling.

Water Heaters

- Reduce your water-heating bill by 10% by lowering the water heater temperature from 140 degrees Fahrenheit to 120 degrees Fahrenheit. Keep the temperature at 140 Fahrenheit if you use a dishwasher without a temperature booster.
- Once a year, drain a bucketful of water out of the bottom of the water heater tank. This gets rid of sediment, which can waste energy by “blocking” the water in the tank from the heating element.
- Consider buying a water heater insulation kit, which reduces the amount of heat lost through the walls of the tank.
- Insulate your hot water supply pipes to reduce heat loss. Hardware stores sell pipe insulation kits.



Cooling Tips

The onset of summer brings longer days and warmer temperatures—for many a welcome treat. But for others, the only thing that provides a source of comfort on those hot, sticky days and steamy nights besides a swim or an ice cream is an air conditioner.

Air conditioning is a major drain on energy, accounting for as much as half of summer energy bills.

By simply making sure that your cooling system is running efficiently, you could save yourself hundreds of dollars a year. Best of all, you don't have to sacrifice comfort to save on your cooling bills. In fact, you may actually be more comfortable once your system is working efficiently.

- Make sure your air conditioner is the proper size for the area you are cooling.



The wrong size air conditioner will use more electricity and increase your energy bills. A unit that is too large for a given area will cool the area too quickly, causing the air conditioner to frequently turn itself on and off. If a unit shuts off quickly, chances are it hasn't been running long enough to reduce the room's humidity and you will be uncomfortable. If your air conditioner is too small, it will run constantly on hot days without ever getting good results.

- The location of your air conditioner has a lot to do with how efficient it will be.

If you have a choice, locate your units on the north, east or the best shaded side of your home. If the unit is exposed to direct sunlight, it has to work much harder and use more energy to cool your home.

- Keep shrubbery away from your air conditioner. They block vents and reduce the unit's ability to exhaust air.
- Regular maintenance will ensure that your air conditioner operates efficiently throughout the summer.

Check the filter once a month by holding it up to a bright light. If you can't see through it, it's time to clean or replace the filter. You can also check your owner's guide to find out how to safely clean the condenser coils and fins on the outside of the unit.

- On very hot days, you can save energy by closing the fresh air intake on your unit.

Cooling fresh, warm outside air requires more electricity than re-cooling the air that is already circulating in your home.

- If you have central air conditioning, repair disconnected ductwork.

If a supply duct has loosened from a vent or a connecting duct, the air from your cooling system never reaches the rooms in your house. It will spill into your home's attic or crawl spaces and eventually leak outside.

- You can save on cooling costs by avoiding cooling rooms that are not occupied.

If you like your home to be cool when you come home at the end of the day, special automatic timers for air conditioners are available that will turn the unit on before you arrive home.



- Depending on the size of your home, you can save 3% on your cooling costs for every degree you raise your thermostat in the summer.

Raising the thermostat from 73 to 78 degrees can mean savings of up to 15% in cooling costs.

- Fans make your air conditioner's job easier while saving you money.

Pedestal and ceiling fans improve the air circulation in your home, allowing you to raise the air conditioner's thermostat. In moderate heat, fans can sometimes completely replace air conditioners.

- Turn off central air conditioning 30 minutes before you plan to leave your home.

The house will maintain a cool temperature for that time.

- Open windows and shades during the evening hours when it's cooler.

Use blinds, shades, and awnings to keep the heat out during daylight hours.

- Turn off lights, TVs and computers when they are not being used.

They make air conditioners work harder.

- To stay comfortable during the hottest hours of the day, do your cooking, laundry and bathing in the early morning or late evenings.

These activities all increase the level of humidity in your home, making it less comfortable and forcing the air conditioner to work even harder. If other heat generating appliances, such as irons, ovens and blow dryers are used only in the early morning or late evening, your home will stay cooler.

Try cooking with microwaves, slow cookers or crock pots that do not heat up a room as much as an oven. Barbecue outdoors whenever possible.



Landscaping

Landscaping is a natural and beautiful way to keep your home more comfortable. You may not realize it, but landscaping can also help reduce your energy bills. In addition to adding aesthetic value and environmental quality to your home, a well-placed tree, shrub or vine can deliver effective shade or act as a wind-break, thereby reducing overall energy bills.

Well-positioned trees can save up to 25% of a typical household's energy used for heating and cooling.

During the summer months, the most effective way to keep your home cool is to prevent the heat from building up in the first place. A primary source of heat buildup is sunlight absorbed by your home's roof, walls and windows. Dark-colored home exteriors absorb 70% to 90% of the radiant energy from the sun that strikes the home's surfaces. Some of this absorbed energy



ends up in your home by way of conduction, resulting in a warmer house, making your air conditioning work longer and harder. In contrast, light-colored surfaces effectively reflect most of the heat away from your home.

Landscaping can help block and absorb the sun's energy by providing shade and evaporative cooling. Shading and evaporative cooling from trees can reduce the air temperature around your home. Air temperatures can be 3 to 6 degrees cooler in tree-shaded neighborhoods than in those with few or small trees. These energy conserving landscape strategies will depend on the type of climate in which you live.

- Trees that lose their leaves in the fall (i.e., deciduous) are most effective at reducing heating and cooling energy costs. When selectively placed around a house, they provide excellent protection from the summer sun, but permit winter sunlight to reach and warm your house.
- Vines provide shading and cooling. Grown on trellises, vines can shade windows or the entire side of a house.

Deflect winter winds by planting evergreen trees and shrubs on the north and west sides of your house; deflect warm summer winds by planting them on the south and west sides of your house.

Small Appliances

Many small appliances made today continue to draw power even when they are switched off.

Nearly 20 percent of the electricity used by appliances is lost while they are sitting in standby mode, waiting to be used. The biggest standby loss of energy, sometimes referred to as "leaking electricity," occurs in modern consumer electronics.

Even when your television is turned off, it's really in standby mode so that it can instantly respond to your remote control. Along with TVs, VCRs, cable boxes, and satellite dishes account for the largest share of a home's leaking electricity, roughly 35%.

Audio equipment makes up another 25% of standby losses; a small compact audio unit can draw 9 watts while it's ostensibly turned off. Communications equipment such as answering

machines, cordless phones, and fax machines are responsible for an additional 10% of home electricity losses.

It is estimated that the average American household constantly leaks about 50 watts of electricity. Right now, the only way for consumers to prevent some appliances from leaking electricity is to unplug them when they might not be in use for a long period of time.

A solution is to plug your television and sound system into a single power strip or surge protector. This will enable you to turn on and off the related consumer electronics simultaneously and avoid leaking electricity. It will also protect your expensive equipment from damage in the case of power interruptions or surges.

Computers and Other Home Office Equipment

Electricity use for office equipment is growing faster than any other category of electricity use in the commercial buildings sector. This category includes computers, monitors, printers, fax machines, and copiers. Energy use by office equipment is expected to grow by as much as 500% in the next decade.

Computers at home also waste a lot of energy, but you can take measures to minimize this. First, understand that screen savers do not save electricity in computer monitors; they are meant to prevent phosphor "burn-in" on the screen. If you leave your computer and other office equipment on all the time, you are likely spending well over \$100 per year on electricity!

