Community Action

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Hillsboro, OR 97123
503.648.6646
www.caowash.org

Energy Conservation

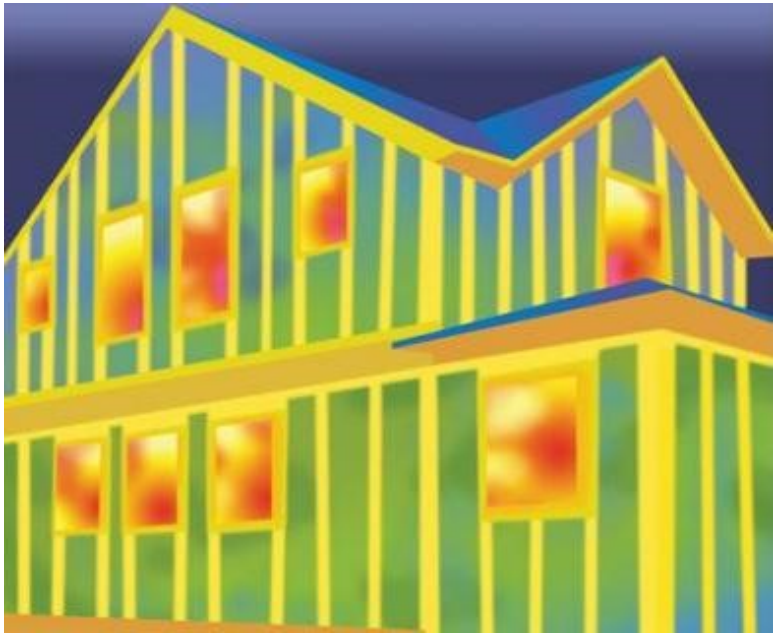
503.906.6550
weatherization@caowash.org

This booklet was produced by Community Action Energy Conservation. The information provided is for the purpose of informing the user on ways save energy and be more warm, safe and comfortable in their home. It is not meant to be comprehensive or exhaustive on any of the topics covered and it cannot cover specific situations in each person's home.

Updated April 2021

Community Action
Helping people. Changing lives.

Home Energy Manual



Ideas to help you save energy and be more warm, safe and comfortable in your home

Our Promise

Community Action changes people's lives,
embodies the spirit of hope, improves communities
and makes America a better place to live.
We care about the entire community and are dedicated
to helping individuals help themselves and each other.

Our Mission

Community Action leads the way to eliminate
conditions of poverty and creates opportunities
for people and communities to thrive.

Our Vision

Washington County's residents are strong,
resilient, involved in the community,
and live with dignity and security.

COMMUNITYRESOURCES

COMMUNITY ACTION

www.caowash.org
503.648.6646
contact@caowash.org

Energy Conservation 503.906.6550
..... weatherization@caowash.org

Utility Assistance 503.615.0771
..... energy@caowash.org

Emergency Rent Assistance 503.615.0770

Housing & Homeless Services 503.640.3263

Head Start/Early Head Start 503.693.3262
..... headstart@caowash.org

Child Care Resource & Referral 971.223.6100
..... ccrr@caowash.org

Help Me Grow 503.726.0879
..... helpmegrow@caowash.org

ELECTRIC & GAS UTILITIES

Forest Grove Light & Power ..... www.forestgrove-or.gov/lp
Customer Service 503.992.3250

NW Natural ..... www.nwnatural.com
Customer Service ..... 503.226.4211 or 800.422.4012
Gas Odor Emergencies 800.882.3377

PGE ..... www.portlandgeneral.com
Customer Service ..... 503.228.6322 or 800.542.8818
Emergency Service ..... 503.464.7777 or 800.544.1795

Western Oregon Electric Cooperative ..... www.westoregon.org
Customer Service ..... 503.429.3021 or 800.777.1276

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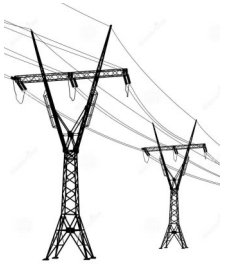
ENERGY BASICS

ENERGY IN OUR HOMES



We use energy to heat and cool our homes, heat water, run appliances and turn on lights. We use electricity, natural gas and other sources, such as propane, heating oil, wood or solar. This book is designed to help you understand how energy is used in your home and how to use it efficiently. It is not meant to be comprehensive and can't cover every situation, but we hope it helps you.

