New Jersey Comfort Partners

RESOURCE SECTION

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RESOURCE SECTION

New Jersey Comfort Partners

WORKING TO SAVE ON HOME HEATING

Space heating is the largest user of household energy, using up to 75% of the total bill.

Weatherization will reduce energy losses, but your habits greatly affect how much energy you use.

What was your thermostat set at last winter? ____________________
What do you set it at when you are sleeping? ____________________
What do you set it at when you are away from the house? __________

Last Year's Heating Energy Use

Total kWh/ccf: ________________ **Cost:** __________________
Heating kWh/ccf: ______________ **Cost:**__________________
Cooling kWh/ccf:_ _____________ **Cost:**__________________

What Can You Do?

- Do not cover or block the vents or radiators – let the heat in.
- Wear clothes and socks to keep your feet & body covered.
- Keep doors and windows closed when heat is on.
- Clean the filter monthly or bleed the radiators each fall.
- Do not use the oven to heat the house.
- Block out all drafts and sources of cold air.
- The greatest savings can be achieved by setting back your thermostat.

Keeping your thermostat set even a few degrees lower this winter can make a big difference on your bill.

What will you set your thermostat at this winter?
Weekdays: ____________________ Weekend Days:____________
Weeknights: ___________________ Weekend Nights: __________
If you're gone more than two hours: ___________________________

°F Reduced	Turndown 24 Hours	Setback 8 Hours
1°F	3%	1%
3°F	9%	3%
5°F	15%	5%
7°F	21%	7%
10°F	30%	10%

Savings from Turndown: _________________ °F x 3% of last year's heating = $ ____________
Savings from Daytime Setback: ____________ °F x 1% of last year's heating = $ ____________
Savings from Nighttime Setback:___________ °F x 1% of last year's heating = $ ____________
Estimated Annual Savings = $ ____________

I can help reduce my home heating energy use.

Comfort Partner: ________________________________ Family Partner:__________________________________

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HOT WATER SAVING TIPS

Dishwashers

Do not rinse your dishes before putting them in the dishwasher. In doing so, you're using hot water twice – in the sink and in the dishwasher. Pre-rinsing may also cause the sensor in your dishwasher to misread how dirty your dishes are and adjust the settings to a lighter wash than they actually need. Be sure to only wash full loads of dishes. You should also avoid using the rinse-hold on your machine for just a few dirty dishes because it uses 3 to 7 gallons of hot water each time.

Clothes Washers

On average, clothes washers use 25-40 gallons of water per cycle. Using warm water instead of hot can cut a load's energy use in half, according to the Department of Energy, and using cool water will save even more. When considering a new clothes washer, look for the ENERGY STAR® logo. Over the lifetime of the product, models that have earned the ENERGY STAR, can save nearly $370.

Showerheads

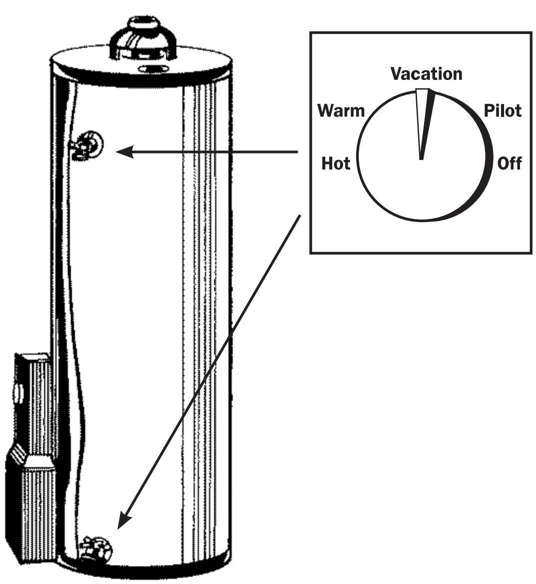
Showers use a lot less water than a typical bath, even less if you have a low-flow showerhead. A water-saving showerhead rated for 2 gallons per minute uses 20 gallons during a 10-minute shower. Compare that with the 70 gallons needed to fill up some bathtubs. (A standard showerhead uses 2.5 gallons of water per minute.)

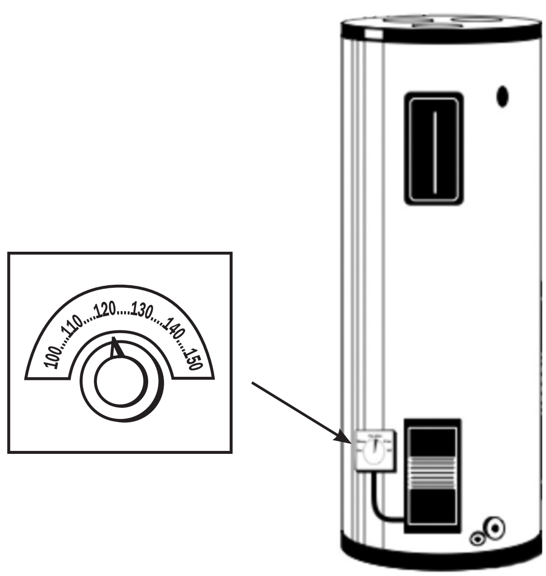
Water Heater Thermostat

For every 10 degrees you turn it down, you'll save 3% to 5% on your bill. Most water heaters come preset at 140 degrees, which has the added risk of scalding. The Department of Energy recommends most households lower it to 120 degrees. That's high enough for your needs, and high enough to reduce mineral buildup in your tank and pipes.

