CHUGACH

POWERING ALASKA'S FUTURE

ENERGY GUIDE

Hours

Member Service lobby:
5601 Electron Drive
Monday - Friday
8 a.m. - 6 p.m.

Member Service phone:
Monday - Friday
8 a.m. - 9 p.m.

Main office:
Monday - Friday
8 a.m. - 5 p.m.

Chugach Electric Association, Inc.
5601 Electron Drive
P.O. Box 196300
Anchorage, Alaska 99519-6300

www.chugachelectric.com

CONTACT US

Main Number	563-7494
Toll Free	(800) 478-7494
Customer Service	563-7366
Customer Service fax	762-4678
Business and Commercial	762-7876
Credit and Collections	563-5060
Power Theft hotline	762-4731
Danger Tree hotline	762-7227
Regulatory Commission of Alaska	(800) 390-2782
	or 276-6222

TO REPORT A POWER OUTAGE

In Anchorage	762-7888
Outside Anchorage	(800) 478-7494

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About **Chugach**

CORPORATE MISSION
Through superior service, safely provide reliable and competitively priced energy

CORPORATE VISION
Powering Alaska's future

INCORPORATION
Chugach Electric Association was incorporated in Alaska March 1, 1948, with funding under the Rural Electrification Act of 1936 as amended. In 1991, Chugach refinanced and paid off its federal debt, leaving the REA program. Chugach remains a cooperative and ranks among the largest of the nearly 900 electric cooperatives in the nation.

As a cooperative, Chugach is owned and governed by the members it serves. Directors on the board are elected by the membership, so they have a vested interest in the operation of the cooperative.

CHUGACH SNAPSHOT
Chugach provides retail service to more than 50 percent of homes and businesses in the Municipality of Anchorage, and wholesale and economy energy services to other utilities throughout Alaska's Railbelt region from Fairbanks to Homer.

Your electric **account**

Chugach provides you choices to make your life easier. For example, you can choose when it's most convenient to get information on your account, how you want to receive your bill and how you want to pay your bill.

BILLING AND USAGE INFORMATION

Use Chugach's automated phone system or look up 24 months of usage and account information on the Chugach Web site at www.chugachelectric.com. You can access the information with your account number together with your personal identification number (PIN) or the last four digits of the account holder's social security number. You may request a PIN by contacting Customer Service.

- **PAYING YOUR BILL**
  You have 25 days from the billing date listed on your statement to make current payments. There are several convenient ways to pay: by mail, in person, over the phone or via Internet. Current payments can be made at any branch of First National Bank of Alaska or by signing up for our *AutoPay* programs. The account services section of this booklet show the options available.

- **QUESTIONS ABOUT YOUR BILL**
  If you believe your bill is incorrect, notify the Customer Service Center in person, by phone, via e-mail or by mail. Include the reason why you feel your bill is incorrect. Your question will be investigated and you will have an opportunity to meet in person, if you wish, to discuss your bill in further detail. If you are not satisfied with the resolution of your inquiry, you may contact the Regulatory Commission of Alaska, 701 W. 8th Avenue, Suite 300, Anchorage, AK 99501; (907) 276-6222 or (800) 390-2782, or fax: (907) 276-0160; TTY/TDD (907) 276-4533 or website: www.state.ak.us/rea/.

  Even if you have provided notification that you do not agree with your bill, the undisputed portion of the bill is still due by the date shown on the bill while your request is being reviewed. Chugach reserves the right to terminate service for non-payment of the undisputed portion of the bill.

- **LATE PAYMENTS**
  Late fees are charged on balances unpaid by the due date. A bill not paid in full within 55 days of the billing date is delinquent and the service may be disconnected. We will attempt to contact you prior to disconnection.

- **PAYMENT ARRANGEMENTS**
  If you have a financial hardship and cannot pay your bill by the due date or need payment arrangements, please contact the Credit & Collections department at (907) 563-5060.

- **ADDITIONAL HELP IN PAYING YOUR BILL**
  There are also community organizations and resources that can help if you need further assistance to prevent the disconnection of your service. You may call either of the agencies below or contact Credit & Collections for an additional list.

  Consumer Credit Counseling Service of Alaska
  208 E. 4th Avenue, Anchorage, AK 99501
  (907) 279-6501

  State of Alaska
  Dept. of Health & Social Services
  Heating Assistance Program - DPA
  400 W. Willoughby #301, Juneau, AK 99801
  Anchorage: (907) 269-5777 All other areas: (888) 8047-6330

ACCOUNT SERVICES

- **AUTOPAY** - Sit back, relax and pay your Chugach bill automatically from your checking account.

- **NETPAY** - Receive and pay your bill online and save time, paper and stamps. Instead of receiving a paper statement, you'll be notified via e-mail when to log on and review your bill. Then pay securely online. For true convenience combine NetPay for online billing and AutoPay for automatic payments.

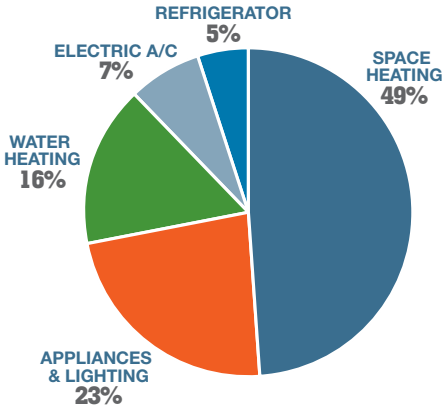
- **PREPAY** - Prepay your annual Chugach bill based on your 12-month average use and you'll save $25 and the expense of making monthly payments.

- **LEVELPAY** - With *LevelPay* you pay the same amount every month, so even when your electric use rises, your monthly bills won't. Payments are based on your average annual use. It's a great way to reduce the pressure on your budget every winter. Enrollment is open during March and April every year.

- **SUMMARY BILLING** - Designed for members with two or more meters, you'll receive all your Chugach electric bills at one time with a billing summary so you can pay with one check. You'll also continue to receive your individual billing statements for record keeping purposes.

Your home energy **use**

Did you know that the typical U.S. family spends close to $1,500 a year on home utility bills? Unfortunately, a large portion of that energy is wasted. The good news is, there is a lot you can do to save energy and money at home. Energy-efficient improvements not only make your home more comfortable, they can yield long-term financial rewards. Reduced utility bills more than make up for the higher price of energy-efficient appliances and improvements over their lifetimes. In addition, your home could bring in a higher price when you sell. By making a few small changes, you can reduce your energy costs by 10 to 50 percent.



HOW WE USE ENERGY IN OUR HOMES

Heating accounts for the biggest chunk of a typical utility bill

The first step to begin saving energy and money is to find out which parts of your house use the most energy. A home energy audit will pinpoint those areas and suggest the most effective measures for cutting your energy costs. You can conduct a simple home energy audit yourself or you can call an independent energy auditor for a more comprehensive examination. To assist our members with their energy analysis needs, Chugach has located online do-it-yourself energy audits from ENERGY STAR®, a government-backed program helping businesses and individuals protect the environment through superior energy efficiency at www.energystar.gov. Another great on-line resource is www.energysavers.gov.

ENERGY AUDITING TIPS

- Check the insulation levels in your attic, exterior and basement walls, ceilings, floors and crawl spaces
- Check for holes or cracks around your walls, ceilings, windows, doors, light and plumbing fixtures, switches and electrical outlets that can leak air into or out of your home
- Check for open fireplace damperss
- Make sure your appliances and heating and cooling systems are properly maintained. Check your owner's manuals for the recommended maintenance.
- Study your family's lighting needs and use patterns, paying special attention to high-use areas such as the living room, kitchen and outside lighting. Look for ways to use lighting controls — like occupancy sensors, dimmers or timers — to reduce lighting energy use, and replace standard (also called incandescent) light bulbs and fixtures with compact or standard fluorescent lamps.