The best way to reduce your computer and monitor's energy consumption is to turn it off when not in use. If your computer has a "sleep" mode, make sure that this feature is enabled. With sleep mode active, the computer will automatically convert to a low-energy mode when not in use, cutting energy usage to less than half. Knowing this, you may want to shorten the delay time before your monitor automatically goes into sleep mode.

Other energy saving ideas include "smart" power strips that sense your presence or absence and turn the attached equipment on and off accordingly. To protect your computer during a power curtailment, invest in Uninterruptible Power Supplies (UPS), which combine surge protectors and battery packs. These will run a computer for a short time and prevent the loss of information if the power goes out.

CHAPTER VII
ENERGY STAR*

The Energy Star Label

Now you can be a smart shopper and make the right choices to start saving energy and money.



The Energy Star Label was created by the U.S. Department of Energy and the U.S. Environmental Protection Agency. These agencies set the criteria to help consumers shop for large and small home appliances and identify the most energy efficient products on the market today.

You can be assured that an appliance with the EnergyGuide label is a high-performance product that will reduce the operating cost of that appliance or product every month during its lifetime.

The following guide will help you read and understand the Energy Star Ratings for each product.

Air Conditioners for Your Room

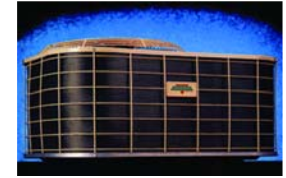
Look for the EnergyGuide label with an Energy Efficiency Ratio (“EER”) for room air conditioners. The higher the EER, the more efficient the unit is. Units with the Energy Star label are among the most energy-efficient products. Don’t forget to choose a size that is appropriate for the room.

| What size to buy: | |
|----------------------------|-----------------|
| <i>Area in Square Feet</i> | <i>Btu/hour</i> |
| 100 to 150 | 5,000 |
| 150 to 250 | 6,000 |
| 250 to 350 | 7,000 |
| 350 to 400 | 9,000 |
| 400 to 450 | 10,000 |
| 450 to 550 | 12,000 |
| 550 to 700 | 14,000 |
| 700 to 1,000 | 18,000 |

* Much of the information for this section was obtained from the U.S. Department of Energy web site at www.eren.doe.gov/conserinfo/energy_savers and the ESP Energy web site www.espenegy.com

Central Air Conditioners

When looking for a central air unit, look for the EnergyGuide label with a Seasonal Energy Efficiency Rating (“SEER”) for central air conditioners. The Energy Star minimum efficiency level is 12 SEER.



Energy Star central air conditioners exceed federal standards by at least 20%.

You should contact a professional in your area for advice on sizing a central air system that best meets your needs.

Clothes Washing Machine

Look for the EnergyGuide label that will tell you how much electricity, in kilowatt-hours (kWh), the clothes washer will use in one year. The smaller the number, the less energy it uses.

Energy Star clothes washers use less than 50% of the energy used by standard washers.

Look for design features such as water level controls that cut water usage. Other design features include a suds saver, spin cycle adjustment and large load capacity. Remember to use hot water only when you have to, as cold water washing saves the most energy.

Dishwashers

Look for the EnergyGuide label that will tell you how much electricity in kilowatt-hours the dishwasher will use in one year. The smaller the number, the less energy it uses.

Look for features that will reduce water usage such as a booster heater setting and “smart” controls to control cycle type and time. Be sure to check how many gallons of water the dishwasher uses in different cycles. This will also reduce the cost to operate your dishwasher.

Natural Gas & Oil Furnaces

Look for the Federal Trade Commission (FTC) EnergyGuide label with an Annual Fuel Utilization Efficiency (AFUE) rating for gas and oil fired furnaces and boilers. The AFUE measures the seasonal or annual efficiency. Energy Star furnaces have a 90 AFUE or greater. Remember that bigger is not always better. A

CONSERVE ENERGY AND EARN TAX CREDITS

system that is too large costs more and operates inefficiently. Make sure to have a professional assess your needs and recommend the type and size of system you should install.

Programmable Thermostats

For maximum efficiency, thermostats should have at least two programs, four temperature settings, a hold feature that allows users to temporarily override settings, and the ability to maintain room temperature within 2 degrees fahrenheit of the desired temperature.

***Refrigerators and Freezers***

Look for the EnergyGuide label that tells you how much electricity (in kilowatt-hours) the refrigerator or freezer will use in one year. The smaller the number, the less energy it uses.

Refrigerators with freezers on the bottom are more efficient than those with freezers on the side or on the top. Also look for heavy door hinges that create a tight door seal.

Water Heaters

Look for the EnergyGuide label that tells you how much energy the water heater uses in one year.

Look for the First Hour Rating (“FHR”) of the water heater. This measures the maximum hot water the heater will deliver in the first hour of use. If you typically need a lot of hot water at once, the FHR will be important to you.

Sizing is important when selecting a water heater. Your utility or appliance professional will be able to assist you in the proper choice of water heater for your needs.

Windows

Look for the National Fenestration Rating Council (“NFRC”) label that provides U-values and solar heat gain coefficient values. The lower the U-value, the better the insulation.

Check the climate region map of the Energy Star label to be sure that you have selected the window, door, or skylight that is appropriate for where you live.

With energy prices at an all time high, Rate Counsel has always encouraged conservation as a great tool to help lower your utility bills. But did you know that undertaking conservation efforts can also help lower your taxes? Yes, it's true!

Federal legislation went into effect on January 1, 2006 entitling consumers who purchase energy efficient products in 2006 and 2007 to tax credits. The new tax credits, included in the Energy Policy Act of 2005, are aimed at encouraging Americans to select products for the home and vehicles that not only reduce energy costs but are also environmentally friendly. The tax incentives encompass measures that save electricity, natural gas, propane, and heating oil. Among the tax incentives in the Energy Policy Act of 2005 are:

- Tax credits for residential solar photovoltaic and solar hot water heating systems
- Tax deductions for highly efficient commercial buildings
- Tax credits for highly efficient new homes
- Tax credits for improvements to existing homes including high-efficiency air conditioners and heating equipment
- Tax credits for residential fuel cell systems
- Tax credits for fuel cell and micro-turbine electric generators used in a business



There is a distinction between a tax deduction and a tax credit. A tax deduction is subtracted from income before your total tax liability is computed. On the other hand, a tax credit is subtracted directly from the total tax liability. This means that a deduction and a credit have very different values. A credit is potentially three times more advantageous to a taxpayer than a deduction.

Homeowners are allowed to claim tax credits up to a maximum of \$500 for making energy efficient improvements to their existing homes. But beware, there are some conditions:

- You have to make the improvements to your primary residence and it must be located in the United States.
- Your home cannot be a second (vacation) home or rental property.
- You can select a number of improvements from various categories but credits for some items are limited and the total tax credit you can receive is \$500.
- You must make the improvements between 2006 and 2007.



Energy efficient property improvements that qualify for a credit of 10% of cost include:

- Energy efficient exterior doors, windows, and skylights
- Insulation designed to reduce heat loss or gain
- Metal roofs with "Energy Star" heat-reducing coatings

Remember, there is an overall limit of \$500 for energy-saving home improvements. In other words, you can't get a credit of \$600 for installing skylights (\$2000), exterior doors (\$2000) and windows (\$2000).