OUR BIGGEST HOT WATER USERS

Reduce Water Heater Temperature to 120 – 125 Degrees





HOW TO CHANGE THE THERMOSTAT SETTINGS ON YOUR WATER HEATER

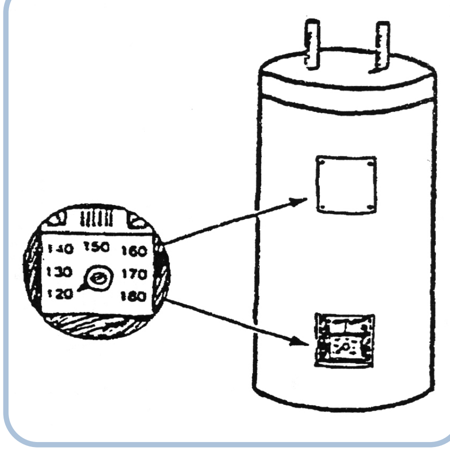
Your water heater is a big user of electricity or gas. Many people overheat their water causing the water heater to use more energy than necessary. **If you mix cold water in with your hot water at the faucet or shower to make it a comfortable temperature, then your hot water is too hot and the water heater is using more energy than necessary.** This means you are paying more to heat your water than you need to pay.

Most people like a shower or bath that is about 105°F. Most water heaters are set between 120° and 150°. We recommend you set your water heater thermostats at 120°. This temperature will save you money on your electric bill and you will still have plenty of hot water. Most water heater thermostats are not really accurate, so 120° on the thermostat might really be higher or lower at the faucet or shower.

To find out what temperature your hot water is, first you need to check the temperature at the faucet. Let the hot water run for a minute or so to get all of the cooled water out of the pipe. Then, use a thermometer designed for higher temperatures like a candy or meat thermometer. Put the thermometer in the water and check the temperature. If the water temperature is over 120° we recommend you turn the water heater setting down.

This is how you turn down the thermostats on an electric water heater:

1. Turn off the circuit to the water heater by flipping the switch(es) in your breaker panel or by removing the fuses in your fuse box.
2. Remove the cover plates that cover the thermostats. Most electric water heaters have two thermostats: one at the bottom of the tank and one about two-thirds of the way up the tank. You will probably need both a slotted and Phillips head screwdriver.
3. Caution should be taken at all times when the cover plates are off. It will be safest if you treat the heater as if the power is still on. Push the insulation aside using something nonconductive like plastic or wood. Use a screwdriver with an insulated handle to turn the pointers on both thermostats to 120°.
4. Pull the insulation back over the thermostats and replace the cover plates. Turn the power on at the breaker panel or fuse box. The next day, check the water temperature at the faucet and readjust the thermostats if necessary.



If you run out of hot water quickly, it usually means that your family uses a lot of hot water at one time, or that the bottom element in your electric water heater is covered with sediment and has stopped working. This means that just the top element is working and can only heat half the water in your tank.

Elements can be checked, removed and replaced if they are dead. You can use a continuity tester or volt meter to see if they are working or call a plumber or electrician to check it. They are fairly easy to replace and most cost around $15.

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HOW TO CHANGE THE THERMOSTAT SETTINGS ON YOUR WATER HEATER (Cont.)

To keep both elements working properly it is necessary to drain the water out of the bottom of the tank at least once a year and as much as every three months if your water is very hard.

To drain water out of your water heater follow these steps:

1. Turn off the power.
2. Close both the cold water inlet valve and the hot water outlet valve. Open a hot water faucet somewhere in the house so air can get into the tank.
3. Drain water out of the tank by opening up the drain cock near the bottom on the tank. You can attach a hose or just fill buckets. Let the water run out until it is clear.
4. To refill the tank open the cold water inlet valve and the hot water outlet valve after closing the drain cock. When the water starts flowing out of the open faucet in the house, the tank is full again and you can turn the water heater back on.

ESTIMATING THE COST OF LIGHTING

New energy-efficient, LED light bulbs for partners are installed at no cost. These bulbs will use about 90% less electricity than regular incandescent bulbs. They will reduce your electric bill the most if you use them *where the lights are on the most.*

Lights I Use Most			Replace With			To Reduce My Bill By
Location	Daily Hours On	Watts/ # Bulbs	Type Bulb	Watts/ # Bulbs	Watts Reduced	Monthly Dollars
1.						
2.						
3.						
4.						
					TOTAL	

DOLLARS TO BE SAVED WITH NEW BULBS

	Watts Reduced	x	Daily Hours	x	Days/ Months	x	.001	x	Cost kWh	=	Monthly Savings
1.		x		x		x	.001	x		=	
2.		x		x		x	.001	x		=	
3.		x		x		x	.001	x		=	
4.		x		x		x	.001	x		=	