WHAT AFFECTS ENERGY USE?

The **shell** of your home consists of the roof, floors, walls and foundation. Cracks or gaps allow conditioned—heated or cooled—indoor air to leave and unconditioned—hot or cold—outside air to enter.

Heating and **cooling** are the biggest energy users in most homes. The type of systems, the fuel they use, how they are maintained and how people use them all make a difference in how much energy is used.

The **people** living in your home affect energy use. How many people there are, their age, health, daily habits and understanding of energy-saving all make a difference on how much energy is used.

There are many other factors that affect energy use. Some you can control and some you can't. Keep reading to find out more!

REGIONAL ENERGY PROVIDERS

- **Portland General Electric** (PGE) provides electricity for the majority of Washington County
- **City of Forest Grove Light & Power** provides electricity for the city of Forest Grove
- **NW Natural** provides natural gas for Washington County
- **Western Oregon Electric** provides electricity for a small part of Washington County

COMMUNITY RESOURCES

211 Info .....2-1-1 or 503.222.5555
.....www.211info.org

Connects people to nonprofit and public services

Catalyst Partnerships 971.245.6555
..... www.catalystnw.org

Provides limited home repair for qualified low-income residents of Washington County (as funding is available)

Energy Trust of Oregon 866.368.7878
.....www.energytrust.org

Provides information, incentives and contractor connections to help customers of PGE and NW Natural use less energy

Habitat for Humanity Portland Region 503.844.7606 x104
.....www.habitatwest.org

Provides limited home repair for qualified low-income residents of Washington County, including Beaverton, Hillsboro, Tigard, Tualatin (as funding is available)

Rebuilding Together 503.644.4544
.....www.togwc.org

Provides limited home repair for qualified low-income residents of Washington County (as funding is available)

Unlimited Choices 503.234.6167
.....www.unlimitedchoices.org

Provides limited home repair for qualified low-income residents in City of Beaverton (as funding is available)

West Tuality Habitat for Humanity..... 503.359.8459
..... www.westtualityhabitat.org

Provides limited home repair for qualified low-income residents of Washington County, including Forest Grove, Gaston and Banks (as funding is available)

COMMUNITY RESOURCES

Washington County Community Development.503.846.8814
..... www.co.washington.or.us/CommunityDevelopment

- Home Repair Loans/Deferred Interest
  Provides loans for home repair to qualified low-income residents of Washington County (except Beaverton)

- Home Access and Repair for Disabled and Elderly (HARDE)
  Provides grants for home repair to qualified low-income senior or disabled residents of Washington County (except Beaverton)

- Wood Stove Exchange Program
  Replaces older and uncertified woodstoves for qualified low-income residents of Washington County

Washington County Health & Human Svc......503.846.4402
..... www.co.washington.or.us/HHS

- Environmental Health
  Provides information and training on health concerns, such as asbestos, asthma, carbon monoxide, lead, mold, and radon

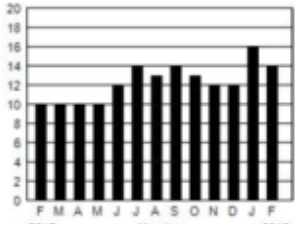
Oregon Law Center 503.227.0198
..... www.oregonlawhelp.org
Provides free legal information for low-income Oregonians

Regional Water Providers Consortium 503.823.7528
.....www.conserveh2o.org
Provides information on indoor and outdoor water conservation

Tualatin Valley Fire & Rescue 503.649.8577
.....www.tvfr.com
Provides emergency services, safety training and fire alarm installation throughout most of Washington County

ENERGY BASICS

TRACK YOUR ENERGY USE



Your utility bill has lots of information—learn how to read it. Look for a chart that shows monthly energy use and compares this year to last year. When do you use more energy? When it's colder? Did you use more or less energy at this time last year? What made the difference?