Energy saving **tips**

IN THE KITCHEN:

- Use open air drying for dishwasher
- Use your dishwasher only for full loads and use the shortest cycle
- Keep your refrigerator and freezer filled
- Adjust refrigerator settings to 37 - 40 degrees Fahrenheit and freezer settings to 0 - 5 degrees Fahrenheit
- Clean refrigerator coils twice a year, more often if you have pets
- Allow foods to partially cool before placing them in the refrigerator
- Install your dishwasher away from your refrigerator
- Use small appliances such as a bake oven or toaster whenever possible
- Thaw out frozen foods before cooking
- Cook more than one dish at a time
- Turn off electric range two-to-three minutes before the end of cooking time
- Use portable appliances for specialized cooking tasks
- Don't preheat the oven
- Use the self-cleaning oven feature only when really necessary
- Defrost refrigerators and freezers before ice buildup becomes 1/4-inch thick
- When buying new appliances, select energy-efficient models
- When washing dishes manually, don't let the hot water run continuously

IN THE LAUNDRY ROOM:

- Wash full loads only, but don't overload
- Wash and rinse in cold or warm water
- Select the correct drying time
- Remove clothes from the dryer as soon as tumbling stops
- Fold clothes and press the wrinkles out by placing them on the warm top of the dryer
- Dry consecutive loads
- Partially line dry bulky and heavy items
- Clean the lint filter after each load

HOT WATER USE:

- Replace electric water heater with a natural gas water heater
- Set water temperature at 125 degrees Fahrenheit
- Insulate hot water pipes
- Fix leaky or dripping hot water faucets
- Install low flow shower heads
- A five-minute shower requires less hot water than a bath
- Wrap your water heater with a water heater blanket

HEATING AND COOLING:

- Weatherproof your house to minimize air leaks around doors and windows
- Block off any chimneys not in use
- Set the furnace thermostat at 68 degrees Fahrenheit
- Clean or replace furnace filters regularly
- When going on vacation, shut off or turn down your furnace
- In winter, open shades to allow additional heat from sun
- In summer, close shades to block heat from sun

- Install an automatic setback thermostat to lower temperature to 60 degrees Fahrenheit at night and when no one is home
- Insulation is important in keeping your home warm in winter and cool in summer
- Place thermostats on interior walls and away from doors, windows or heat-generating appliances

LIGHTING:

- Long-life incandescent bulbs are less efficient than standard incandescent bulbs
- Replace incandescent bulbs with compact fluorescent bulbs where possible
- Turn off lights in parts of the house not in use
- Clean light fixtures; dirt reduces light output
- For outdoor lights, install a photoelectric cell or motion sensor that will turn lights on and off automatically
- Use “task lights” to provide light where you need it
- Light colored rooms require less light
- Use natural daylight; one 3-foot by 5-foot window lets in more light than 100 standard 60-watt bulbs

HOT TUB AND SPA:

- When not in use, keep covered with a tight-fitting insulated lid
- Insulate thoroughly around the sides and bottom of the unit
- Set temperature no higher than 102 degrees Fahrenheit
- Reduce the number of hours you filter to 1/2 - 1 per day
- Have filter pump checked by a qualified maintenance company each year
- When not in use, turn off the aerator (the device that adds bubbles)

IN THE WINTER:

- Use timers for car engine heaters, automatically turning on heater approximately two hours before car use
- For holiday lighting, install a timer that will turn lights on and off automatically

What does it **cost?**

In order to calculate the energy cost of an electrical device, you must first find out some general information. Most items, such as a motor, heater, appliance or electronic component will have a tag that indicating wattage, voltage, horsepower or amperage. Once you find this information, the rest is simple mathematics. To calculate how much it costs to run a specific item for one hour, just plug the information into the formula below.

$$\textbf{Cost per hour} = \frac{\textbf{watts x cost per kWh}}{\textbf{1,000}}$$

Example: If the current cost per kWh is $0.13, calculate the cost for a 6000 watt hot tub with the below-listed formula:

$$\frac{\textbf{6000 x 0.13 = \$0.78}}{\textbf{1,000}}$$

It would cost 78 cents per hour to run the hot tub

If wattage information for your electrical device is not shown, it can be calculated with the following formula:

Watts = volts x amps

Example: A hot tub that runs on 230-volt power and draws 26 amps would use 5,980 watts (230 x 26 = 5,980). Once you have figured the watts you can calculate the cost per hour.

Motor capacities are sometimes specified using horsepower (h.p.). In this case, you would calculate wattage by multiplying the horsepower by 746 (2 h.p. x 746 = 1,492 watts). You can now calculate the cost per hour.

ITEM	AVERAGE WATTAGE	AVERAGE MONTHLY KWH USAGE
Ceiling Fan	60	1-20
Clock	2	1-4
Clothes Dryer	4200-5600	60-300
Clothes Washer	500	3-16
Coffee Maker	200-1200	4-27
Computer (Monitor & Printer)	100-400	5-75
Deep Fryer	1500	8-15
Dishwasher	1300	20-102
Electric Blanket	180	5-16
Electric Heater (portable)	1500	540
Engine Heater (1-4 hrs/day)	500-1500	30-150
Fan (portable)	115	2-6
Freezer	350-500	40-200
Furnace Fan Motors		
Winter Month	250-1400	90-375
Continuous Circulation	250-1400	180-930
Hair Dryer	750-1500	1-20
Heating Pad	60	1
Hot Tub/Spa (summer)	6000	125-350
Hot Tub/Spa (outdoor winter)	6000	750-1500
Humidifier (portable)	100	8-54
Iron	1000	1-10
Microwave Oven	500-1700	5-30
Range	1250-4000	50-80
Refrigerator	350-720	75-212
Sewing Machine	75	1-4
Slow Cooker	200	3-12
Stereo	30-300	4-50
Television	145-240	5-35
Toaster	1150	1-4
Toaster Oven	1250	2-15
VCR/DVD Player	40	1-8
Vacuum, Central	1600	4-10
Vacuum, Portable	800	2-5
Video Games	30	1-4
Water Bed Heater	150-400	70-200
Water Heater		
Typical use, 2 person	3800	250-350
Typical use, 4 person	3800	375-525

Appliances

Appliances account for about 20 percent of your household's energy consumption, with refrigerators, clothes washers and clothes dryers topping of the consumption list.

When shopping for appliances, think of two price tags. The first one covers the purchase price — think of it as a down payment. The second price tag is the cost of operating the appliance during its lifetime. You'll be paying on that second price tag every month with your utility bill for the next 10 to 20 years, depending on the appliance. Refrigerators last an average of 20 years; room air conditioners and dishwashers, about 10 years each; clothes washers, about 14 years.

ENERGY-EFFICIENT FEATURES TO LOOK FOR WHEN PURCHASING NEW APPLIANCES

OVENS:

- Self-cleaning models are more efficient because they have more insulation
- Convection ovens are more energy-efficient because heated air is continuously circulated around the food being cooked. More even heat distribution and temperatures mean faster cooking times.
- If you are a cook who likes to peek in the oven, buy a model with a window

DISHWASHERS:

- Buy a dishwasher with a water booster heater as this will allow you to maintain a lower water heater temperature
- Energy-saving wash cycles, such as "light wash" or "light/china," saves energy by using less water and running shorter cycles

- A “no-heat” dry option will save energy by allowing you to air-dry, instead of using an electric heater to dry
- Energy Guide ratings for dishwashers can be misleading. The rating is based on operating the dishwasher through 322 cycles annually, on the “normal” setting. Your energy use could vary substantially, depending on how often you run your dishwasher. This is especially true if you are considering a model with other wash cycle options. Also, be aware that there are two categories of dishwashers – compact and standard capacities. Compact models use less energy but they also hold fewer dishes.