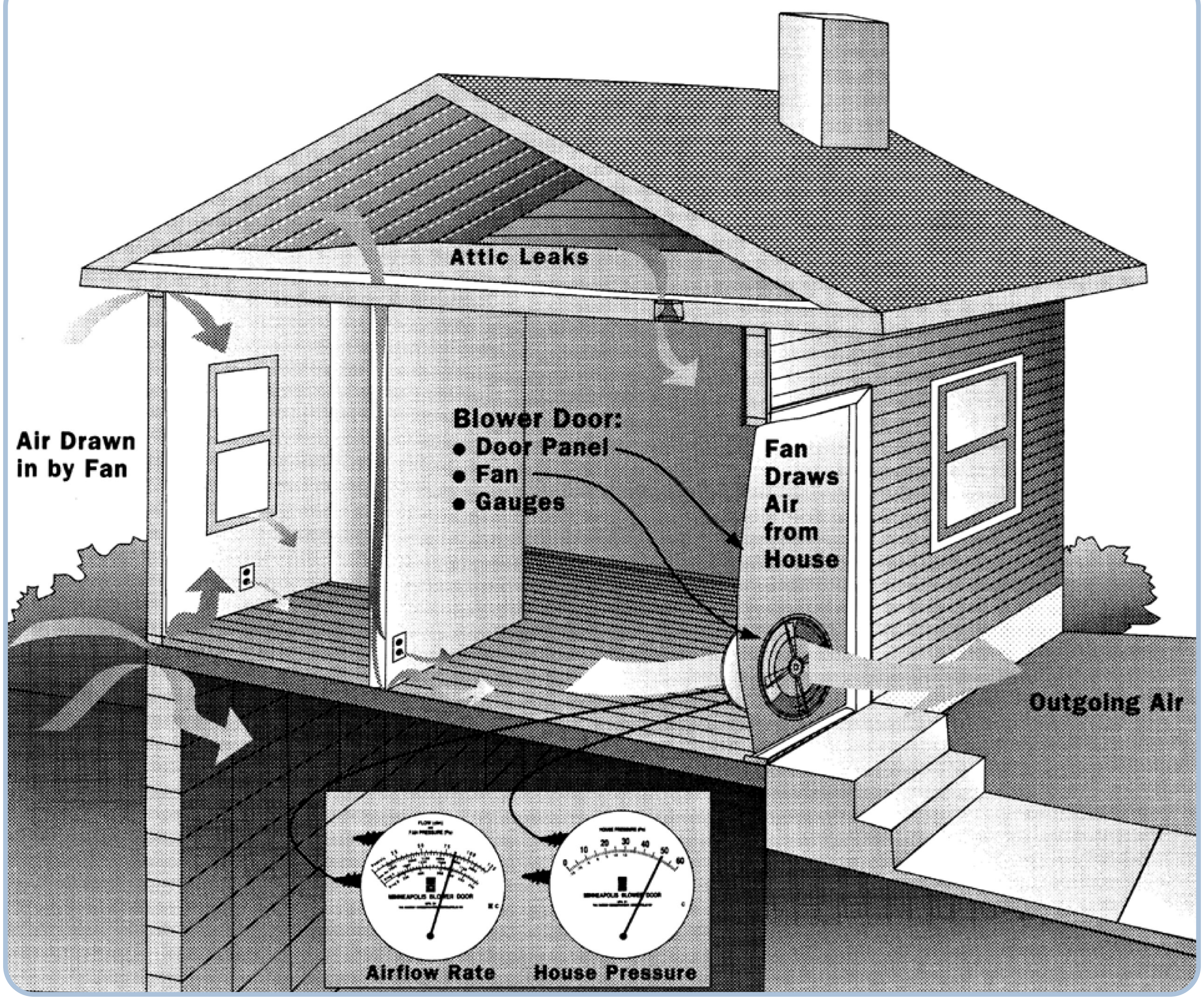
We will reduce the cost of lighting even more by taking the actions checked:

_____ Use task lighting more. _____ Devise a reward system for turning off lights when leaving a room.

_____ Use more natural light. _____ Replace all lights with lower wattage bulbs, fewer bulbs, or energy-efficient bulbs.

Information courtesy of: Rana Belshe & Lydia Gill-Polley

BLOWER DOOR DEPRESSURIZATION TEST



Calculate Leakage from House Pressure and Airflow Rate

New Jersey Comfort Partners

WHOLE HOUSE THINKING

WHOLE SYSTEM THINKING

Houses are complex systems that provide privacy and shelter. We rely on them to keep us safe, secure and comfortable. Whether we pay rent or have a mortgage, we also have to pay for utility and maintenance costs that can be a big part of most household budgets.

In the United States, houses represent an incredible store of physical and embodied material and energy — resources. With only four percent of the 6.2 billion people on the earth, we use the most resources — over one-fourth of the known total according to various experts.

This disproportionate consumption is one of the main reasons our country emits the most greenhouse gases. The buildup of these gases in the buffer zone between Earth and outer space contributes to significant global climate changes. Automobiles and other forms of fossil fuel-powered transportation, as well as our power plants, are the primary sources of carbon dioxide, the most prevalent of these greenhouse gases.

At the same time, we also suffer from the depletion of natural resources and an overload of trash and pollution — circumstances that, at a household level, lead to ever-increasing utility costs for heating fuel, electricity, water, sewage treatment, garbage removal and recycling.

Increasing home comfort, health, safety, durability, affordability and efficiency can have a positive effect on all of these areas.

HOUSEHOLD SYSTEMS

Utility and maintenance expenses vary greatly, even between seemingly identical houses. How much we pay to heat and cool our houses and operate our appliances and lights depends on a complicated series of interactions involving 1) the outdoor climate 2) the flow of heat, air and moisture into, within and out of the building 3) the fuel source and the type, size and efficiency of the heating and cooling equipment 4) the number and type of lights and appliances 5) the habits (or lifestyle) of the occupants.

General Climate — Specific Location

Some of our energy use is highly weather-dependent. In general, the colder the winter and the hotter the summer, the more energy will be used to heat and cool the home. Local conditions — the direction the building faces, how tall it is, whether it is sheltered or exposed to precipitation, winds and sun, whether it is near a large body of water, etc. — can either exaggerate or reduce the effects of general climatic conditions.

Health and Safety First

Environmental illness, including problems related to household environments, is on the rise. It is therefore important to identify existing hazards and refrain from introducing them. Existing conditions can have extremely serious effects. A cracked heat exchanger in a furnace, for example, can release deadly levels of carbon monoxide into the living spaces. Unvented clothes dryers and space heaters also can introduce carbon monoxide. Untrapped waste lines can release other toxic fumes into living spaces. Since any change to the whole house system will have multiple effects, it is important to consider all of them, particularly those that will affect occupant health and safety.

Heat Flow

Heat flows from areas of higher temperature to areas of lower temperature. When the temperature is equal on both sides of a barrier, there is no heat flow through the barrier (conduction). Thermal insulation reduces the rate of conduction. The location of insulation then defines the thermal boundary of the space that is being heated (conditioned). The thermal boundary (or envelope) should be continuous (without voids or gaps) and uniform (consistent in R-value, the relative resistance to heat flow). Insulation also should be used to reduce heat loss from ducts, water pipes and hot water storage tanks.

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Air Movement

Air flows from areas of higher pressure to lower pressure. When there is no pressure difference, there is no airflow even if there is a hole. When there is a pressure difference, there still cannot be airflow unless there is a hole (pathway). Since temperature differences cause pressure differences, buildings typically experience airflow into and out of the living space during heating seasons. There are numerous pathways, often hidden, that cause this type of air movement and, hence, occupant discomfort and excessive heating costs. The wind is another natural force that can cause air to move into and out of a building. A third way is through such mechanical devices as clothes dryers and exhaust fans. By reducing excessive air movement through control of pathways in the exterior building envelope, both occupant discomfort and energy consumption can be reduced.