ENERGY TERMINOLOGY

Watt (W) = unit of energy to measure electricity

Kilowatt (kW) = 1,000 watts

Kilowatt Hour (kWh) = 1 kilowatt used in 1 hour – electricity is charged by how many kWh you use

British Thermal Unit (BTU) = amount of energy needed to heat or cool 1 pound of water by 1° F

Therm = unit of energy equal to 100,000 BTUs– natural gas is charged by how many therms you use

Cubic Feet per Minute (CFM) = unit of air flow — used when discussing fan performance or air leakage from home or ducts

Lumen = unit to measure perceived brightness

Sone = unit to measure perceived loudness

Minimum Efficiency Reporting Value (MERV) = unit of effectiveness for air filters — higher numbers catch more particles

R Value = capacity of insulating materials to resist heat flow – for insulation, the higher the R value, the less heat is lost

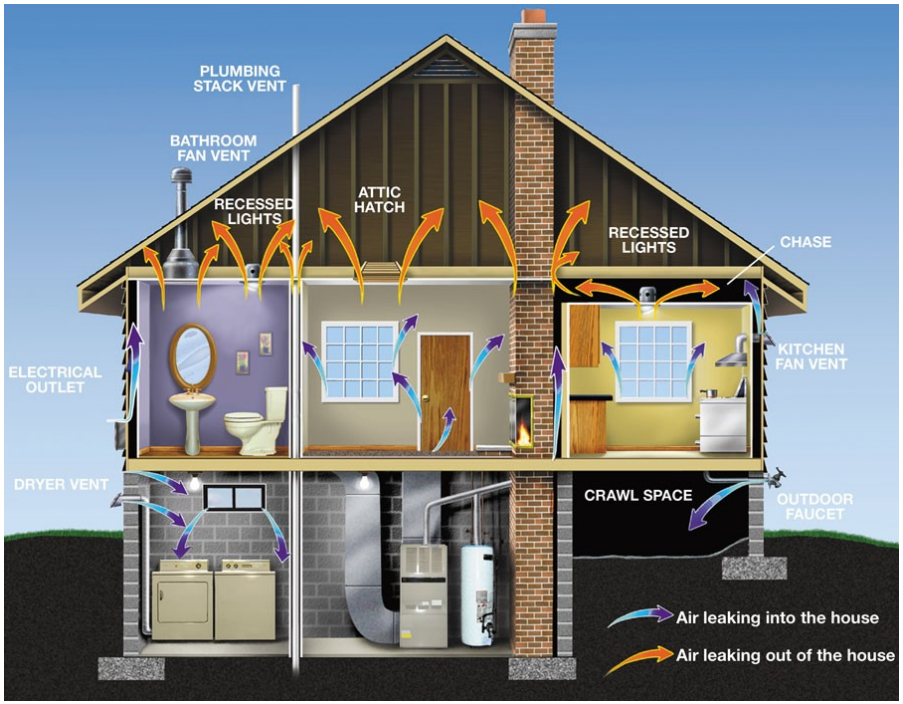
U Value = rate of heat transfer through a structure – for windows, the lower U value, the less heat is lost

AIR INFILTRATION

HOME'S SHELL

The foundation, bottom floor, exterior walls and roof make up the shell of a home. It's designed to protect you from wind, rain and sun. A perfect shell would keep you warm, safe and dry. Energy would not be lost through cracks and gaps. Pests, mold or poor air quality would not be a problem.

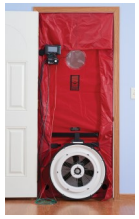
Most of us don't live in a perfect shell. There are cracks and gaps. Outside air, water and pests enter and conditioned indoor air—heated or cooled—escapes. On a cold or windy day, walk through your home to see where air is coming in. Reducing air infiltration can help increase comfort and reduce energy costs.



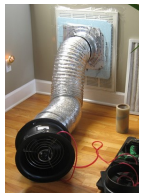
Controlling where air comes in and out is important. Fresh air coming in around a door may be fine. Moist air coming in from a crawlspace is not. There will always be a balance between maintaining indoor air quality and saving energy. You need to consider what works best for you, your family and your budget.

ENERGY CONSERVATION

ENERGY AUDITOR TOOLS



Blower Door slightly changes the air pressure in the home. It helps determine the amount of air leakage and whether cost-effective measures to reduce it, such as air sealing, are appropriate.



Duct Blaster blows air into the duct system. It helps determine air leakage in the ducts and whether cost-effective measures to reduce it, such as duct sealing, are appropriate.