There are also specific credit limits for some equipment:

- \$300 for some central air conditioning units, heat pumps and high-efficiency water heaters
- \$150 for high-efficiency furnaces and boilers
- \$50 for air-circulating fans and heating and cooling systems

There are even larger credits available for major home improvement projects. For example, homeowners can qualify for

a tax credit of 30% (up to \$2,000) for the cost of solar hot water systems. Consumers should be forewarned that tax credits can't be used for solar hot water systems used for swimming pools and hot tubs. A similar tax credit applies to solar photovoltaic systems. (Note that all kinds of solar equipment, and all wind energy systems as well, are already exempt from the state's 6% sales tax.)

If you do decide to make improvements to your home, make sure you know which equipment is eligible for tax breaks because the law is very specific. Even though there are complexities and limits to the amount of tax breaks you can receive, make sure you take advantage of every credit to which you are entitled. Don't be reluctant to take tax breaks out of fear you may be audited by the I.R.S. There is no reason to believe that taking these credits increases the chance of an audit. And if you are audited by the I.R.S. for any reason, they will allow these credits as long as you have proof that you made the claimed purchases.

Along with these federal incentives, New Jersey also offers benefits for homeowners who make their homes more energy-efficient. These programs are run through the BPU's Clean Energy Program, which gives rebates for solar power and for many kinds of energy saving equipment that reduces use of electricity or natural gas. For example, solar rebates can cover up to 70% of the cost of installation. For more information on these rebates, please go to Chapter XI in this book on the New Jersey Clean Energy Program. For more information on the federal tax breaks, please visit www.irs.gov/newsroom/article/0,,id=154657,00.html.



WATER CONSERVATION

We seldom appreciate what is plentiful and easy to obtain. And what could be more plentiful than water? To get water, all we do is just turn on the tap, and it's there, 24/7, ready to be used. Right?



Think again — our water resources are not unlimited. They are affected every day by precipitation, population growth, economic development and pollution. Because water is a resource that must be shared, competition for its use is an ever-increasing management problem. In the past, we tried to solve our supply problems by constructing storage facilities and developing new resources, such as wells and reservoirs. However, these measures can be both economically and environmentally costly.

Although water is the most common substance on our planet, 97% of it is seawater, unfit for human consumption. Of the 3% of water that is fresh, two-thirds is trapped in glaciers and ice caps. Believe it or not, just 1% of the entire water supply in the world is available for human use. Just this small percentage takes care of the world's agricultural, manufacturing, and personal household and sanitation needs. We actually drink very little of our processed "drinking water"—around 1% of all treated water. The rest goes on lawns, in washing machines, and down toilets and drains!

Water Conservation in New Jersey

The cost of clean water is on the rise. And, as demonstrated by the drought of 2002, an abundant supply of water is no longer guaranteed. Furthermore, in New Jersey, demand for water is on the rise and water resources are constantly strained by the competing needs of the growing population, agriculture, industry, and recreation. In addition, pollution, declining water tables, and prolonged drought conditions are shrinking New Jersey's usable supply. As consumers, we need to reassess our water resources and water conservation activities.



Although water comes out of our taps and goes down our drains, it is a mistake to think that it's a one-way trip. In fact, water continually cycles through the environment, and both water treatment and water use rely on this cycle. When we think of water in this way, we can begin to appreciate the significance of water conservation on the natural environment. The less water we use or abuse, the less we degrade this valuable resource. Water conservation can ensure that the cycle will continue

well into the future. In addition there are certain steps you can take to conserve water in and around your home and business.

Water conservation practices have the effect of increasing water-use efficiency which ultimately results in benefits to water utilities and their customers. Some of the benefits of conservation are the reduction of water demand during drought years, the extension of water supplies during other emergencies, the saving of energy, and the reduction of water costs.

Is your water costing you more than it used to? Are you using more water than you thought? You'd be surprised how much you can save by water conservation. It not only will help save water, it

will also save you money. The following tips can help you live a more water-wise lifestyle.

Conserving Water Indoors

Conserving Water in the Kitchen

Here are some steps that can add up to big water savings in the kitchen.

- Take foods out of the freezer early and place in the refrigerator to allow plenty of time for thawing. Thawing frozen goods under a running tap wastes water.
- Clean fruits and vegetables in a partially filled sink and rinse them quickly.
- Chill tap water in the refrigerator for drinking.
- Completely fill the dishwasher before you turn it on.
- Use ice trays in your freezer and turn off automatic ice makers.
- Never pour water down the drain if there is another use for it such as watering a plant or garden, or for cleaning around your home.
- When washing dishes by hand, fill one sink or basin with soapy water. Quickly rinse under a slow-moving stream from the faucet.
- Kitchen sink disposals require lots of water to operate properly. Start a compost pile as an alternate method of disposing food waste instead of using a garbage disposal.

Conserving Water in the Bathroom

The bathroom accounts for about 65% of the water used inside the home. Since we waste the most there, it is also the area where potential water savings are the biggest and the easiest to achieve.

- Men can save 10 to 20 gallons of water each time they shave by filling the basin instead of letting the water run continuously.
- Turn off the tap while brushing your teeth and use short bursts of water for rinsing.



- Install a high-pressure, low flow showerhead.
- A quick shower uses less hot water than a bath in a full tub. If you prefer a bath, don't overfill the tub; 1/3 full should be enough.
- Flush the toilet only when necessary. Never use it as a wastebasket.
- Bathe your young children together.
- Turn the water off while you shampoo and condition your hair and you will save more than 50 gallons a week.

Conserving Water In the Utility room

- An automatic clothes washer can use from 150 to 250 gallons of water for each cycle. This accounts for about 20% of total indoor water use. Cutting back on the amount of water you use for clothes washing takes planning; you can reduce water consumption and save on energy costs by planning ahead.
- When doing laundry, match the water level to the size of the load.
- Choose new water-saving appliances, like washing machines that save up to 20 gallons per load.

Other Water Conservation Tips

- Conserve water because it is the right thing to do. Conserve water even if someone else is footing the bill, such as when you are staying at a hotel.
- Encourage your friends and neighbors to be part of a water-conscious community.
- Pick up the phone and report significant water losses from broken pipes, open hydrants and errant sprinklers to the property owner or your water management district.
- Encourage your school system and local government to help

develop and promote a water conservation ethic among children and adults.

- Try to do one thing each day that will result in saving water. Each saving maybe minimal but every drop counts. You can make a difference!

Conserving Water Outdoors

Lawn & Garden

During the summer months, the biggest drains on water resources are lawns and gardens. It is not unusual to find that half or more of the water piped into your home is going right back out through hoses onto lawns and gardens. If you have a lawn and garden, the careful selection of the right plants, coupled with wise watering habits, can significantly reduce outdoor water use without affecting the beauty of your landscape.

- Don't over water your lawn. As a general rule, lawns only need watering every 5 to 7 days in the summer and every 10 to 14 days in the winter.
- Water lawns during the early morning hours when temperatures and wind speed are the lowest. This reduces losses from evaporation.
- Install sprinklers that are water efficient. Micro and drip irrigation and soaker hoses are examples of water efficient methods of irrigation.
- Raise the lawn mower blade to at least three inches. A lawn cut higher encourages grass roots to grow deeper, shades the root system and holds soil moisture better than a closely clipped lawn.
- Mulch to retain moisture in the soil. Mulching also helps to control weeds that compete with plants for water.
- Grow grass only in those areas where it provides a functional benefit. Whenever possible substitute less water-demanding materials such as ground covers, rocks, and wood to enhance your yard.