For insulation to work optimally, air movement through the insulation must be minimized, and conditioned air movement past the insulation should be eliminated. The thermal (insulation) and pressure boundaries of a house then should be aligned and continuous for optimal operation of the building envelope.

In addition, reducing (if not eliminating) air movement from the living space into exterior building cavities can promote building longevity and occupant health since moisture is transported by air movement. When moist air reaches a cold surface, that moisture condenses. This can result in damage to building materials and the growth of molds harmful to humans and pets.

Sealing air leakage pathways, however, also can have the effect of increasing health hazards by trapping indoor pollutants, causing the backdrafting of combustion appliances and increasing moisture levels that can encourage the growth of molds. The solution to this apparent dilemma requires understanding the movement of air in the house being treated and all of the potential interactions between the various subcomponents of the house system. Reducing the air leakage rate of a house need not result in any ill effects, provided that proper precautions are taken. The result can be reduced energy use, increased comfort and a more healthful living environment.

Moisture

The average family can produce more than 25 pounds of water vapor a day through breathing, washing and cooking. This is the rough equivalent of adding three gallons of water a day into the living environment. Unless excess moisture is safely removed, serious problems can occur to both a building and its occupants. Excessive moisture can damage or destroy building components and promote unhealthful living conditions, as well as cause general discomfort.

Managing moisture levels involves the use of one or more of three basic strategies. First, eliminate the sources of excess moisture so far as possible. Fix any leaks, keep lids on pots while cooking and vent clothes dryers directly to the outdoors, for example. Second, isolate moisture as feasible. Place plastic sheeting over dirt floors in cellars and crawl spaces, for example. Third, ventilate when neither elimination nor isolation is appropriate. Use bathroom exhaust fans when showering, for example. Dehumidifiers should be used only as a last resort since they use significant amounts of energy while failing to directly address the root cause of excessive moisture levels.

Mechanical Equipment

The use of mechanical equipment is necessary to make houses functional and comfortable. They also can be excessive consumers of energy, depending on their inherent efficiency and the efficiency of their associated components.

The efficiency of heating equipment is rated in terms of AFUE (annual fuel utilization efficiency) or HSPF (heating season performance factor) in the case of heat pumps. The efficiency of cooling equipment is rated in terms of EER (energy efficiency ratio) in the case of window air conditioners or SEER (seasonal energy efficiency ratio) in the case of central air conditioners or heat pumps. Water heater efficiency is rated in terms of EEF (energy efficiency factor). In each of these rating systems, the higher the rating, the more efficient the equipment.

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WHOLE HOUSE THINKING (Continued)

Mechanical Equipment *(Continued)*

A high efficiency rating does not directly translate into high operating efficiency, however, mechanical equipment typically also relies on various other components to produce the ultimate end service; e.g., conditioned air or hot water.

In the case of furnaces, central air conditioners and heat pumps, the conditioned air must be delivered by a ducted distribution system. To the extent that these ducts have leaks, are uninsulated in unconditioned spaces, or are not properly balanced between supply and return, the efficiency of the mechanical equipment will be compromised, often substantially. Ducted distribution system deficiencies also will affect occupant comfort and the use of other mechanical equipment; e.g., humidifiers.

Hot water and steam systems can have comparable issues with their distribution systems as well.

All systems have controls that can be either less than optimal or operated less than optimally. Lack of understanding can result in operational inefficiencies such as treating thermostats as accelerators instead of the on/off switches that they are, using dirty filters, blocking return grills, maintaining higher water temperatures than necessary and so on.

Lights and Appliances

Only 35% to 45% of the energy used to produce electricity ultimately is available for use at the outlet. The rest has been lost in generation, transmission and distribution. Further, of the energy used in the home, a significant part of it typically can be saved through the use of more efficient lights and appliances. (Compact fluorescents can use up to 75% less energy than their incandescent counterparts while providing comparable light output; an ENERGY STAR® certification provides assurance of a high-efficiency appliance.) Savings also can be achieved through better consumer awareness of where and how energy is used. In addition to reducing utility costs, more efficient electrical energy use can help control greenhouse gas emissions and the need for more generation, transmission and distribution capacity.

Occupants

It is sometimes said that "houses don't use energy, people do." In any case, it is clear that what people do and how they do it can significantly affect the consumption of energy and have important health and safety consequences. How people choose to use energy can be affected by their conceptions of what are significant uses of energy, how energy usage can be reduced without sacrifices in lifestyles or comfort levels, how some reductions in energy use can increase comfort while decreasing health and safety hazards, and so on. A clear understanding of the various energy-related components in a house, and the behavior of its occupants, can help both energy technicians and house occupants alike to fashion site-specific strategies for improving efficiency without jeopardizing comfort or health and safety.

Savings Opportunities

It's safe to say that where there is waste, there is a savings opportunity. The problem is that some savings opportunities cost more to take advantage of than they are worth. Further, waste isn't always easily recognized. Some high users use energy very efficiently and effectively. Some low users use energy very inefficiently and ineffectively. That is why energy technicians must be appropriately skilled, trained and experienced to identify and treat all of the cost-savings opportunities at a given site. The basic principles summarized above, however, should be clear to everyone.

Information courtesy of: Rana Belshe & Lydia Gill-Polley

TAKING ADVANTAGE OF ZONED HEATING FOR COMFORT AND SAVINGS

WHAT IS ZONED HEATING?

The general idea of zoned heating is to keep only as much of a house at comfort-zone temperatures as necessary. This is done by zoning a house into areas that have different occupancy patterns (e.g., sleeping areas versus other spaces) and controlling their temperatures separately. To maintain comfort-zone temperatures in unoccupied areas is to heat unnecessarily and to waste energy and money.

CAN ANY HOUSE HAVE ZONED HEATING?