Flow Hood measures air flow in exhaust fans in bathroom and kitchen. It helps determine whether fans are moving enough air out of the home to reduce moisture and particulate matter.

Digital camera captures images that document areas throughout the home, including the attic and crawlspace. It's a simple, but essential tool.

Infrared camera captures thermal (hot or cold) images. It helps identify potential problems, like missing insulation or air infiltration.

Manometer measures differences in pressure and converts it to air flow. It is used with the blower door, duct blaster and flow hood.

REM/*Design* is a computer program approved by the Department of Energy that determines the cost-effectiveness of upgrades by modeling the home's heating, cooling, hot water, lighting, appliance loads, climate and energy data.

ENERGY CONSERVATION

PROGRAM DESCRIPTION

Community Action Energy Conservation provides no-cost weatherization assistance to income qualified residents of Washington County. Our primary goal is to improve the efficiency, safety, comfort and durability of people's homes.

Eligible clients receive a comprehensive energy audit. During this visit, diagnostic tests are performed by an Energy Auditor to determine potential cost-effective improvements. Once improvements are selected, licensed contractors perform the installations. Weatherization improvements can include:

- Insulation
- Air/Duct Sealing
- Ventilation
- Heating Systems
- Windows

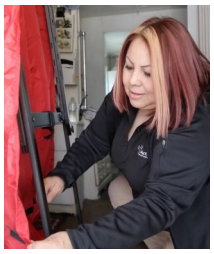
Along with the energy audit, clients also receive education on the following topics:

- Energy Saving
- Health and Safety
- Water Conservation

Services are provided for both homeowners and tenants in dwelling types such as:

- Houses
- Mobile/Manufactured homes
- Multi-units

Some homes may not qualify for cost-effective weatherization improvements. At times, homes need repair assistance outside of Community Action's scope of work and may be referred to other programs that could possibly assist.

AIR INFILTRATION

WAYS TO REDUCE INFILTRATION

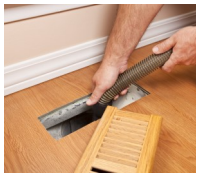
If you are a homeowner, install a door sweep at bottom of door to exterior or unconditioned space, like a garage or laundry room. If you rent, use a rolled-up towel or piece of foam to block the gap.

If you are a homeowner, use caulk to seal small openings. For larger openings, use expanding foam or board foam or another durable airtight material. If you rent, use rope caulk to block small cracks. Stuff plastic bags or styrofoam into larger gaps.

Close damper in wood fireplace when not in use. Remember to open again when you light a fire. If you don't use the fireplace, block off the front to keep warm air from escaping up the chimney.

Install foam gaskets behind electric outlet and light switch covers, starting with those on exterior walls. Screw covers on carefully to avoid breaking them. Installing child safety caps also helps block drafts.

In winter, warm air hitting cold a window can create a convective current that feels like a breeze. Close curtains or add plastic film to help insulate. Leave a gap at the bottom to reduce moisture build-up.



If you have a ducted heating system, lift off vent cover and make sure duct is completely attached. If it's not, you may be losing heated air to crawl space. With the cover off, use a vacuum to remove dirt or items that have fallen into duct.

If you have a window air conditioner, seal any gaps you see around it. If not, you will let warm outside air in and cool inside air out. When summer is over, take air conditioner out of window.

HEATING & COOLING

For most of us, the number one user of energy is heating and cooling. The type of system we have, the fuel it uses, its age and condition, thermostat setting, the condition of the home's shell and the weather all affect heating and cooling costs.

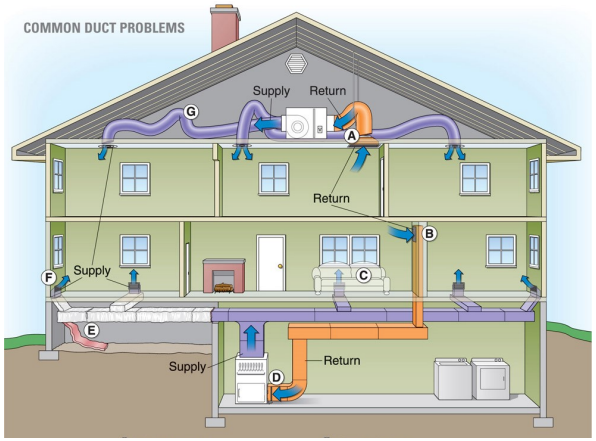
FORCED AIR SYSTEMS

In a forced air system, air is supplied to the furnace or air handler, is either heated or cooled and then is blown through ducts to vents throughout the house. A thermostat is used to set the temperature.