Other Outdoor Conservation Tips

- Use a broom instead of a hose to clean your driveway or sidewalk and save up to 80 gallons of water every time.
- Periodically check your pool for leaks if you have an automatic refilling device.
- When the kids want to cool off, use the sprinkler in an area where your lawn needs it the most.
- Wash your car on the grass. This will water your lawn at the same time
- Avoid the installation of ornamental water features such as fountains unless the water is recycled.
- Do not leave sprinklers or hoses unattended. Your garden hoses can pour out 600 gallons or more in only a few hours.

How Much Water is Leaking?

A dripping faucet is more than annoying, it's expensive. Small leaks waste significant amounts of water. Furthermore, a hot water leak not only wastes water but also the energy needed to heat the water. Some water leaks such as a dripping faucet are obvious. Other water leaks can be virtually invisible, such as a leaky toilet flapper valve or a leaky irrigation pipe in your yard. By following the advice in this handbook, you will be able to conserve water while you help keep your pipes, plumbing fixtures and water-using appliances in top shape.

FAUCET LEAK

60 Drops per minute = 192 gallons wasted per month
90 Drops per minute = 310 gallons wasted per month
120 Drops per minute = 429 gallons wasted per month

Source: California Urban Water Conservation Council

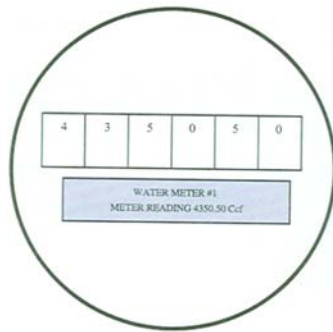
Water Meters and Leak Detection

Learning to read a water meter can help you monitor water

usage and review your utility bill for accuracy. More importantly, your water meter is a valuable tool in determining whether you have any water leaks. Water meters are usually located either in the basement, in a concrete box along the front curb or along an outside wall to your house. Most meters are read manually by an employee of your water utility. **Employees of your water utility are required to wear photo identification badges. Always ask to see an employee's identification before allowing an employee in your home.**

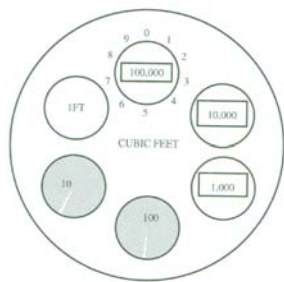
There are two main types of water meters in use today. Both record water usage in units of cubic feet (Ccf) or gallons.

Water Meter #1 looks like an odometer and is read in the same way an odometer is read in your car, left to right. To determine your monthly water usage, write down the meter reading on a specific date. Take another reading exactly 30 days later. Subtract the old reading from the new reading and you will have the number



of water units your household has consumed in 30 days.

Water Meter #2 looks like a set of small clocks, each with one pointer hand. These clocks turn either clockwise or counter clockwise. To determine water usage, start at the first clock with the highest cubic feet rating, *i.e.*, 100,000. Write down the number the



pointer hand points to on the first clock. If the pointer hand is between two numbers, write down the number to the left of the pointer hand. Proceed to the next lower clock and repeat procedure until all clocks are read.

As with meter #1, take a reading and repeat in 30 days. Subtract the old reading from the new one and you will have your water usage for that period.

Modern technology now permits automatic meter reading in some areas. Meters can be read from either a touch pad or over a

telephone line, so that you won't have to wait for a meter reader and you will get an actual reading every time.

Unmetered Water

If your water use is not metered, you must determine your water use for each fixture. Flow rates for showers and faucets can be measured by using a container and watch to determine the amount of water discharged through the fitting in a minute. Toilet use per flush can be approximated by measuring the volume of water inside the toilet tank (width x length x height) and dividing by 231 (there are 231 cubic inches in a gallon of water). After you have determined the water use of each fixture, you will need to record the number of uses and the length of time each fixture is used to determine your average daily water use. Remember to estimate the amount of water used by appliances such as clothes washers and dishwashers as well as home water treatment systems.

Master Valves & Shutoff Valves

The master water supply valve controls the water supply to your home. It is a good idea to know where your master valve is located, so you can turn off the water supply in the event of a major leak or as needed when making a plumbing repair.



The two most common locations for the master valve are next to the water meter or where the water supply pipe enters your home. To shut off the water supply, slowly turn the handle clockwise. (Many water supply valves require a special two-pronged "key" to turn the handle. Water supply keys can be purchased at most plumbing, hardware and home improvement stores.)

Plumbing codes now also require new houses to have a main shutoff valve inside the house. The valve can be located under any plumbing fixture, but the most common location is next to the water heater.

To make sure that the master valve has indeed shut off the water, turn on a faucet. If water flows, the master valve has not completely shut off the water.

Most homes also have shutoff valves for the water lines that run to individual water fixtures. For example, the shutoff valve for a toilet is located below the toilet tank. The shutoff valves for a kitchen or bathroom faucet are located under the sink. The typical faucet or toilet shutoff valve has an oval handle. Turn the handle clockwise to turn off the water supply.

Finding and Fixing Indoor Leaks

Toilets

How much water your toilet uses depends on two factors; its tank size and its working condition. Since 1992, federal law has mandated that all new toilets use no more than 1.6 gallons per flush. If your toilet is a 3.5 gallon-per flush model from the 1980's or an even older model that uses five or more gallons per flush, consider replacing your old water guzzler with a sleek new water conserving 1.6 gallon unit.

But even the new low flush toilets can be water wasters. A leaky flapper valve or an improperly set water level in the tank can cause significant water leakage. Remember, not every running toilet will make noise.

Even though you may think that your toilet is not leaking, there is one way to find out. Lift the lid off the toilet tank and put 10–15 drops of dark-colored food dye in the tank. After 15 minutes, check the toilet bowl for any signs of dye color. If there is color in your bowl, your toilet is leaking!

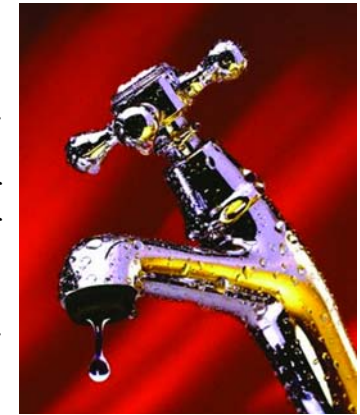
Leaks and noises are the most common problems with tank toilets, and the two types of problems are often related. The good news is that many common toilet leaks can be fixed by making minor adjustments.

If your toilet runs all the time the culprit may be an improperly adjusted float ball that results in the water level in the tank that's so high that the water is escaping into the top of the overflow pipe. A running toilet can also be caused by a cracked float ball, an improperly seated flapper or tank ball, a kinked lift chain or a bent lift wire.



Faucets

A dripping faucet is more than annoying, it is expensive. A leaky faucet is a common household water waster. A steady drip at the rate of one drop per second wastes 192 gallons of water a month. There are two types of faucets. The first type includes compression faucets which have two handles, one for hot water and one for cold water. The other type is the washerless faucet. These typically have just one handle that controls both the hot and the cold water. Washerless faucets are known for providing years of trouble free service because their design minimizes friction and wear.