Unfortunately, only houses heated with electric-resistance elements or by hot-water boilers typically can be permanently zoned since zoning requires having independently controllable portions of the heating system. Each room in a house heated with electric-resistance elements tends to be a unique zone since there typically are individual room controls. Houses heated with hot-water boilers tend to have two zones: the bedrooms and the rest of the house each controlled by its own thermostat. The supply ducts of forced-air systems can be somewhat controlled by closing/opening dampers to do a kind of zoning. Doing so, however, tends to unbalance the system, thereby having other effects that can be negative. An entire house can be effectively zoned between daytime and nighttime, however, by setting back temperatures during sleeping hours.

HOW MUCH CAN BE SAVED BY ZONING?

A general rule used for projecting savings in heating climates is that for every degree the temperature is setback for 8 hours, there will be 1% savings. If half of the house is kept 10 degrees cooler for 8 hours, compared to the rest of the house, the prediction is that there would be 5% savings (10 degrees setback multiplied by 1% savings per degree of setback multiplied by half of the total heating consumption, since only half of the house is affected). This may not seem like much but if the total heating bill is $1,000, that's $50 saved just by turning down the thermostat in rooms that are not occupied anyway.

WON'T THE ENERGY SAVED BE USED TO WARM THINGS BACK UP AGAIN?

In general, the warmer a house is kept during the heating season, the more energy is lost to the outdoors since the greater the temperature difference, the greater the heat loss rate. Reducing the interior temperature then reduces the rate of loss. The energy used by the heating system to raise the temperature back to the comfort zone is not automatically lost since it is being used.

WHY NOT KEEP THE ENTIRE HOUSE COOLER AT NIGHT?

There's no particular reason not to turn down temperatures at night. In addition to saving energy and money, most people find it more comfortable to sleep when temperatures are cooler than comfort zone temperatures during the day. Further, a programmable setback thermostat can raise nighttime temperatures to the comfort zone, automatically, just prior to awakening. By setting back the temperature of the entire house for 8 hours, using the same example of a $1,000 heating bill, would save approximately $100 annually. If a new thermostat must be purchased and installed to allow automatic setback, the cost typically could be recovered in a year or less, assuming setback isn't already being practiced.

Note: Material has been adapted from the material produced for the GPU Warm Program, 12/97
by Rana Belshe & Lydia Gill-Polley

WHAT NEW JERSEY COMFORT PARTNERS THINK OUR CUSTOMERS NEED TO LEARN AND KNOW

- We're here to help you
- Understanding your energy bill
- Rate options (choices) Time-Of-Day/Standard (JCP&L only)
- Costs of choices — running water while shaving, taking a bath versus a shower, washing clothes in hot versus cold water, decreasing thermostat setting at night
- Habits affect personal luxuries/needs; saved dollars could be used for other purposes
- General cost of operating large energy users: refrigerators, hot water heaters, air conditioners, heaters
- New Jersey utilities are serious about saving energy
- New Jersey utilities will work with you to prevent discontinuance of services
- What we have installed, and why, potential benefits, and what they need to do to get maximum savings (for example, change filter on heating unit)
- Health/safety risks and actions they can take
- Big picture, impact of their household on environment/planet
- How to be comfortable without increasing (or with reducing) energy use
- We are partners — New Jersey utilities/customer — in reducing energy: responsibilities, benefits, process

Information courtesy of: Rana Belshe & Lydia Gill-Polley

ANNUAL END-USE CONSUMPTION RANGES

END USE	LOW	MID	HIGH
Electricity	kWh	kWh	kWh
Refrigerator	400	900	1500
Clothes Dryer	500	900	1200
Clothes Washer	500	900	1200
Indoor Lighting	350	900	1200
Air Conditioning	300	500	750
Cooking	300	500	750
Television	200	350	600
Outdoor Lighting	50	250	500
Space Heating Motors	150	250	350
Stereo	100	200	300
Hair Dryer	25	100	200
Vacuum Cleaner	25	50	50
Miscellaneous	100	200	400
SUBTOTALS	3,000	6,000	9,000

Gas	ccf	ccf	ccf
Space Heating	350	500	750
Domestic Hot Water	35	200	365
Clothes Dryer	10	25	50
Cooking	5	25	35
SUBTOTALS	400	750	1,200

New Jersey Comfort Partners

ENERGY COST AND VALUE

ENERGY UNITS OF MEASURE

1 Btu (British thermal unit) = the amount of heat it takes to raise the temperature of one pound of water by 1ºF.

1 Btu = the approximate amount of energy given off by one burning wooden kitchen match.

1 quad = 1 quadrillion Btu
297 quads = world's energy production in 1979*
44 quads = U.S. energy use 1960
79 quads = U.S. energy use 1979
76 quads = U.S. energy use 1986
81 quads = U.S. energy use 1992 (projected)

NATURAL GAS

1CF (cubic foot) = about 1,000 Btu (actual Btu content of natural gas varies slightly)

1CCF = 100 CF
1 therm = 1 CCF = 100 CF = 100,000 Btu
1 MCF = 1,000 CF = 10 CCF

ELECTRICITY

Watt = power produced by the flow of current (amps) and the "push" behind it (volts)

Watts = volts x amps
Kilowatt (kW) = 1,000 watts
Watt-hour (Wh) = energy produced by 1 watt
Kilowatt-hour (kWh) = 1,000 watt-hours
1 kWh = ten 100 watt bulbs burning for 1 hour
1 kWh = 3,412 Btu
1 MW = megawatt = 1 million watts = 100 kilowatts

*Interim Report of the National Energy Strategy, 1990

ENERGY AND THE ENVIRONMENT

Carbon dioxide is the major "greenhouse gas" contributing to global warming. Huge quantities are released when wood, coal, oil or gas are burned for transportation, power, heat or to generate electricity. Other gaseous contributors are: CFCs (chlorofluorocarbons), halons, methane and nitrous oxide. The United States emits more than 20% of the world's greenhouse gases – 14 trillion pounds per year, or about 55,000 pounds for each man, woman and child.

RESIDENTIAL ENERGY USE	AMOUNT (UNITS)	CO_2 FACTOR PER UNIT	TOTAL LBS. OF CO_2 EMITTED PER YEAR
Electricity	kWh	1.5 lbs./kWh	
Natural Gas	therm	11 lbs./therm	
Oil	gal.	22 lbs./gal.	
Propane	gal.	20 lbs./gal.	
Garbage & Paper	lb.	3 lbs./gal.	