Heating vents should be left open and unblocked as much as possible. Closing or blocking vents can damage the furnace over time by causing it to overheat. Closing vents also adds pressure to the ducts which can increase duct leakage.

Interior doors should be left open as much as possible. This helps keep room pressures even which means less infiltration. If you prefer to keep doors closed, undercutting them or adding grills or jumper ducts helps balance room pressures.

Furnace filters should be checked at least every three months. Replace dirty filters or clean them if possible. Filters protect the furnace by keeping dust or dirt out. Dirty filters don't allow enough air in which means the furnace needs to work harder which can damage it over time.



Ducts systems need maintenance. The picture at left shows possible problem areas.

A. Leaky duct connection
B. Return leaks
C. Furniture blocking vent
D. Dirty furnace filter
E. Fallen duct insulation
F. Supply leaks
G. Kinks in ductwork

RADON

Radon is a radioactive gas that comes from the natural breakdown of uranium found in soil, rock and water. It seeps up through the ground and normally diffuses into the air. Radon can enter a home through cracks in floors, walls or foundations. Radon levels can be higher in well insulated, tightly sealed homes.

Exposure to high levels of radon increases a person's risk of lung cancer. The risk is greatly increased for smokers. You can't see, taste or smell radon. Testing kits are available at stores or on-line for as little as $15. In Washington County, 13% of homes test above recommended levels. To learn more about radon, go to www.healthoregon.org/radon.

PARTICULATE MATTER

Particulate matter is solid particles or liquid droplets found in the air. Some particulate matter, such as dust, dirt, soot, or smoke, you can see. Others are too small to see. Particulate matter can get into your lungs and even get into your bloodstream and cause health problems.

People with heart or lung disease, children and older adults are the more likely to be affected. Health problems include:

- premature death in people with heart or lung disease
- nonfatal heart attacks or irregular heartbeat
- aggravated asthma or decreased lung function
- respiratory symptoms, such as irritated airways, coughing or difficulty breathing.

You can reduce indoor levels by reducing sources, such as candles, old wood-burning stoves and fireplaces. Use exhaust fans when you cook. Do not smoke inside. You can reduce outdoor levels by keeping car engines tuned and avoiding using engines that smoke.

****Conserving energy helps reduce particulate matter****

HEALTH AND SAFETY

SMOKE ALARMS

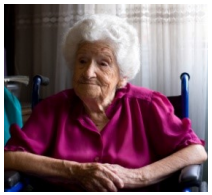
Smoke alarms save lives, but only if they are properly installed and in good working order. Each floor of your home should have an alarm. There should always be an alarm outside the bedrooms. Install alarms on ceiling or high on walls. Follow manufacturer's instructions.

Press test button regularly to make sure alarm is still working. If alarm is dusty, dirty, painted or damaged replace it. If alarm is over 10 years old, replace it. The alarm may still sound when you test it, but sensors work less well over time. Most alarms have a date of manufacture in small print on the back.

If you don't have an alarm and can't afford to buy one, contact Tualatin Valley Fire & Rescue 503.649.8577 or American Red Cross 503.284.1234. Landlords are required to provide alarms.

CARBON MONOXIDE ALARMS

Carbon monoxide (CO) is an odorless, colorless, tasteless gas that can make you sick or kill you. CO is made when fuel—such as natural gas, kerosene, propane, oil or wood—burns. Devices that burn fuel—such as furnaces, water heaters, wood stoves or fireplaces—need to be properly vented.



At low levels, CO causes sleepiness, headaches, dizziness and nausea. At high levels, CO causes death. Seniors, children and people with breathing issues are at greater risk. If you use a device that burns fuel, install an alarm on each floor of your home. Follow manufacturer's instructions.