WASHING MACHINES:

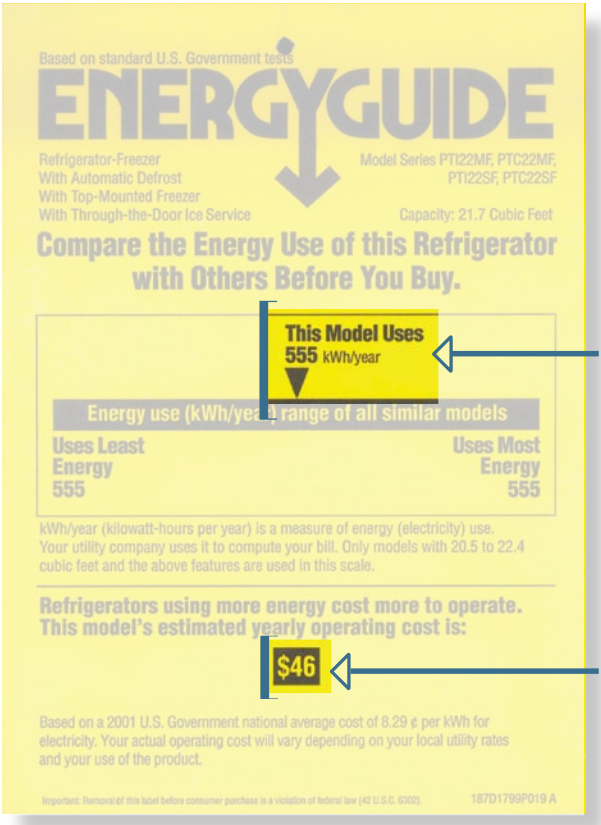
- Choose a washer that offers a wide range of water temperature controls for wash and rinse cycles. Options to control the length of a wash cycle have little impact on energy consumption.
- Choose a machine that allows you to select lower water levels when doing smaller loads. Some models have advanced electronic controls that automatically adjust water levels according to the size of the load.
- A front-load washer uses one-third less water than a top-loading machine. Consumer Reports and other studies show better overall washing performance with a front-load machine. Front-load washers have no agitator so you can fit large items and clothes won’t wear out as fast. Finally, since front-loaders use less water, you need less detergent.
- The Energy Guide label will help you compare energy efficiency by comparing annual operating costs. But be sure not to compare apples to oranges. Smaller capacity washers have better energy-efficiency ratings, but smaller capacity may mean that you have to run the machine more often, and it may cost you more to operate.

REFRIGERATORS AND FREEZERS:

- Consider what style and features you want in the new refrigerator and what the energy consequences might be. Side-by-side refrigerators use more energy than the standard models with freezers on the top. Bottom freezer models are slightly more efficient than top freezer models. Manual defrost models use less electricity than automatic defrost models, but beware, manual defrost models must be defrosted periodically to maintain their efficiency.
- Also consider size when shopping for a refrigerator. Larger units use more electricity and take up more space. Currently, the most efficient models are in the most popular 16-20 cubic-foot range. Models that are equipped with ice makers and water dispensers will have a higher energy use.

ENERGY GUIDE LABEL:

One of the easiest ways to determine and compare the operating or energy cost of different models is to use the Energy Guide label. The federal government requires that all appliances (not just energy-efficient models) display this yellow and black label. This label identifies the type of appliance, make and model number, and estimated annual energy cost based on average electric rates and use. It also compares the model to others having the highest and lowest energy costs and contains a table showing average costs for different electric rates.



Estimated energy consumption on a scale showing a range for similar models

Estimated yearly operating cost based on the national average cost of electricity

EVERYDAY ENERGY SAVING TIPS FOR APPLIANCES

DISHWASHER TIPS:

- Check the manual that came with your dishwasher for the manufacturer's recommendations on water temperature; many have internal heating elements that allow you to set the water heater in your home to a lower temperature (120 degrees Fahrenheit)
- Scrape, don't rinse, off large food pieces and bones. Soaking or prewashing is generally only recommended in cases of burned-on or dried-on food.
- Be sure your dishwasher is full, but not overloaded, when you run it
- Don't use the "rinse hold" on your machine for just a few soiled dishes. It uses 3 to 7 gallons of hot water each time you use it
- Let your dishes air dry; if you don't have an automatic air-dry switch, turn off the control knob after the final rinse and prop the door open a little so the dishes will dry faster

$ LONG-TERM SAVINGS TIP: When shopping for a new dishwasher, look for the ENERGY STAR® to find a dishwasher that uses less water and 25 percent less energy than required by federal standards

REFRIGERATOR TIPS:

- Look for a refrigerator with automatic moisture control. Models with this feature have been engineered to prevent moisture accumulation on the cabinet exterior without the addition of a heater. This is not the same thing as an "anti-sweat" heater. Models with an anti-sweat heater will consume 5 to 10 percent more energy than models without this feature.
- Don't keep your refrigerator or freezer too cold. Recommended temperatures are 37 to 40 degrees Fahrenheit for the fresh food compartment of the refrigerator and 5

degrees Fahrenheit for the freezer section. If you have a separate freezer for long-term storage, it should be kept at zero degrees.

- To check refrigerator temperature, place an appliance thermometer in a glass of water in the center of the refrigerator. Read it after 24 hours. To check the freezer temperature, place a thermometer between frozen packages. Read it after 24 hours.
- Regularly defrost manual-defrost refrigerators and freezers; frost buildup decreases the energy efficiency of the unit
- Make sure your refrigerator door seals are airtight. Test them by closing the door over a piece of paper or a dollar bill so it is half in and half out of the refrigerator. If you can pull the paper or bill out easily, the latch may need adjustment, the seal may need replacing or you might consider buying a new unit.
- Cover liquids and wrap foods stored in the refrigerator. Uncovered foods release moisture and make the compressor work harder.
- Move your refrigerator out from the wall and vacuum its condenser coils once a year, unless you have a no-clean condenser model. Your refrigerator will use less energy with clean coils.

$ LONG-TERM SAVINGS TIP: Look for the ENERGY STAR® when buying a new refrigerator. Select a new refrigerator that is the right size for your household. Top freezer models are more energy efficient than side-by-side models. Features like ice makers and water dispensers, while convenient, will increase energy use.

LAUNDRY TIPS:

- Wash your clothes in cold water using cold-water detergents whenever possible
- Wash and dry full loads. If you are washing a small load, use the appropriate water-level setting

- Dry towels and heavier cottons in a separate load from lighter-weight clothes
- Don't over-dry your clothes. If your machine has a moisture sensor, use it.
- Clean the lint filter in the dryer after every load to improve air circulation
- Use the cool-down cycle to allow the clothes to finish drying with the residual heat in the dryer
- Periodically inspect your dryer vent to ensure it is not blocked. This will save energy and may prevent a fire. Manufacturers recommend using rigid venting material, not plastic vents that may collapse and cause blockages.
- Consider air drying clothes on clothes lines or drying racks. Air drying is recommended by clothing manufacturers for some fabrics.

$ LONG-TERM SAVINGS TIP: Look for the ENERGY STAR® and Energy Guide labels. ENERGY STAR® clothes washers clean clothes using 50 percent less energy than standard washers. Most full-sized ENERGY STAR® washers use 18-25 gallons of water per load, compared to the 40 gallons used by a standard machine. ENERGY STAR® models also spin the clothes better, resulting in less drying time.