ANNUAL U.S. RESIDENTIAL CO_2 EMISSIONS PER CAPITA IN LBS.

Appliances	3,100
Space Heating	3,000
Water Heating	1,200
Air Conditioning	660

Source: *Audobon ACTIVIST*, Jan/Feb 1990

HOT WATER ENERGY UNITS

1 gallon = 8 lbs.

8 Btu/gal. = energy needed to raise temperature of one gallon water 1ºF.

To calculate cost of heating water ($/gal.):

= Delta T x 8 lbs./gal. x $/therm + 100,000 Btu/therm efficiency of gas water heater

= Delta T x 8 lbs./gal. x $kWh = 3,412 Btu/kWh

Delta T = hot water temperature – groundwater temperature

Comparison of Energy Costs per Million Btu (MMBtu) for Various Fuels

FUEL TYPE	Btu/unit	MMBtu/unit	Cost/unit	Cost/MMBtu
ELECTRICITY	3,412 Btu/kWh	293 kWh/MMBtu		
#2 HEATING OIL	139,000 Btu/gal.	7.2 gal./MMBtu		
PROPANE	91,600 Btu/gal.	10.9 gal./MMBtu		
NATURAL GAS	100,000 Btu/therm	10 therms/MMBtu		
WOOD (PINE)	15,000,000 Btu/cord	0.067 cord/MMBtu		

Information courtesy of: Rana Belshe & Lydia Gill-Polley

WHAT AFFECTS APPLIANCE CONSUMPTION

APPLIANCE	EQUIP. EFFICIENCY	NO. OF PEOPLE	USE HABITS	SETTINGS	INSULATION LEVEL	EQUIP. TYPE/SIZE
DHW	X	X	X	X	X	
Refrigerator	X		X	X		X
Freezer	X		X	X		X
Waterbed			X	X	X	
Clothes Dryer		X	X			
Lighting	X		X			
Electric Range		X	X			
Dishwasher	X		X			
Color T.V.			X			X
Microwave			X			
Clothes Washer	X	X	X	X		

A LOOK AT SOME SAVINGS RANGES

Water Heaters – Sat 7%
- Modify use – 100-900
- Repair leaky faucet – 150-900
- Insulate tank – 300-700
- Install energy-efficient showerhead – 300-750
- Reduce temperature – 150-300
- Pipe insulation – 75-100
- Faucet aerator – 75-225

Refrigerators/Freezers – Sat 99%
- Unplug second appliance – 650-1,850
- Replace with new – 700-1,200
- Turn off anti-sweat heater – 200-570
- Raise temperature setting – 200-400 (2.5% savings per degree)
- Clean coils – 36-200
- Relocate appliance – 90-180

Waterbed Heaters – Sat 18.4%
- Turn off heater and insulate between body and bed – 720-2,000
- Replace with heaterless mattress – 720-2,000
- Insulate sides & bottom – 307-632
- Make the bed – 180-740

Clothes Dryers – 30.7%
- Hang clothes to dry – 253-1,281
- Combine small loads – 130-420
- Avoid overdrying – 68-136
- Remove restriction in vent – 227-455

Lighting – Sat 100%
- Replace with compact fluorescents – 180-361
- Don't overlight – 54-108
- Turn off unused lights – 27-126

Range/Ovens – Sat 22.4%
- Cook with lid on – 235-343
- Use proper burner size – 72-217
- Minimize oven preheating – 54-90

Dishwashers – Sat 14.9%
- Don't pre-rinse dishes – 198-415
- Reduce number of loads – 198-415
- Use air-dry option – 90-162

Information courtesy of: Rana Belshe & Lydia Gill-Polley

WEATHERIZATION INFORMATION

- Did you know that two-thirds of all heat pump systems have a major problem? Often these problems date back to their installation. Be sure you know how to troubleshoot heat pumps for your New Jersey Comfort Partners customers with heat pumps.
- Can you tell the difference between an electric furnace and a heat pump air handler? A heat pump has tubing, usually wrapped with insulation, which leads outside to a compressor. It is important to know the difference between the heating systems when you do your energy education. Heat pump thermostats should be usually "set and let."
- Sometimes, it is hard to tell the difference between a heat pump and an electric furnace with central air conditioning. A heat pump will have four to ten wires going to the outside compressor and an air conditioner will have two. Sometimes, the thermostat will give you clues. If there is a light indicating when the auxiliary heat or emergency heat is on, you are dealing with a heat pump and not a furnace/air conditioner combination.
- Baseboard heaters draw about 250 watts per running foot. Therefore, a four-foot-long baseboard heater draws about 1000 watts, or one kW. One thousand watts used for one hour is one kWh. For an RT customer, one kWh costs 4.538 cents during offpeak hours and 11.69 cents during on-peak hours. For an RS customer, one kWh costs 7.458 cents all the time.
- A leak of one drop of hot water per second equals one-half cup per minute, which equals almost 2,000 gallons of wasted hot water per year. This wasted water cost almost $300 to heat with electricity (averaging all rates), and more if there is a water pump. Fixing hot water leaks is always cost effective.
- One kWh runs one 1,500 watt portable space heater for 40 minutes.
- The first thing your auditors should do on a job is look at the usage printout. **How much** electricity does this family use? Get an idea **how** this family is using electricity. Ask the customer what they have that uses electricity and how they use these items.
- Be sure to ask your customers where they think their energy problems are. You can learn a lot from the customers. They know where they are feeling drafts and which rooms are hard to heat. Do their pipes freeze?
- A low-number blower door test does not mean that the home should not be weatherized. A low blower door test indicates how much air infiltrates into the home from the outside. It alone does not tell you where the pressure and thermal boundaries are in that home. You need to do investigative work. Insulation, unless densely packed or rigid-foamed in place, is not air sealing and should be done in homes with low blower door readings.
- One of the most critical areas to seal is around the perimeter of the basement or crawl ceiling where the underfloor, floor joists and the rim joist or header (band joist) join. Also, be sure to check the sill plate. Keeping cold basement air out of the living space is a priority measure.
- For your RT customers, be sure you are programming water heater timers correctly. During Daylight Savings Time, the customers should change their habits to use electricity after 9 p.m. and before 9 a.m.; however, your timer clock and programs must be according to Eastern Standard Time, or one hour earlier than Daylight Savings Time.