Do *not* use a camp stove or a propane grill inside your home or in your garage. Do *not* heat your home by turning on oven. Do *not* leave car running in the garage even if the door is open. Do *not* use barbecue grill close to home where CO may enter. Do *not* ignore the symptoms of CO poisoning.

If you have a combustion device installed your home, like a gas furnace or fireplace, landlords are required to provide alarms.

HEATING & COOLING

Electric furnaces have electric resistance heating elements. A fan blows air across the hot elements and the heated air is blown through ducts throughout the home. Electric furnaces convert 100% of the electricity into heat. For every kilowatt of electricity put into the system, you get exactly that much heat.

Gas furnaces have burners where fuel burns or "combusts". A heat exchanger surrounds the burner and transfers heat to the air. The heated air is blown through ducts throughout the home. Gas furnaces are between 78% and 95% efficient.

Heat pumps convert electricity into heated or cooled air at more than 100% efficiency. Some heat pumps are up to 300% efficient which means for every kilowatt of electricity, you get three times that much heat.

Heat pumps can be ducted or ductless. A ducted heat pump has an indoor air handler that looks like a normal furnace. Heated or cooled air is blown through ducts throughout the home. A ductless heat pump is installed high on a main wall. It blows heated or cooled air directly into the home.

Ducted and ductless heat pumps have an outside unit that takes outside air and converts it into heated or cooled air. This unit looks similar to a central air conditioning unit. Heat pumps work even with outdoor temperatures at 20° or colder, but they are less efficient and additional heat sources may be needed.

Programmable thermostats can help save energy. If you have one, spend some time learning how to use it correctly.

FURNACE *or* **AIR HANDLER**

DUCTLESS HEAT PUMP

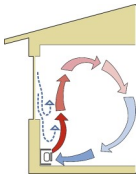
HEAT PUMP *or* **AIR CONDITIONER** *(outside unit)*

HEATING & COOLING

ZONAL SYSTEMS

In a zonal system, air is heated or cooled in one or more locations of the home and it mainly affects that area or "zone". The temperature is set by a single thermostat or by multiple switches. Zonal systems may use electricity, gas, propane or other fuel.

Ductless heat pumps, also called **mini-splits**, are an example of a zonal system. They are more than 100% efficient and provide both heating and cooling. They affect a large area of the home, but you may need additional heat in back rooms.



Baseboard heaters, wall heaters, space heaters and **radiant heaters** are zonal. The heat may come out passively or it may be blown out. Make sure area in front of the heater is open so heat can move freely into the room.

Window or **free-standing air conditioners** provide cooling to areas of the home nearby. **Fans** don't provide cooling, but they make you feel cooler by blowing air across your skin. They can also be used to move both hot and cool air in the home.

EXAMPLES OF ZONAL HEATERS

SAFETY NOTE:

Kerosene, propane, oil or other combustible fuel space heaters should NOT be used inside your home unless they are vented to the outside. Unvented combustion devices are a carbon monoxide hazard. Kitchen oven should NOT be used to heat your home. If oven is off, it is okay to open the door to release heat.

HEALTH & SAFETY

HEALTHY HOME PRINCIPLES

Energy Conservation is focused on energy savings, but many of our measures, like installing smoke alarms or improving exhaust fans, follow healthy homes principles. Make your home healthier by following the guidelines shown below. For more information on healthy homes, visit www.greenandhealthyhomes.org .

Keep Dry. Fix leaks in roof or plumbing. Wipe water off windows. Prevent water from entering crawlspace or pooling around foundation.

Keep Clean. Control sources of dirt, dust and contaminants, including pet dander. Reduce clutter in and around home.

Keep Safe. Keep cleaners, chemicals, poisons and medicines out of reach of children. Add guards on upper floor windows to prevent falls.

Keep Well-Ventilated. Use fans to reduce the concentration of contaminants in the home and to reduce moiture and mold.

Keep Pest-Free. Seal any cracks or openings where pests can enter. Store food in sealed containers.

Keep Well-Maintained. Routinely inspect, clean and maintain your home. Take care of small problems before they become big ones.

Keep Contaminant-Free. You can reduce lead-related hazards in pre-1978 homes by fixing peeling paint. Use wet cloth to remove paint chips or dust.