The flow rate of a faucet is measured in gallons per minute (gpm). Older kitchen and bathroom faucets can have a maximum flow rate of 3 to 7 gpm. Since 1992, the maximum allowable flow rate is 2.5 gpm. Remember, no matter the flow rate of your faucet, leaving the tap running is a most wasteful practice.

Most indoor faucets have an aerator at the tip of the faucet spout. An aerator is a screw on attachment with a small wire screen that mixes tiny air bubbles into the water to create a smooth flow. A faucet aerator is an inexpensive and efficient water conservation device because it reduces water flow with no apparent reduction in pressure or volume.

Dishwasher

In recent years, dishwasher manufactures have made impressive strides in making their machines more water efficient. Some new water efficient models use less than 5 gallons per load on the normal wash setting. Older dishwashers may use up to 15 gallons per load.

Although dishwasher leaks are uncommon, there are a few possible types of leaks. If water leaks from the door, the likely culprit is the rubber gasket around the door. If the gasket has cracked or become hard and brittle with age, replace it with a new gasket.

**Drought Emergency Lifted:
*Water Conservation Still Essential***

On January 8, 2003, the statewide drought emergency that had been in place since March 5, 2002 was lifted. Water use restrictions imposed by the state in March 2002, including a ban on watering lawns, were relaxed in June 2002 after a wet spring, but were reinstated after a parched July and August 2002. Before the heavy rains came in the fall of 2002, New Jersey had just experienced its driest period in more than 100 years. The 16 inches of rain that fell during the unusually soggy fall were enough to boost northern reservoirs to well above the norm for January 2003.

In lifting the drought emergency, the Governor announced that “the short-term crisis is over, but the long-term threat remains.” He asked all New Jerseyans to work together to protect our waterways, to end crisis-to-crisis management of our most precious resource and to stop the over-development and sprawl that threaten to destroy New Jersey’s water supplies and quality of life.

In January 2003, after the drought emergency was lifted, New Jersey remained under a drought warning because underground well supplies in South Jersey were still below average. The drought warning also gave officials the authority to block construction that would affect water supplies. However, due to the significant amounts of snow that fell in the beginning of 2003, on March 21, 2003 the drought warning was lifted. As of December 2004, no statewide water use restrictions were in effect.

To protect our water supplies against future water shortages, all consumers must be better stewards of water resources to ensure that there will be safe and reliable water supplies for the State’s growing communities and for future generations.

New State Water Initiatives

While in New Jersey, water continues to remain a plentiful and comparatively cheap resource, supplies of drinking water are finite and must be conserved and protected. New Jersey’s rivers, lakes, reservoirs and aquifers, like those in many states around the country, are subjected to pollutants like acid rain, industrial and manufacturing effluent, fertilizers, pesticides, wastewater discharges, and storm water/roadway runoff. New Jersey’s plentiful water sources must supply clean drinking water to all residents but are facing increasing environmental stress including well contamination and drought conditions, causing concern about aquifer depletion and salt water encroachment up the Delaware River. These conditions highlight the need for long-term steps to protect the potable water resources of the State.

Several major initiatives continue New Jersey’s progress toward implementing the most comprehensive water protection measures in the country. Among these measures are the establishment of the Highlands Commission and continued development of stormwater rules that will encourage the recharge of groundwater supplies with rainwater. In addition, the New Jersey Department of Environmental Protection (NJDEP) has designated a special level of protection for a number of waterways in the State. This protection, known as Category One, targets water bodies that provide drinking water, habitat for endangered and threatened species, and popular recreational and commercial species, such as trout or shellfish, providing additional protections to help prevent water quality degradation and discourage development where it would impair or

destroy natural resources and environmental quality. For a complete list of the Category One water bodies in the State of New Jersey, visit the NJDEP website at www.state.nj.us/dep/cleanwater/c1_waters_list.pdf.

Many of the water rate increases throughout the state are triggered by the costs companies must incur to comply with the federal Clean Water Act and the Safe Drinking Water Act. These two initiatives mandate that every state adopt specific water treatment strategies which require expensive new water treatment plants. The costs of these treatment plants are borne almost entirely by ratepayers. Rate Counsel is working to contain these costs by closely scrutinizing the engineering plans and accounting methods used by the utilities to support their rate increase petitions. However, the best long-term options for maintaining clean, safe, affordable water supplies are to keep existing water sources clean and to conserve existing clean water sources.

According to projections, New Jersey's population is expected to rise from a current estimate of 8.1 million to about 9 million by 2020. More residents means more development, greater demand for water and increased storm water runoff. These factors place continuous stress upon existing and future water supplies. Rate Counsel supports consultations among state officials, business people, environmentalists and residents working together to develop long-term policies to protect this priceless resource.



The Amount of Water We Use in Our Homes Varies During the Day

- **Lowest rate of water use:** 11:30 p.m. to 5:00 a.m.
- **Sharp rise/high use:** 5:00 a.m. to Noon.
(Peak hourly use from 7:00 a.m. to 8:00 a.m.)
- **Moderate use:** Noon to 5:00 p.m.
(Lull around 3:00 p.m.)
- **Increasing evening use:** 5:00 p.m. to 11:00 p.m.
(Second minor peak, 6:00 p.m. to 8:00 p.m.)
- **Compared With Other Countries, the United States Uses the Most Water Per Person (per capita)**

This is true even when compared with other countries that are equally well developed. In the United States, significant amounts of water are used for lawn and garden sprinkling, automobile washing, kitchen and laundry appliances, such as garbage disposals, clothes washers, and automatic dish washers.

| Country | Annual Water Use Per Capita in Gallons | % of Use for Residential Needs | % of Use for Industrial/Agriculture Needs |
|---------------|--|--------------------------------|---|
| United States | 525,000 | 10 | 90 |
| Canada | 310,000 | 13 | 87 |
| Belgium | 221,000 | 6 | 94 |
| India | 132,000 | 3 | 97 |
| China | 122,000 | 6 | 94 |
| Poland | 112,000 | 14 | 86 |
| Nicaragua | 72,000 | 18 | 82 |
| Malta | 16,000 | 100 | 0 |

Source: Van Der Leeden, F., F. L. Troise, and D. K. Todd. *The Water Encyclopedia*, Lewis Publishers, Inc., Second Ed. (1990).

CHAPTER X

NATURAL GAS TIPS

A Word About Natural Gas

Natural gas is one of the largest sources of energy for homes and businesses throughout the United States, and its popularity continues to grow. During the last decade, the use of natural gas in the United States has increased by 35% and is expected to grow by another 60% by 2020. About 87% of the natural gas consumed in the United States is produced within U.S. borders.



Environmentally, Natural Gas is an Attractive Fuel

Of every 100,000 Btus (British thermal units) of natural gas extracted from a gas well, 90,000 Btus reach the customer. Because we use natural gas in the same form in which it comes from the earth, it is a primary fuel. Natural gas requires no expensive, pollution-generating processing. Little energy is needed to carry it through underground pipelines. As a result, natural gas production is 90% efficient.

Electricity is a secondary fuel because it is produced from another energy source. Electricity is manufactured in a power plant where heat from water, coal, gas, oil or uranium produces steam to drive a turbine generator, which then produces electricity. Only 27%

of the converted energy reaches the consumer. That means that 73% of the energy generated is lost in production and transmission, making electricity production far less efficient than natural gas.