Continued next page

WEATHERIZATION INFORMATION (Continued)

- When installing water heater timers, ask the customer what his/her hot water use patterns are. Set the timers so that they are on the minimum hours possible. This usually requires two turn-on and two turn-off times. Be sure to set the weekend programs, too. Try to avoid letting the heater turn on during on-peak hours.
- Sealing attic and basements and other leaks are your first priority measures. Do these things before you insulate underfloors.
  - Dense packed cellulose weighs four pounds per cubic foot.
  - The R value of ceramic block is R-1. This is the same for a single pane of glass.
  - The average goal for weatherization programs is to get a house to use no more than about 15 Btu per square foot per degree day.
  - One Btu equals 3,412 kWh.
  - To change a behavior, a person has to do it the new way at least 25 times.
  - A furnace fan uses about 200 kWh per month.
  - A computer uses about 1 kWh per day.
  - When a refrigerator is in its defrost cycle, the temperature can go as high as 60 degrees in the freezer.
  - Automatic ice makers in refrigerators heat the trays so the ice will fall out. It does this even if the ice maker isn't hooked up to make ice. The heaters use up to 700 kWh per year.
  - Fifty percent of low-income folks use their ovens to heat at some time during the winter. Keep this in mind when analyzing their bills.
  - Utilities can use 12-year payback for any insulation work, refrigerators, new heating systems and new water heaters for their weatherization programs.
  - If a customer's fossil fuel heater is broken and they use electric heaters, they can be treated as an electric heat customer.
  - A one-degree heat setback for eight hours equals 1% savings.
- The best savings happen on a job if this combination exists:
  - the thermostat is set back as many hours as possible
  - the thermostat is set back as much as possible
  - the thermal envelope is poor
  - the climate is cold

Continued next page

WEATHERIZATION INFORMATION (Continued)

- Ninety percent of the energy used by an incandescent light bulb goes to heat, not light. Having one 100-watt bulb on puts out 90 watts of heat. A few bulbs on at the same time can heat a room as much as a space heater. Turning off lights keeps rooms cooler and saves energy.
- To figure the cost of using an appliance: (Watts x .001) x (rate/kWh) x hours used per month.
- Many dishwashers have energy-saving wash cycles that use less water. Using these cycles saves $5 to $15 a year. Also, not using the heated-dry cycle will result in 15% to 50% energy savings. If the dishwasher is an older model without the dry feature, the door can be opened for air-drying.
- A room cooled to 75 degrees with an air conditioner costs 18% more than a room cooled to 78 degrees.
- For every dollar's worth of electricity used by appliances and lighting (an additional four hours or more), it takes less energy to re-cool than it does to keep cool as long as the air conditioner is off (or way up) for those four hours or more.
- For every cubic foot of air that goes out of a house, one must come in. The opposite is also true. Therefore, if the heat or air conditioner is on, exhaust fans should be used as little as possible to remove moisture and pollutants.

Approximate depth needed for R-38

loosefill fiberglass	17 inches
loosefill cellulose	10 inches
loosefill rockwool	13 inches
loosefill perlite	15 inches
loosefill vermiculite	14 inches
batts fiberglass	12 inches
high density fiberglass batts	10 inches
batts rockwool	10 inches
urethane foam	6 inches
polyisocyanurate	5 inches

Information courtesy of: Tamasin Sterner

New Jersey Comfort Partners

CONSUMER EDUCATION – ENGLISH & SPANISH

(See Figure 1 on following page)

Key to Figure 1.

1. chimney – *chimenea*
2. incandescent bulb – *bombillo incandescente*
3. insulation – *aislamiento*
4. attic access door – *entrada de desván*
5. air-to-air heat exchanger – *unidad recuperadora de calor*
6. storm window – *ventana de tormenta*
7. skylight – *ventana de cielo*
8. exhaust fan – *ventilador*
9. shutters – *persianas*
10. baseboard heater – *calentamiento eléctrico*
11. grille – *reja*
12. faucet – *espita*
13. low-flow showerheads – *rociadores especiales para las duchas*
14. washing machine – *lavaropa*
15. dryer – *secadora de ropa*
16. bed – *cama*
17. room air conditioner – *aire acondicionado para habitación*
18. window – *ventana*
19. space heater – *calentador de ambiente*
20. outlet – *enchufe*
21. compact fluorescent – *luz fluorescente*
22. thermostat – *termostato*
23. coils – *resortes*
24. return air register – *escapa de ventilador*
25. fluorescent – *luz fluorescente*
26. freezer – *congelador*
27. refrigerator – *refrigerador*
28. dishwasher – *lavaplatos*
29. range hood – *huméro de estufa*
30. stove – *estufa*
31. ceiling fan – *ventilador de techo*
32. blinds – *sombrías de ventana*
33. curtains – *cortinas*
34. cat – *gato*
35. lamp – *lampara*
36. fireplace – *chimenea*
37. television – *televisión*
38. porch light – *luz de porche*
39. energy auditor – *inspector de energía*
40. clipboard – *tableta*
41. step ladder – *escala*
42. water heater – *calentador de agua*
43. pipes – *pipas*
44. insulation blanket – *cubierta de aislamiento*
45. supply air ducts – *conductos de aire provisión*
46. return air ducts – *conductos de aire volver*
47. furnace – *calentamiento de gas/de eléctrico*
48. supply air register – *ventilador de aire*
49. fuse box – *caja de fusibles*
50. electric meter – *metro contador*