$ LONG-TERM SAVINGS TIP: When shopping for a new clothes dryer, look for one with a moisture sensor that automatically shuts off the machine when your clothes are dry. Not only will this save energy, it will save wear and tear on your clothes caused by over-drying. Keep in mind that natural gas dryers are less expensive to operate than electric dryers.

$ LONG-TERM SAVINGS TIP: The cost of drying a typical load of laundry in an electric dryer is 30 to 40 cents, compared with 15 to 25 cents in a natural gas dryer. ENERGY STAR® does not label clothes dryers because most of them use similar amounts of energy, which means there is little difference in energy use between models.

Carbon monoxide **detector**

Carbon monoxide (CO) has been estimated to claim the lives of ten thousand Americans each year. Many of these fatalities can easily be prevented through the use of relatively inexpensive and easy-to-install carbon monoxide detectors. These devices look and function much like smoke detectors but contain special sensors that detect excessive levels of carbon monoxide, rather than smoke. The Occupational Safety and Health Administration (OSHA) has established guidelines that indicate continuous exposure to carbon monoxide levels of 50-parts-per-million should not be exceeded in an eight-hour period.

Carbon monoxide is a colorless, odorless and tasteless gas that can be highly toxic. Individuals exposed to excessive levels of carbon monoxide can literally be poisoned without knowing. Carbon monoxide is the number one cause of fatal poisonings each year in the U.S. Carbon monoxide is produced when fossil fuels containing carbon (coal, wood, oil or gas) are burned without sufficient oxygen to allow for complete combustion. As carbon monoxide enters the body through the lungs, it inhibits the ability of the blood stream to carry oxygen throughout the body.

Exposure to low concentrations of carbon monoxide can cause headaches, fatigue, shortness of breath and chest pains in persons with heart disease. Higher concentrations can result in severe headaches, dizziness, disorientation, and various flu-like symptoms which mysteriously disappear when away from the home or source of exposure. Extreme levels of exposure can result in coma, convulsions, cardio-respiratory failure and death.

SOME COMMON SOURCES OF POTENTIAL CO EXPOSURE

- Non-vented kerosene and gas space heaters
- Leaking chimneys, down-drafts from wood stoves and fireplaces
- Faulty furnaces
- Poorly ventilated gas appliances
- Car exhaust from attached garages
- Tobacco smoke

WHAT TO DO IF CO DETECTOR ALARMS

If the alarm goes off, shut off appliances or other sources of combustion at once. Immediately get fresh air into the premises by opening doors and windows. Call a qualified technician and have the problem fixed before restarting appliances. If anyone is experiencing symptoms of carbon monoxide poisoning: headaches, dizziness, vomiting, call the fire department and immediately move to a location that has fresh air. Do a head count to be sure all persons are accounted for. Do not re-enter the premises until it has been aired out and the problem corrected.

CARBON MONOXIDE TIPS:

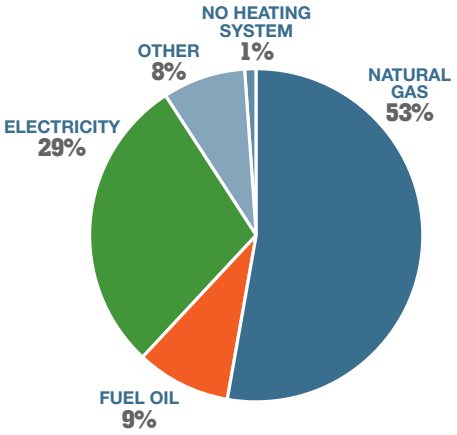
The following precautions can help minimize the risk of CO exposure:

- Have furnaces inspected, cleaned and tuned up annually (be sure to check flues and chimney areas for potential leaks)
- Be sure fireplace dampers are open before lighting a fire and leave the damper open until the ashes cool (smoldering ashes can actually produce more CO than a fully-burning fire)
- Choose properly designed and sized wood stoves that are certified as meeting EPA's emissions standards
- Make sure all gas appliances are properly vented
- Make sure gas flames and pilot lights are blue. Yellow or orange-tipped flames indicate that the gas is not burning properly and the equipment may need to be adjusted (by a qualified professional).
- Do not start or idle automobiles with the garage door closed
- Ventilate areas where people smoke to avoid CO buildup and minimize the risk of exposure to children
- Install CO detectors in key areas throughout the home — rooms near a garage, rooms with space heaters, hallways, living and sleeping areas: CO detectors should not be installed in garages, kitchens or furnace areas, as the initial combustion of starting a car, or turning on a stove or furnace, may trigger the alarm needlessly.

Following these simple guidelines can help keep you and your family from becoming unnecessary victims. More information on CO detectors can be obtained from your local fire department or local or federal government agencies.

Heating and **cooling**

Heating and cooling your home uses more energy and drains more energy dollars than any other system. Typically, 56 percent of your utility bill goes for heating and cooling. What's more, heating and cooling systems in the U.S. together emit more than a half-billion tons of carbon dioxide into the atmosphere each year, adding to global warming. They also generate about 24 percent of the nation's sulfur dioxide and 12 percent of the nitrogen oxides, the chief ingredients in acid rain.



HOUSEHOLD HEATING SYSTEMS

Although several different types of fuels are available to heat our homes, more than half of us use natural gas

No matter what kind of heating, ventilation and air-conditioning system you have in your house, you can save money and increase your comfort by properly maintaining and upgrading your equipment. But remember, an energy-efficient furnace alone will not have as great an impact on your energy bills as using the whole-house approach. By combining proper equipment maintenance and upgrades with appropriate insulation, air-sealing, and thermostat settings, you can cut your energy bills and your pollution output in half.

HEATING AND COOLING TIPS

- Set your thermostat as low as is comfortable in the winter and as high as is comfortable in the summer
- Clean or replace filters on furnaces once a month or as needed
- Clean warm-air registers, baseboard heaters and radiators as needed; make sure they're not blocked by furniture, carpeting, or drapes

- Bleed trapped air from hot-water radiators once or twice a season; if in doubt about how to perform this task, call a professional
- Place heat-resistant radiator reflectors between exterior walls and the radiators
- Turn off kitchen, bath and other exhaust fans within 20 minutes after you are done cooking or bathing. When replacing exhaust fans, consider installing high-efficiency, low-noise models.
- During the heating season, keep the draperies and shades on your south-facing windows open during the day to allow the sunlight to enter your home and closed at night to reduce the chill you may feel from cold windows
- During the cooling season, keep the window coverings closed during the day to prevent solar gain

$ LONG-TERM SAVINGS TIP: Select energy-efficient products when you buy new heating and cooling equipment. Your contractor should be able to give you energy fact sheets for different types, models and designs to help you compare energy usage. For furnaces, look for high Annual Fuel Utilization Efficiency (AFUE) ratings. The national minimum is 78 percent AFUE but there are ENERGY STAR® models on the market that exceeding 90 percent AFUE.

DUCTS

One of the most important systems in your home, though it's hidden beneath your feet and over your head, may be wasting a lot of your energy dollars. Your home's duct system, a branching network of tubes in the walls, floors and ceilings, carries the air from your home's furnace and central air conditioner to each room. Ducts are made of sheet metal, fiber glass or other materials.

Unfortunately, many duct systems are poorly insulated or not insulated properly. Ducts that leak heated air into unheated spaces can add hundreds of dollars a year to your heating and cooling bills. Insulating ducts that are in unconditioned spaces is usually very cost effective. If you are buying a new duct system, consider one that comes installed with insulation.

Sealing your ducts to prevent leaks is even more important if the ducts are located in an unconditioned area such as an attic or vented crawl space. If the supply ducts are leaking, heated or cooled air can be forced out unsealed joints and lost. In addition, unconditioned air can be drawn into return ducts through unsealed joints. In the summer, hot attic air can be drawn in, increasing the load on the air conditioner. In the winter, your furnace will have to work longer to keep your house comfortable. Either way, your energy losses cost you money.