Natural Gas Prices Have Increased

Wholesale natural gas prices are set in a competitive North American market and are subject to the market forces of supply and demand. Unfortunately, pervasive damage to gas production and transport facilities caused by the natural disasters of Hurricanes Katrina and Rita, coupled with an ever increasing demand for energy, natural gas costs have gone through the roof.

The BPU is the state authority responsible to review and approve all gas costs incurred by New Jersey's natural gas utilities when they purchase natural gas to provide to customers. The BPU is also responsible for enforcing customer service and reliability standards on behalf of consumers. But neither the BPU nor the utilities control the cost of the gas and the utilities are allowed to recover these expenses as a pass-through when natural gas prices increase. Even though the natural gas companies are not permitted to make a profit on the cost of gas, Rate Counsel is constantly reviewing the gas companies' requests to ensure ratepayers pay the lowest rates possible consistent with receiving safe, reliable and proper service. We urge you to renew your conservation efforts and implement the following gas conservation tips.

Gas Conservation Tips

It is important for you to remember that, in addition to gas costs, weather dramatically affects your natural gas bills. When you use more fuel to heat your home during the cold-weather months, energy conservation becomes even more important. By taking a few easy steps, you can save money on your gas bill.

Natural Gas Water Heater

A water heater is a thermostat-controlled storage tank that heats water and keeps it warm. It operates automatically when cold water is delivered to the bottom of the tank through the dip tube. The thermostat senses the cold water and calls for the burner to ignite. The burner brings the water to the preset temperature. The

thermostat then shuts off the main burner until the stored water temperature again calls for heat.

- Set your water heater temperature to 120 degrees F or to the “warm” setting.
- Set your water heater temperature control to the pilot position when your home is vacant for two days or longer.
- A natural gas water heater typically has a substantially faster recovery rate than an electric water heater so you have the hot water you need, when you need it. The recovery rate is a combination of how much water is stored in the water heater and how quickly the water heater can heat the cold water to the preset temperature.
- Natural gas water heaters have about a 50% lower operating cost than electric water heaters.
- Keep the burner area free of dust and dirt.
- Wrap insulation on long stretches of pipe between your water heater and the point of use, and on pipes running through unheated areas.
- Install a water heater insulation wrap around the sides of the water heater. Never put insulation on the top or near the bottom of the heater.



A Typical Home Water Heater Costs This Much To Operate (per month)

| | |
|-----------|---------|
| Electric: | \$54.10 |
| Gas: | \$27.75 |

Source: South Jersey Gas web site: www.sjindustries.com

Natural Gas Clothes Dryers

Natural gas provides a clean, efficient fuel for drying clothes economically. New gas dryers are designed for efficiency with features such as pilot-less ignition and automatic shutoff. Many new gas dryers use up to 30% less energy than older models.

- Vent the dryer to the outside in order to carry moisture-laden air out of your home. Flexible venting is not recommended, as it tends to obstruct airflow and collects lint in its grooves.
- Use the fast spin cycle of your washer to remove as much water as possible from your laundry before putting it in the dryer.
- Do not open the dryer door unnecessarily.
- Avoid overloading and over drying; these waste energy



Natural Gas Furnaces

The furnace is the biggest guzzler of natural gas in most homes. If you are shopping for a new gas heating system, make sure you compare energy efficiencies and installation costs of various models. Also, look for models that are certified by the American Gas Association to ensure safety, reliability and efficiency.

There are several types of warm air heating systems or furnaces. The two main types are gravity systems and forced air systems. With a gravity system, heated air rises from the furnace through large supply ducts. Cool air returns to the furnace through cold air return ducts. The weight difference between warm and cool air keeps air circulating. A forced air system is where a blower forces warm air through supply ducts. Air enters the room through registers or diffusers and then returns via cold air ducts to the furnace where it is filtered of dust and dirt particles, and then reheated and recirculated.



- Furnaces need periodic care to extend their operating life, save energy and increase efficiency. Make sure to follow all manufacturer’s recommendations.
- Cleaning or adjusting a natural gas burner should be done by a qualified service person. If your heating system is not working properly, contact a professional.
- Allow heat to circulate freely. Once you have your furnace operating at peak performance, go through your home to make sure that heat is circulating properly. Move furniture, draperies and rugs that obstruct registers and heat vents.
- Keep radiators and registers dust free.
- Tightly shut exterior doors and avoid frequent in and out traffic.
- Your chimney is an important escape route for hot air, both from your fireplace and heating system. Close the damper tightly when you are not using the fireplace.

How Much Energy Do Natural Gas Appliances Use?

Besides being safe and clean, natural gas is one of the most cost efficient forms of energy. By effectively using your household gas appliances, you can save even more on your monthly natural gas bill.

The following chart lists the average amount of natural gas household appliances consume:



| GAS APPLIANCE | THERM (TH) USE |
|---|------------------------------|
| Water Heater | 6–8 TH, per person per month |
| Washing Machine [gas required for hot water (50 gallons)] | .33 TH per load |
| Dishwasher [gas required for hot water (15 gallons)] | .20 TH per load |
| Clothes Dryer | .17 TH per load |
| Range | .10 TH per meal |
| Oven | .20 TH per day |
| Oven (self-cleaning feature) | .50 TH per clean |
| Fireplace (35,000 Btu/hr) | .20 TH per hour |
| Barbecue (25,000 Btu/hr) | .25 TH per hour |
| Gas Yard Light | .50 TH per day |
| Furnace Pilot Light | 4–12 TH per month |

Note: A British Thermal Unit (Btu) is a measure of heat. One Btu is the quantity of heat needed to raise the temperature of one pound of water one degree Fahrenheit. One Therm of gas = 100,000 Btus. One kilowatt hour (kWh) = 3,412 Btus.

Source: Sierra Pacific web site: www.sierrapacific.com/services.energy/energy_tips

CHAPTER XI

THE NEW JERSEY CLEAN ENERGY PROGRAM

Many New Jersey consumers can benefit from the New Jersey Clean Energy Program. This program promotes and encourages greater efficiency in the use of electricity and gas, as well as the use of renewable energy sources to help meet the State's ever-increasing electricity needs.



When the Electric Discount and Energy Competition Act (EDECA) was signed into law in 1999, it required the establishment of renewable energy and energy efficiency programs. These programs are now known as the Clean Energy Program (CEP), which is administered by the New Jersey Board of Public Utilities (BPU). The program is funded through small charges on gas and electric utility bills, which currently collect approximately \$165 million per year statewide.

The BPU established the New Jersey Clean Energy Council to advise the BPU and its staff in planning and administering the Clean Energy Program. The Council also makes assessments and recommendations on the components of the CEP. The Council, including Rate Counsel, also includes BPU staff, consumer groups, energy experts, industry groups, utility representatives and government agencies.

The Clean Energy Program website www.njcleanenergy.com provides comprehensive information on New Jersey's statewide energy efficiency and clean energy generation programs.

Rate Counsel's Role

Since the passage of EDECA, Rate Counsel has actively participated in BPU proceedings that establish and carry out the Clean Energy Program.

"When it comes to long-range energy policies, our office is the voice for New Jersey's ratepayers," said Ratepayer Advocate

Seema M. Singh. "Our office also provides consumers with the information they need to advance energy efficiency and renewable energy initiatives.