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Additional Glossary

basement – *sótano*
bedroom – *dormitorio*
bill – *cuenta*
boiler – *boilér*
caulking – *masilla*
Coefficient of Performance – *Coeficiente de Rendimiento*
crawlspace – *entrada para desván (attic); espacio angosto (basement)*
demand water heater – *calentador de agua rapido*
den – *etudio*
doorsweep – *umbral*
double-pane window – *ventana de vidriado doble*
electricity – *electricidad*
Energy Efficiency Ratio – *Promedio de Rendimiento de Energia*
energy conservation – *conservación de energía*
energy-saving (adj.) – *que ahorra energía*
evaporative cooler – *enfriador por evaporación*
filters – *filtros*
flow restrictors – *reguladores de salidas de aire o de agua*
foam sealant – *esponjas*
fuel – *combustible*
gas – *gas*
hall – *pasillo*
heat-pump water heater – *unidad del calentador de agua*
heat pump – *unidad de calefacción*
heat recovery unit – *unidad recuperadora de calor*
heater – *calentador*
hot and cold water – *agua caliente y frío*
insulation – *aislamiento*
  cellulose – *celulosa*
  fiberglass – *fibra de vidrio*
  rock wool – *lana de roca*
kilowatt-hour meter – *contador de kilovatios-horas*
kilowatt-hour – *kilovatio-hora*
kitchen – *cocina*
living room – *sala*
mobile home – *casa móvil*
off-peak period – *período de menor demanda*
oil – *aceite*
on-peak period – *período de mayor demanda*
oven – *horno*
R-value – *clasificación de aislamiento*
radiator – *radiador*
rates – *tarifas*
roof – *techo*
shutters – *persianas*
single-pane window – *ventana de vidriado singular*
solar collector – *colector solar*
solar water heater – *calentador de agua solar*
temperature setting – *graduación de temperatura*
TOU (time-of-use) – *horario de consumo*
utility room – *lavadora*
vent – *respiradero*
wall-outlet insulation gasket – *juntas de aislamiento en los tomacorrientes*
waterbed – *cama de agua*
weatherstripping – *cintas termicas para evitar perdidas de energía*
window fan – *ventilador de ventana*

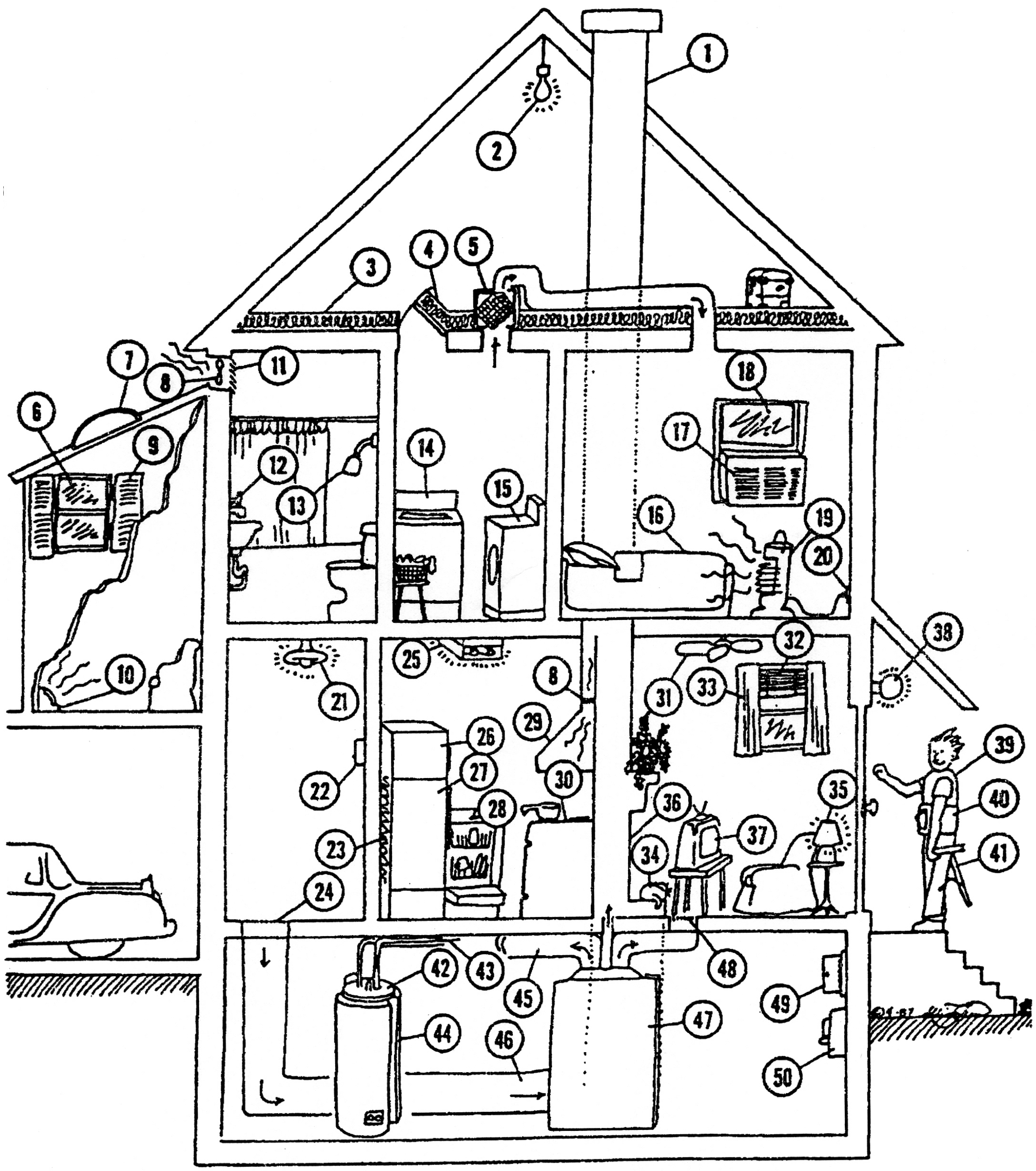

Figure 1. *The Bilingual House.* The above figure shows a cross-section of a house with a variety of energy-related devices. The key on the preceding page matches the English and Spanish terms. In addition, we have provided a glossary of terms that do not appear in the figure. We invite our readers to send us any suggested changes or alternate translations.