Although minor duct repairs are easy to do, ducts in unconditioned spaces should be sealed and insulated by qualified professionals using the appropriate sealing materials. Here are a few simple tips to help with minor duct repairs.

DUCT TIPS:

- Check your ducts for air leaks. First, look for sections that should be joined but have separated and then look for obvious holes.
- If you use tape to seal your ducts, avoid cloth-backed, rubber adhesive duct tape, which tends to fail quickly. Researchers recommend other products to seal ducts: mastic, butyl tape, foil tape or other heat-approved tapes. Look for tape with the Underwriters Laboratories logo.
- Remember that insulating ducts in the basement will make the basement colder. If both the ducts and the basement walls are uninsulated, consider insulating both.*
- If your basement has been converted to a living area, hire a professional to install both supply and return registers in the basement rooms
- Be sure a well-sealed vapor barrier exists on the outside of the insulation on cooling ducts to prevent moisture buildup
- When doing duct work, be sure to get professional help. Changes and repairs to a duct system should always be performed by a qualified professional.
- Ducts that don't work properly can create serious, life-threatening carbon monoxide (CO) problems in the home.

Install a CO monitor to alert you to harmful CO levels if you have a fuel-burning furnace, stove or other appliance or an attached garage.

- For new construction, consider placing ducts in conditioned space — space that is heated and cooled — instead of running ducts through unconditioned areas like the crawlspace or attic, which is less efficient.

$ LONG-TERM SAVINGS TIP: You can lose up to 60 percent of your heated air before it reaches the register if your ducts aren't insulated and they travel through unheated spaces such as the attic or crawlspace. Get a qualified professional to help you insulate and repair ducts.

** Note: Water pipes and drains in unconditioned spaces could freeze and burst in the space if heat ducts are fully insulated, because there would be no heat source to prevent the space from freezing in cold weather. However, using an electric heating tape wrap on the pipes can prevent this.*

SOLAR HEATING AND COOLING

Using passive solar design techniques to heat and cool your home can be both environmentally friendly and cost-effective. Passive solar heating techniques include placing larger, insulated windows on south-facing walls and locating thermal mass, such as a concrete slab floor or a heat-absorbing wall, close to the windows. In many cases, you can cut your heating costs by more than 50 percent compared with the cost of heating the same house that does not include passive solar design.

Passive solar design can also help reduce your cooling costs. Passive solar cooling techniques include carefully designed overhangs, windows with reflective coatings, and the use of reflective coatings on exterior walls and the roof.

A passive solar house requires careful design and site orientation which depend on the local climate. If you are considering passive solar design for new construction or a major remodeling, you should consult an architect familiar with passive solar techniques.

SOLAR TIPS:

- Keep all south-facing glass clean
- Make sure that objects do not block the sunlight shining on concrete slab floors or heat-absorbing walls

FIREPLACES

When you cozy up next to a crackling fire on a cold winter day, you probably don't realize that your fireplace is one of the most inefficient heat sources you can possibly use. It literally sends your energy dollars right up the chimney along with volumes of warm air. A roaring fire can exhaust as much as 24,000 cubic feet of air per hour to the outside which must be replaced by cold air coming into the house from the outside. Your heating system must warm up this air which is then exhausted through your chimney. If you use your conventional fireplace while your central heating system is on, these tips can help reduce energy losses.

FIREPLACE TIPS:

- If you never use your fireplace, plug and seal the chimney flue
- Keep your fireplace damper closed unless a fire is going. Keeping the damper open is like keeping a window wide open during the winter; it allows warm air to go right up the chimney.
- When you use the fireplace, reduce heat loss by opening dampers in the bottom of the firebox (if provided) or open the nearest window slightly — approximately 1 inch — and close doors leading into the room. Lower the thermostat setting to between 50 and 55 degrees Fahrenheit.
- Install tempered glass doors and a heat-air exchange system that blows warmed air back into the room
- Check the seal on the flue damper and make it as snug as possible
- Add caulking around the fireplace hearth
- Use grates made of C-shaped metal tubes to draw cool room air into the fireplace and circulate warm air back into the room

NATURAL GAS AND OIL HEATING SYSTEMS

If you plan to buy a new heating system, ask your local utility or state energy office for information about the latest technologies available to consumers. They can advise you about more efficient systems on the market today. For example, many newer models incorporate designs for burners and heat exchangers that result in higher efficiencies during operation and reduce heat loss when the equipment is off. Consider a sealed combustion furnace; they are both safer and more efficient.

$ LONG-TERM SAVINGS TIP: Install a new energy-efficient furnace to save money over the long term. Look for the ENERGY STAR® and Energy Guide labels.

INSTALL A CARBON MONOXIDE DETECTOR

Carbon monoxide (CO) detectors are highly recommended in homes with fuel-burning appliances, such as natural gas furnaces, stoves, ovens, water heaters and fuel burning space heaters. An alarm signals homeowners if CO reaches potentially dangerous levels.

PROGRAMMABLE THERMOSTATS

You can save as much as 10 percent a year on your heating and cooling bills by simply turning your thermostat back 10 to 15 percent for 8 hours. You can do this automatically without sacrificing comfort by installing an automatic setback or programmable thermostat.

Using a programmable thermostat, times may be adjusted by turning on the heating or air-conditioning according to a pre-set schedule. As a result, the equipment doesn't operate as much while your sleeping or when the house, or part of the house, is unoccupied. Programmable thermostats can store and repeat multiple daily settings (six or more temperature settings) that you can manually override without affecting the rest of the daily or weekly program. When shopping for a programmable thermostat, be sure to look for the ENERGY STAR®.

HOT WINTER TIP

Using a programmable thermostat, you can automatically turn down your heat at night or when you are not at home

COOL SUMMER TIP

In the summer, you can save money by automatically turning your air-conditioning up at night or when you are at work

Holiday **lighting**

Many home owners love to decorate during the holidays with strings of lights. Most people currently use standard incandescent C7 lights or mini-lights. Two energy-efficient alternatives to consider are LED lights and fiber optic trees. As more lighting is used and as energy rates climb, consumers find decorating with lights costly.

HOW MUCH DO THEY COST?

Lighting is important, especially when many in the Anchorage area participate in the City of Lights program to help provide a cheerful environment during those dark days of winter. Lighting costs vary depending on the type of lights and how long they are lit, as shown in the graph. Using luminescent diodes (LEDs) and timers and turning lights off during the daylight hours will help reduce costs and conserve electricity.

LED LIGHTS

Light Emitting Diode (LED) holiday lights are a new application. Each year manufacturers have improved the choices, producing bigger and brighter bulbs and new color options. LED lights have a number of benefits over conventional lighting:

- **ENERGY-EFFICIENT** - 0.08 watts per LED C7 multi-color bulb (compared with 0.48 watts for an incandescent mini-light and 6.0 watts for a standard incandescent C7 bulb)
- **LONG LIFE-SPAN** - up to 100,000 hours or more used indoors, half that outdoors, and some manufacturers provide limited lifetime warranty
- **SAFETY** - no chance of combustion since the bulbs are cool to the touch, regardless of how long they are left on
- **STURDY BULBS** - the epoxy lenses are virtually indestructible

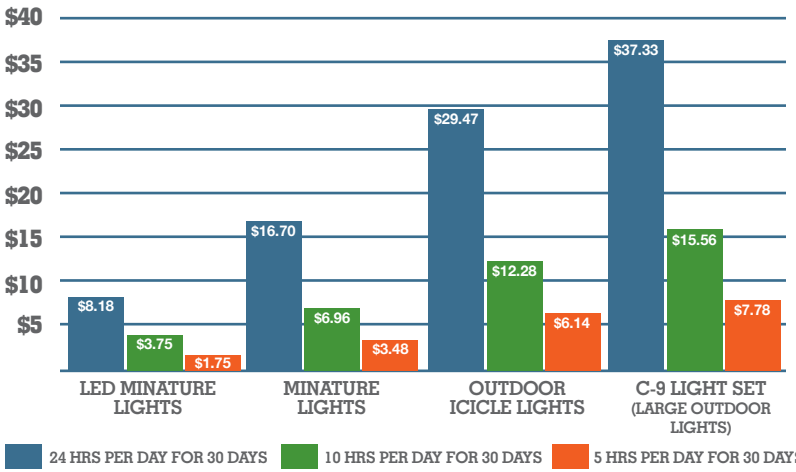
HOLIDAY LIGHTING TIPS:

Holiday lights add a festive quality to your neighborhood and your home; however, if used incorrectly they can present a safety hazard.