"We are particularly concerned that the Clean Energy Program must benefit ratepayers and that it is cost efficient. We want to make sure the best and most effective use is made of CEP monies," Ms. Singh continued.

The Benefits of the Clean Energy Program*

"The Clean Energy Program promotes the installation of energy-efficient equipment, the adoption of energy-savings practices and renewable energy generation," Ms. Singh said. "All of which provide substantial environmental, monetary and public health benefits."

The Clean Energy Program and its initiatives save New Jersey ratepayers money by helping them reduce their overall consumption of gas and electricity compared to what it would be, and by reducing the need to build new transmission lines, distribution system upgrades and power plants.

Clean energy is crucial for New Jersey's future because it reduces pollution, protects the environment, creates jobs and decreases dependence on foreign oil.

From its inception in 2001 through the third quarter of 2005, the Clean Energy Program committed some \$164 million in grants and rebates for renewable energy projects that generate electricity. Many of these projects are operating now and others will be on-line soon. When these committed projects are all operating they will generate over 177,000,000 kiloWatt-hours of electricity each year. Compared with the conventional electricity generation that it replaces, this renewable generation will reduce harmful air pollutants such as sulfur dioxide, nitrogen oxides, and mercury. The renewable energy projects will also avoid emissions of carbon dioxide, the gas that contributes to global warming.

From 2001 through the third quarter of 2005, the Clean Energy Program committed some \$118 million in incentives to promote energy-efficient equipment and practices in homes, businesses, and

*Program results information from *New Jersey's Clean Energy Program Report Submitted to the New Jersey Board of Public Utilities*, January 16, 2006.

other facilities in the state. When these committed energy-efficiency measures are all in place they will save over 249,000,000 kiloWatt-hours of electricity each year, as well as some 11,000,000 annual therms of natural gas used in residential, commercial, and industrial facilities.

Clean Energy Program investments in renewable energy and energy efficiency will continue at least through 2008, based on decisions made by the BPU through March 2006. And, the programs may be extended beyond that date. Thus, the benefits of the programs will increase in future years.

Programs for Residential Customers

For New Jersey's residential consumers, there are several efficiency and clean energy programs available, including COOLAdvantage, WARMAdvantage, New Jersey for Energy Star, Comfort Partners, and Home Energy Analysis.

COOLAdvantage

The COOLAdvantage program provides rebates toward the purchase and installation of energy-efficient electric central air conditioners or heat pumps. Rebates range from \$300 to \$400 for qualified central air conditioning units and from \$350 to \$450 for qualified heat pumps. The program is open to all New Jersey residents who install a new qualifying energy-efficient electric central air conditioner or heat pump. **Contact your electric utility for program applications, a free guide on buying an energy-efficient central air conditioner, and other program requirements.**



WARMAdvantage

The WARMAdvantage program promotes the purchase of high efficiency natural gas home heating systems and/or water heaters. Rebates range from \$50 to \$400 toward the purchase of qualifying high-efficiency natural gas equipment. The program is open to all New Jersey residents who install a qualifying high

efficiency natural gas furnace, natural gas boiler, or natural gas water heater. **To enroll in the program, contact your natural gas utility.**

New Jersey for Energy Star

The Clean Energy Program works closely with manufacturers and retailers to increase the availability and use of Energy Star products in New Jersey. Energy Star products meet and exceed energy efficiency guidelines set by the U.S. Environmental Protection Agency and the Department of Energy. Innovative components give Energy Star products many advantages over conventional models, including energy cost reductions. **Look for the Energy Star label on lighting appliances, home electronics, office equipment, home heating and cooling equipment.**

New Jersey ENERGY STAR Homes

The New Jersey ENERGY STAR Homes program is part of the larger EPA ENERGY STAR programs developed to promote energy-wise products and programs that help consumers save money while protecting the environment. A New Jersey ENERGY STAR Home is certified by the Environmental Protection Agency to be at least 30% more energy efficient than a standard home. The benefits of owning a New Jersey ENERGY STAR home are:

- You save money on energy costs
- Will have all-season comfort and superior indoor air quality
- You can qualify for special ENERGY STAR mortgages at lower interest rates
- Have a higher resale value for your home
- Help protect the environment.

Comfort Partners

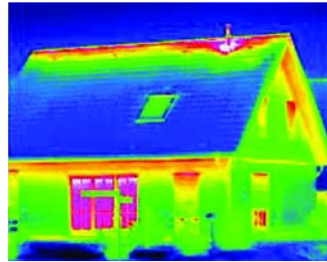
Comfort Partners provides energy affordability measures for income-eligible households through the installation of energy efficiency measures, personalized energy education, and personalized energy counseling. All efficiency measures and energy education services are provided free of charge. The program is available to New Jersey households at or below 175

percent of the federal poverty level.

Comfort Partners participants may receive efficient lighting products; hot water conservation measures; replacement of inefficient refrigerators and thermostats; insulation upgrades; duct sealing and repair; heating and cooling equipment maintenance; and personalized energy education and counseling. **To participate, call your electric or natural gas utility.**

Home Energy Analysis

New Jersey energy customers should, if possible, perform an online home energy analysis to help save energy and money. The online audit provides links to various incentives developed under the New Jersey Clean Energy Program. The audit provides do-it-yourself energy efficiency measures and suggestions for changes in energy consumption practices. **To participate in a home energy analysis, visit www.njcleanenergy.com/home-analysis.html.**



Customer On-Site Renewable Energy Program

All ratepayers in New Jersey are entitled to financial incentives for the installation of renewable energy systems on their house, building, or other premises. Direct financial incentives are available to reduce the initial cost of the renewable generation system. Incentives are paid based on the size of the system installed. The incentives help to defray installation, equipment and electric inter-connection costs. **To find out about this program go to www.njcep.com/html/2_incent.html or contact your electric utility.**



CleanPower Choice Program

The newest Clean Energy Program is the CleanPower Choice program. This program allows any electric utility customer to voluntarily choose to support the development of additional clean, renewable sources of energy. By choosing CleanPower, the customer

pays a small amount on the bill in order to support the generation of renewable energy sources that diversify our energy supply and help create a healthier environment. When customers make the CleanPower Choice, electricity is generated from clean, renewable energy sources located in New Jersey and the mid-Atlantic region. The Board of Public Utilities' Office of Clean Energy verifies that renewable energy is delivered into the Mid Atlantic power pool that serves New Jersey's needs. The more people who sign up for the CleanPower Choice Program, the more renewable energy sources will be added to the energy mix. To find out about this program go to www.njcleanpower.com/ or contact your electric utility.

The Clean Energy Program & Businesses

The CEP includes a comprehensive set of programs to help non-residential customers, both businesses and non-profit institutions, to save energy through a variety of technologies. Many businesses have taken advantage of innovative technology, practices and funding offered through the Clean Energy Program. A variety of businesses also benefit from the renewable energy components of the CEP.

Renewable Energy

The Clean Energy Program includes several programs geared toward renewable energy generation. One of these, the Customer On-Site Renewable Energy Program, was described above. The CEP also includes several other renewable energy programs to promote a wide range of projects to develop windpower, solar energy, biomass, and other resources.