- Make sure any light set you purchase has been approved for the right use, indoor use, outdoor use or both and is marked with the UL label
- Do not overload electrical circuits. Circuits in older homes carry a maximum of 15 amps or 1,800 watts each. Circuits in most new homes can carry 20 amps or 2,400 watts each.
- Before you decorate, check light sets for frayed wires, damaged sockets or cracked insulation. If you find defects, replace the entire set.
- Use timers to reliably turn off lights during daylight hours and other times when lighting not needed

ESTIMATED CHRISTMAS LIGHT USAGE COSTS

(FIVE STRINGS OF LIGHTS USING RESIDENTIAL RATES)



Insulation and sealing **leaks**

Checking your home's insulation is one of the fastest and most cost-efficient ways to reduce energy waste and make the most of your energy dollars. A good insulating system includes a combination of products and construction techniques that protect a home from outside temperatures — hot and cold, protect it against air leaks and control moisture. You can increase the comfort of your home while reducing your heating and cooling needs up to 30 percent by investing just a few hundred dollars in proper insulation and sealing air leaks.

SHOULD I INSULATE MY HOME?

The answer is probably "yes" if you:

- Have an older home and haven't added insulation. Only 20 percent of homes built before 1980 are well insulated.
- Are uncomfortably cold in the winter or hot in the summer — adding insulation creates a more uniform temperature and increases comfort
- Build a new home, addition or install new siding or roofing
- Pay high energy bills
- Are bothered by noise from outside — insulation muffles sound

Heat always flows from warm areas to cooler ones. For instance, in Alaska in the winter, the heat from your home is trying to move to the outdoors. In warmer climates, heat from the outdoors is trying to move into an air-conditioned home. Although any of the principles of insulation apply to both situations, this book will focus on reducing heat loss. This process can only be slowed down by something that will resist this movement.

Air is a very poor conductor of heat, which is why it is a good resistor. When air pockets are trapped inside insulation or between panes of glass they retard the flow of heat. Therefore, it's not the substance itself (glass fiber, cellulose, rock wool or foam, for instance) that slows heat loss, but the trapped pockets of air that are in or between these materials.

INSULATION

R-VALUE

R-value tells you how well a material resists heat flow. Resistance (R) to heat flow is measured by how many hours it takes one BTU (British Thermal Unit) to go through one-square foot of a material experiencing a one-degree temperature difference. The higher the R-value, the greater the resistance.

R-values vary with different types of materials. Therefore, how well insulation performs is more accurately measured by its R-value than by inches or thickness.

WHERE TO INSULATE
Adding insulation in the areas shown above may be the best way to improve your home's energy efficiency

Although insulation can be made from a variety of materials, it usually comes in four types; each type has different characteristics.

ROLLS AND BATTS or blankets — are flexible products made from mineral fibers, such as fiberglass and rock wool. They are available in widths suited to standard spacings of wall studs and attic or floor joists: 2x4 walls can hold R-13 or R-15 batts; 2x6 walls can have R-19 and R-21 products.

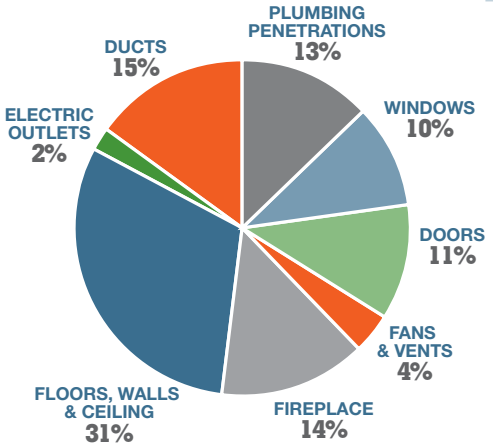
- **Loose-fill insulation**—usually made of fiberglass, rock wool or cellulose — comes in shreds, granules or nodules. These small particles should be blown into spaces using special pneumatic equipment. The blown-in material conforms readily to building cavities and attics. Therefore, loose-fill insulation is well suited for places where it is difficult to install other types of insulation.

- **Rigid foam insulation** — foam insulation typically is more expensive than fiber insulation. But it's very effective in buildings with space limitations and where higher R-values are needed. Foam insulation R-values range from R-4 to R6.5 per inch of thickness (2.53 cm), which is up to two times greater than most other insulating materials of the same thickness.
- **Foam-in-place insulation** — can be blown into walls and reduces air leakage.

WHERE TO INSULATE

Insulation should be installed in areas that separate heated spaces from unheated spaces. That includes all exterior walls, attics, floors over unheated areas, heated basement walls and overhangs. Other areas that should not be overlooked include; exterior walls between levels in a split-level home, rim joist area, knee walls next to heated attics, walls next to unheated garages, storage rooms and utility rooms, dormer and cantilever walls and ceilings; and floors over vented crawl spaces.

The insulation should completely surround your home, with the only openings being doors, windows and vents.



HOW DOES THE AIR ESCAPE?

Air infiltrates into and out of your home through every hole, nook and cranny. About one-third of this air infiltrates through openings in your ceilings, walls and floors.

SEALING AIR LEAKS

Warm air leaking into your home during the summer and out of your home during

the winter can waste a lot of your energy dollars. One of the quickest dollar-saving tasks you can do is caulk, seal, and weatherstrip all seams, cracks and opening to the outside. You can save 10 percent or more on your energy bill by reducing the air leaks in your home.

TIPS FOR SEALING AIR LEAKS:

- Test your home for air tightness. On a windy day, hold a lit incense stick next to your windows, doors, electrical boxes, plumbing fixtures, electrical outlets, ceiling fixtures, attic hatches and other locations where there is a possible air path to the outside. If the smoke stream travels horizontally, you have located an air leak that may need caulking, sealing or weatherstripping.
- Caulk and weatherstrip doors and windows that leak air
- Caulk and seal air leaks where plumbing, ducting or electrical wiring penetrates through exterior walls, floors, ceilings and soffits over cabinets
- Install rubber gaskets behind outlet and switch plates on exterior walls
- Look for dirty spots in your insulation, which often indicates

SOURCES OF AIR LEAKS IN YOUR HOME

Areas that leak air into and out of your home cost you lots of money. Check the areas listed below.

1. Dropped ceiling
2. Recessed light
3. Attic entrance
4. Sill plates
5. Water and furnace flues
6. All ducts
7. Door frames
8. Chimney flashing
9. Window frames
10. Electrical outlets and switches
11. Plumbing and utility access

holes where air leaks into and out of your house. You can seal the holes by stapling sheets of plastic over the holes and caulking the edges of the plastic.