Renewable energy is an environmentally friendly way to power our lives. It allows us to generate electricity without air pollutants and greenhouse gas emissions from conventional fossil fuel based electricity generation. Among technologies promoted through CEP programs for renewable energy generation technologies and systems are photovoltaic or solar electricity, small wind and fuel cells.

* Information from www.electrifyingtimes.com and www.fuelingthefuture.org.

Photovoltaic/Solar Electricity

Photovoltaic panels, also called solar electric panels, use sunlight to produce electricity. They are usually mounted on a rooftop. The photovoltaic cells in PV panels produce a direct current, which is changed into alternating current by an inverter. PV systems only produce electricity during the times when they are receiving sufficient solar radiation. Usually PV systems include interconnection equipment so that excess electricity that is not being used in the house or building at the time it is being generated by the solar panels can be sent into the electricity system. Under a New Jersey regulation known as “net metering,” customers receive a credit against their own electricity bills for electricity from their PV system that goes out into the electricity system. Photovoltaic energy provides many benefits, most notably producing electricity at a time when demand is at its peak. Photovoltaic power is also emissions-free, highly reliable and easy to operate.



Photovoltaic energy provides many benefits, most notably producing electricity at a time when demand is at its peak. Photovoltaic power is also emissions-free, highly reliable and easy to operate.

Small Wind Energy

Wind power can be used to provide electricity to homes, schools, businesses and entire communities. Wind resources can be used with both large wind turbines for utility applications and with small wind turbines for on-site generation. In New Jersey, small wind electric systems are beginning to make a significant contribution to the State’s energy needs.



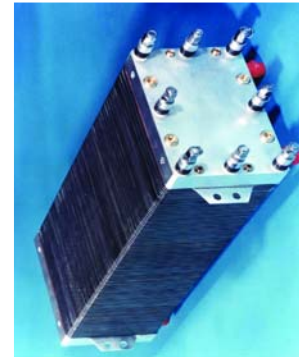
Small wind energy systems can provide practical and economical sources of electricity if:

- Your property has a good wind resource.
- Your home or business is located on at least one acre of land in a rural area.
- Your local zoning codes or covenants allow wind turbines.

- Your property is in a remote location that does not have easy access to utility lines.
- You can afford long-term investments.

Fuel Cells*

A fuel cell resembles both a battery and an engine. Like batteries, they provide electricity from chemical reactions without combustion or moving parts. Like engines, they run off a fuel source, hydrogen. Since fuel cells do not burn gas, they operate virtually pollution-free. And, unlike a battery, a fuel cell doesn’t run down or require recharging; it will produce electricity and heat, quietly and cleanly, as long as fuel is supplied. Fuel cells offer high-energy efficient output.



- Fuel cells produce electricity at efficiencies of 40–60 percent or more, compared with 30–40 percent for conventional boilers.
- When the fuel cell’s heat and electricity can both be used, efficiency levels can exceed 80 percent.
- Because fuel cells operate at the user’s site, they don’t suffer the typical eight percent loss of electricity that conventional distribution lines do.

Future of the New Jersey Clean Energy Program

“With the Clean Energy Program and its important initiatives, New Jersey is setting a powerful example for the future of energy conservation, energy efficiency and energy technology,” said Ratepayer Advocate Seema M. Singh. “The Clean Energy Program must continue to develop and broaden to reach more consumers and more businesses. Rate Counsel will continue contributing and participating in all aspects of the development of the Clean Energy Program.”

If you are interested in learning more about the Clean Energy Program and you do not have access to the internet,

*Information from www.electrifyingtimes.com and www.fuelingthefuture.org.

you can call your electric or gas utility. You can also write the New Jersey Board of Public Utilities to get more information.

New Jersey Board of Public Utilities
Office of Clean Energy
44 South Clinton Avenue
Post Office Box 350
Trenton, New Jersey 08625-0350

Phone: 1-609-777-3300
Fax: 1-609-777-3330

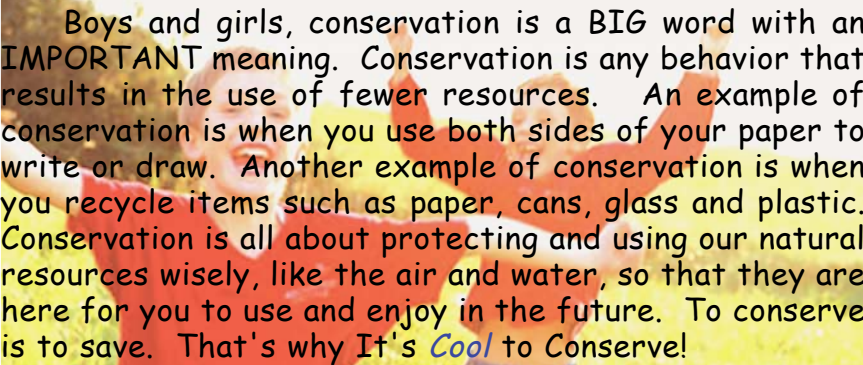
Toll Free number: 1-800-624-0241

Website: www.njcleanenergy.com

All statistical information from: The New Jersey Clean Energy website
www.njcleanenergy.com.

XII. Conservation for Kids

It's *Cool* to Conserve!



Boys and girls, conservation is a BIG word with an IMPORTANT meaning. Conservation is any behavior that results in the use of fewer resources. An example of conservation is when you use both sides of your paper to write or draw. Another example of conservation is when you recycle items such as paper, cans, glass and plastic. Conservation is all about protecting and using our natural resources wisely, like the air and water, so that they are here for you to use and enjoy in the future. To conserve is to save. That's why It's *Cool* to Conserve!

The sun, the wind, the oceans and the trees are all resources that are used to generate electricity. If we don't use these resources wisely they may disappear. Can you imagine living at home without any lights, or not being able to watch TV and work on your computer? What would you do if there was no water to drink, to brush your teeth or to take a bath? If we don't conserve this may happen.



Did you know that many of our friends around the world do not have enough clean water to drink, or enough electricity to light up their homes? The United States has only 5 percent of the world population but uses over 25 percent of the world's energy. The more we waste the less there is to go around. It is important to conserve. Conservation is right.

There are some simple but important things you can do to save electricity and water in your home. Then you can pass on these tips to your parents, grandparents, aunts and uncles, your neighbors and your friends.

- **Turn off the lights when you leave the room.**
- **Turn off your CD player, computer, video game and other electronics when not in use. All of these things use a lot of electricity.**
- **Always turn off the TV when you are finished watching.**
- **Don't leave the refrigerator door open. Get what you want quickly and shut the door!**
- **Ask mom and dad to use a fan instead of an air conditioner to keep cool on warm days.**
- **Keep your windows closed in the house if you are using the air conditioner in the summer or the heater in the winter.**



To help save water:



- **Don't leave the water running while you brush your teeth.**
- **Don't pour your glass of water down the drain; instead, use the water on a plant.**
- **Take a short shower instead of filling a bath tub to the top.**
- **Help your mom or dad fix a dripping faucet.**

Did you know that a dripping faucet can waste up to 20 gallons of water a day?



- **If you see water from your sprinkler hitting the sidewalk or driveway, tell mom or dad to move it so that it only waters the lawn.**

Thank you for exploring conservation with us. Now that you have learned all about conservation, we hope that you will find ways to save energy in your everyday activities. I hope that you share what you have read and learned with others.

Remember, It's *Cool* to Conserve!