- Install storm windows over single-pane windows or replace them with double-pane windows
- When the fireplace is not in use, keep the flue damper tightly closed. A chimney is designed specifically for smoke to escape, so until you close it, warm air escapes — 24-hours a day!
- For new construction, reduce exterior wall leaks by either installing house wrap, taping the joints of exterior sheathing, or comprehensively caulking and sealing the exterior walls

Lighting

Making improvements to your lighting is one of the fastest ways to cut your energy bills. An average household dedicates 5 to 10 percent of its energy budget to lighting. Using new lighting technologies can reduce lighting energy use in your home by 50 to 75 percent. Advances in lighting controls offer further energy savings by reducing the amount of time lights are on but not being used.

INDOOR LIGHTING

Use tube fluorescent and energy efficient compact fluorescent lights (CFLs) in fixtures throughout your home to provide high-quality and high-efficiency lighting. Fluorescent lamps are much more efficient than incandescent (standard) bulbs and last about 4 to 10 times longer.

INCANDESCENT WATTS	CFL WATTAGE RANGE	LUMEN RANGE
60	13-18	890
75	18-22	1210
100	23-28	1750
150	30-38	2780

INCANDESCENT

Incandescent bulbs provide an excellent bright light for safety, security and decoration. They are inexpensive but generally use three to four times more electricity than other bulbs. Incandescent only last 750 to 3,000 hours.

COMPACT FLUORESCENT

Today's CFLs offer brightness and color rendition that is comparable to incandescent lights. Although fluorescent and compact fluorescent lamps cost a bit more than incandescent bulbs, they pay for themselves by saving energy over their lifetime.

CFL fixtures are now available that feature dimmers and operate much like incandescent fixtures. They screw into the same socket as an incandescent bulb but may not fit some covered fixtures due to the ballast in the base of the bulb. These bulbs have an average life of about 10,000 hours. However, very cold weather may keep them from lighting up. CFLs in outside fixtures work best if the fixture is completely covered. The cover retains heat the fluorescent needs to attain full brightness in cold weather.

WHEN TO TURN OFF STANDARD FLUORESCENT FIXTURES

It is a myth that it costs more to turn off fluorescent lights than to leave them on. This was true in the 1940s when fluorescent lamps first became popular because it greatly shortened lamp life. Today's lamps aren't as affected by start-up damage. Their lives are shortened by unneeded hours of operation. The energy surge to start up the lamps is so small, it's cheaper to switch them off.

WHAT CAN I SAVE?

CFL savings depend on how many hours per day the incandescent light bulb that you replaced was used. The examples below give you a better idea of what your savings might look like. Of course, your savings will vary if the incandescent light bulb that you replace was used more or less than the hours listed in the chart on the next page.

INDOOR LIGHTING TIPS:

- Turn off the lights in any room you're not using, or consider installing timers, photo cells or occupancy sensors to reduce the amount of time your lights are on
- Use task lighting: instead of brightly lighting an entire room, focus the light where you need it. For example, use fluorescent under cabinet lighting for kitchen sinks and counter tops.
- Consider three-way lamps; they make it easier to keep lighting levels low when brighter light is not necessary

BULB TYPE	100W INCANDESCENT	23W COMPACT FLUORESCENT
Purchase Price	75¢	$11. 00
Life of Bulb	750 hours	10,000 hours
Number of Hours Burned per Day	4 hours	4 hours
Number of Bulbs Needed	About 6 over 3 years	1 over 6.8 years
Total Cost of Bulbs	$4. 50	$11.00
Lumens	1,690	1,500
Total Cost of Electricity (10 cents/kilowatt-hour)	$45. 38	$10.44
Your Total Cost over 3 years	$49. 88	$21.44
Total Savings over three years with the Compact Fluorescent		**$28. 44**

- Use 4-foot fluorescent fixtures with reflective backing and electronic ballasts for your workroom, garage and laundry areas
- Consider using 4-watt mini fluorescent or electro-luminescent night lights. Both lights are much more efficient than their incandescent counterparts. The luminescent lights are cool to the touch.
- Use CFLs in all the portable table and floor lamps in your home. Consider carefully the size and fit of these systems when you select them. Some home fixtures may not accommodate some of the larger CFLs.

SAVE ENERGY AND MORE

Halogen lamps generate excessive heat that can create fire hazards. Use compact fluorescent lights in your torchieres or better yet, buy a torchiere designed for compact fluorescent bulbs.

- Take advantage of daylight by using light-colored, loose-weave curtains on your windows to allow daylight to penetrate the room while preserving privacy. Also, decorate with lighter colors that reflect daylight.
- If you have torchiere fixtures with halogen lamps, consider replacing them with compact fluorescent torchieres. Compact fluorescent torchieres use 60 to 80 percent less energy, can produce more light (lumens) and do not get as hot as the halogen torchieres. Halogen torchieres are a fire risk because of the high temperature of the halogen bulb.
- Look for the ENERGY STAR® label when purchasing these products

OUTDOOR LIGHTING TIPS:

- Use outdoor lights with a photocell unit or a motion sensor so they will turn on only at night or when someone is present. A combined photocell and motion sensor will increase your energy savings.
- Exterior lighting is one of the best places to use CFLs because of their long life. Living in a cold climate, be sure to buy a lamp with a cold weather ballast since standard CFLs may not work well below 40 degrees.
- Consider high-density discharge (also call HID) or low-pressure sodium lights

Right tree, right **place**

Planting trees and shrubs can provide energy savings in addition to enhancing the beauty and value of your home.

Planting evergreens can create a winter windbreak for your home and planting trees which lose their leaves in the fall can provide shade in the summer while allowing the sun to shine through on short Alaska winter days.

However, if you are thinking of planting, choose the appropriate tree or shrub to minimize conflicts between trees and utility lines. And remember, planting in a utility easement can make it difficult for Chugach or other utilities to gain access and to maintain their facilities. The result could mean your landscaping might need to be moved or trimmed.

Before digging and planting where there are underground facilities, call the Alaska Digline at 278-3121. They will coordinate locations for buried utility facilities, including Chugach's electric lines, at no charge.

Chugach is certified by the National Arbor Day Foundation as a Tree Line USA utility. Chugach has a certified arborist on staff who is available to help customers determine what type of plants and trees should be planted near utility rights of way. For more information, call Chugach at 762-7660.

Here are a few tips on how to properly plant your new tree once you have selected the right one for a safe and conflict-free location:

- Remove vegetation and loosen the soil. The site should be a saucer-shaped area at least three times the diameter of the root ball but only as deep as the height of the root ball.
- Slope and roughen the sides of the site
- Do not remove the container or burlap until you are ready to plant the tree because it will help to keep the root system moist
- Remove all twine and tags from the trunk. When ready to plant, remove or cut away the container, wire basket or burlap from the root ball. Separate and spread the roots.

- Set the tree in the prepared site. The trunk flare or collar (just above the point where the roots begin to branch) must be above ground level. Planting too deeply can kill the tree.
- Use soil from the planting site as backfill (remove large rocks and loosen the compacted soil)
- Soak the planting site thoroughly. Apply composted mulch 2 to 4 inches deep around the tree but at least 6 inches away from the trunk. Do not fertilize until the following spring.

VEGITATION PLANTING ZONES
FOR POWERLINES

ZONE 1

(within 10 horizontal ft. of pole)

Grasses, annuals and non-woody perennials are recommended

ZONE 2

(10 to 20 horizontal ft. from pole)

Plant trees such as:
Juniper
Red Twig Dogwood
Lilacs
Spirea
Nanking Cherry

ZONE 3

(20 horizontal ft. or more from pole)

Plant trees such as:
Chokecherry
Birch
Scots Pine

Water **heating**

Water heating is the third largest energy expense in your home. It typically accounts for about 16 percent of your utility bill. There are four ways to cut your water heating bills: use less hot water, turn down the thermostat on your water heater, insulate your water heater or buy a new, more efficient water heater. A family of four, each showering for five minutes a day, uses 700 gallons of water a week; this is enough for a three-year supply of drinking water for one person. You can cut that amount in half simply by using low-flow aerating shower heads and faucets.

KEEP YOUR ENERGY BILLS OUT OF HOT WATER

Insulate your water heater to save energy and money

WATER HEATING TIPS:

- Install aerating, low-flow faucets and shower heads
- Repair leaky faucets promptly; a leaky faucet wastes gallons of water in a short period of time
- Lower the thermostat on your water heater; water heaters sometimes come from the factory with high temperature settings but a setting of 120 degrees Fahrenheit provides comfortable hot water for most uses
- Take more showers than baths. Bathing uses the most hot water in the average household. You use 15-25 gallons of hot water for a bath but less than 10 gallons during a five-minute shower.
- Insulate your electric hot-water storage tank but be careful not to cover the thermostat. Follow the manufacturer's recommendations.
- Insulate your natural gas or oil hot-water storage tank, but be careful not to cover the water heater's top, bottom, thermostat or burner compartment. Follow the manufacturer's recommendations; when in doubt, get professional help.
- Insulate the first 6 feet of the hot and cold water pipes connected to the water heater

- If you are in the market for a new dishwasher or clothes washer, consider buying an efficient, water-saving model to reduce hot water use. See Appliances for more information.
- Install heat traps on the hot and cold pipes at the water heater to prevent heat loss. Some new water heaters have built-in heat traps.
- Drain a quart of water from your water tank every three months to remove sediment that impedes heat transfer and lowers the efficiency of your heater. The type of water tank you have determines the steps to take, so follow the manufacturer's advice.
- Although most water heaters last 10-15 years, it's best to start shopping for a new one if yours is more than seven years old. Doing some research before your heater fails will enable you to select one that most appropriately meets your needs.

$ LONG-TERM SAVINGS TIP: Buy a new energy-efficient water heater. While it may cost more initially than a standard water heater, the energy savings will continue during the lifetime of the appliance. If your current water heater is electric, consider switching to a natural gas water heater if gas is available. Look for the Energy Guide label. The American Council for an Energy-Efficient Economy lists the energy performance of the most energy-efficient water heaters on its Web site.

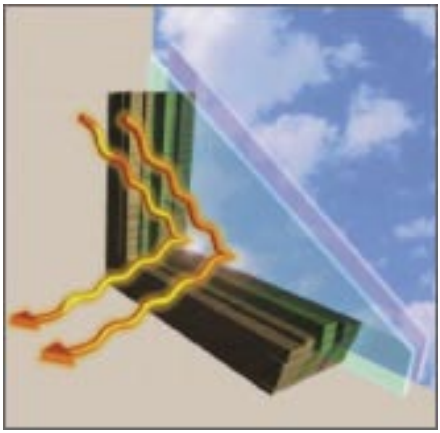
$ LONG-TERM SAVINGS TIP: Consider installing a drain water waste heat recovery system. A recent DOE study showed energy savings of 25 percent to about 30 percent for water heating using such a system.

$ LONG-TERM SAVINGS TIP: Consider demand or tankless water heaters. Researchers have found savings can be as much as 34 percent compared with a standard electric storage tank water heater.

$ LONG-TERM SAVINGS TIP: Heat pump water heaters are very economical in some areas.

Windows

Windows can be one of your home's most attractive features. Windows provide views, daylighting, ventilation and solar heating in the winter. Unfortunately, they can also account for 10 to 25 percent of your heating bill. During the summer, sunny windows make your air conditioner work two to three times harder.



COLD CLIMATE WINDOWS KEEP HEAT IN

Double-pane windows with low-e coating on the glass reflect heat back into the room during the winter months

If your home has single-pane windows, as almost half of U.S. homes do, consider replacing them. New double-pane windows with high-performance glass (e.g., low-e or spectrally selective) are available on the market. In colder climates, select windows that are gas-filled with low emissivity (low-e) coatings on the glass to reduce heat loss. In warmer climates, select windows with spectrally selective coatings to reduce heat gain. If you are building a new home, you can offset some of the cost of installing more efficient windows because doing so allows you to buy smaller, less expensive heating and cooling equipment.

R-value ratings are also used for different types of windows, again measuring a material's ability to resist the flow of heat. Some windows and doors are rated by U-value. U-value is the opposite of R-value. While R-value measures a material's ability to resist the flow of heat, U-value measure the ability to conduct heat.

For instance, a single-pane glazed window has an approximate R-value of 0.85, while a double-pane glazed window has a value

of 1.5 - 2.0, a low-e double-pane glazed window has a 2.4 - 3.0 rating and a low-e double-pane glazed window using an argon gas fill has a 2.7 - 3.6 R-value.

If you decide not to replace your windows, less costly measures listed below can improve their performance.

COLD-CLIMATE WINDOW TIPS:

- You can use a heavy-duty, clear plastic sheet on a frame or tape clear plastic film to the inside of your window frames during the cold winter months. Remember, the plastic must be sealed tightly to the frame to help reduce infiltration.
- Install tight-fitting, insulating window shades on windows that feel drafty after weatherizing
- Close your curtains and shades at night; open them during the day
- Keep windows on the south side of your house clean to let in the winter sun
- Install exterior or interior storm windows; storm windows can reduce heat loss through the windows by 25 to 50 percent. Storm windows should have weatherstripping at all moveable joints, be made of strong, durable materials and have interlocking or overlapping joints. Low-e storm windows save even more energy.
- Repair and weatherize your current storm windows, if necessary

WARM-CLIMATE WINDOW TIPS:

- Install white window shades, drapes or blinds to reflect heat away from the house
- Close curtains on south and west facing windows during the day
- Install awnings on south and west facing windows
- Apply sun-control or other reflective films on south-facing windows to reduce solar gain

$ LONG-TERM SAVINGS TIP: Installing new, high-performance windows will improve your home's energy performance. While it may take many years for new windows to pay off in energy savings, the benefits of added comfort and improved aesthetics and functionality may make the investment worth it to you. Today, many new window technologies are available that are worth considering. Glazing materials (the glass part of the window) now come with a variety of selective coatings and other features and frames are available in aluminum, wood, vinyl, fiber glass or combinations of these materials. Each type of glazing material and frame has advantages and disadvantages.

SHOPPING TIPS FOR WINDOWS

- When you're shopping for new windows, look for the National Fenestration Rating Council label; it means the window's performance is certified
- Remember, the lower the U-value, the better the insulation. In colder climates, a U-value of 0.35 or below is recommended. These windows have at least double glazing and a low-e coating.
- In warm climates, where summertime heat gain is the main concern, look for windows with double glazing and spectrally selective coatings that reduce heat gain
- Select windows with air leakage ratings of 0.3 cubic feet per minute or less

WARM CLIMATE WINDOWS KEEP HEAT OUT

In the summertime, the sun shining through your windows heats up the room. Windows with spectrally selective coatings on the glass reflect some of the sunlight, keeping your rooms cooler.

- In temperate climates with both heating and cooling seasons, select windows with both low U-values and low solar heat gain coefficiency (SHGC) to maximize energy benefits
- Remember that new windows must be installed correctly to avoid air leaks around the frame. Look for a reputable, qualified installer.
- Look for the ENERGY STAR® and Energy Guide labels

More energy saving **resources:**

U.S. DEPARTMENT OF ENERGY:
www.eere.energy.gov/consumer/your_home/

ENERGY STAR:
www.energystar.gov

AMERICAN COUNCIL FOR AN ENERGY-EFFICIENT ECONOMY:
www.aceee.org/consumer/consumer.htm

GREEN STAR:
www.greenstarinc.org

Notes

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