Keep Energy Efficient. Energy efficiency is good for your home and for your health

PHANTOM LOAD

Phantom load, also called vampire or stand-by load, is electricity used by devices when they are off or in standby mode. It helps your TV remember its setting and the clock running on your microwave. It can make life easier, but there is a cost.

Here are some clues to whether your device has phantom load:

- It's off, but there's still a light on
- It's off, but there's still a display
- It uses a remote control
- It's a charger plugged into an outlet

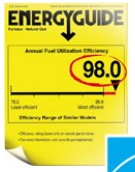
Some studies estimate phantom load at 10% of a home's energy use. That depends on how many devices have a phantom load as well as other energy costs. For most of us, phantom load is worth the convenience.

TIPS TO REDUCE PHANTOM LOAD

Unplug it. No electricity, means no cost, but be aware that unplugging devices may mean loss of convenience or memory. For example, unplugging a cable box mean you need to reprogram channels.

Use a smart strip. This lets you set one device as the master that controls when other devices will turn off. You could set it so when you turn computer off, the printer or fax also turn off.

Unplug charger. This may not save a lot, but it's easy to do. When you finish charging a phone or other device, remove charger from the outlet. If it's plugged in, it's using a small amount of energy.



Look for the labels. Electronics and appliances with the Energy Star label are certified to use 20-30% less energy than required by federal standards. Products with Energy Guide label show you estimated yearly energy consumption and operating cost. Use these labels to help you make a decision on whether to buy a product or not.

HEATING & COOLING

HEATING AND COOLING TIPS

For heating during the day when you're at home, set the thermostat between 65°-70°. At night or when you're not home, set thermostat between 55°-60°. Set air conditioner between 74°-78°.

Heat pumps are an exception to the rule. They are so efficient, you don't have to turn them down at night or when you're away. If you do, turn heat back up slowly, no more than 5° at a time, to avoid having the more emergency or auxiliary heat come on. Thermostat display will show if it's on or there may be red light.

If you have a forced air system, check your furnace filters every 1-3 months. Change or clean filters if dirty. Use filters with a MERV rating of 6 or 8. Higher MERV ratings may restrict airflow.

If you have a forced air system, keep vents open and unblocked as much as possible. Keep interior room doors open as much as possible.

Do NOT plug space heaters into extension cords. Plug them directly into wall outlets. Do NOT plug too many heaters into the same circuit. Leave 3 feet of space around heater to avoid fire hazard.

Dressing warmly inside may allow you to turn down the temperature a degree or two. You don't want to be too cold, but adding a sweater or another layer of clothing may give you all the comfort you need.

In winter, set ceiling fan blades to rotate clockwise on low speed. This helps push warm air down. In summer, set ceiling fan blades to rotate counter-clockwise to push cool air down.

During winter, open curtains on south-facing windows so sun can warm room. During summer, close curtains to keep sun from overheating rooms. Open windows and doors in morning or at night to let in cooler air.

HOT WATER

WATER HEATER

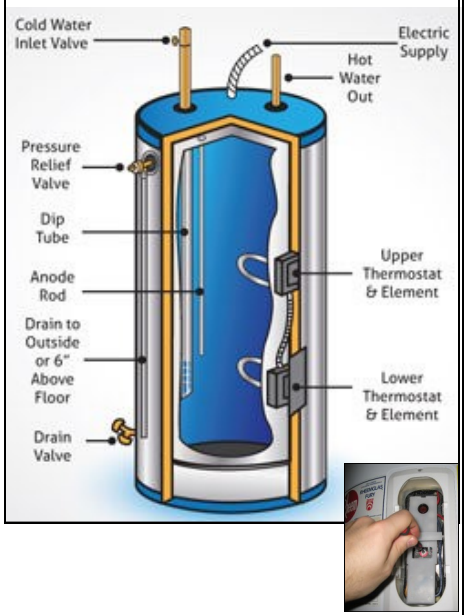
For energy-savings, hot water should be set to 120°. To check the temperature, turn on the hot water and let it run until it's as hot as it will get. Then, fill a cup with the water and use a cooking thermometer to check the temperature.

Temperature above 120° can be a burn risk, especially for infants, young children and seniors. Gas water heaters are simple to adjust using dial at the bottom. Electric water heaters are more difficult. You need to turn off breaker, remove two panels and adjust two thermostats. Replace panels and turn on breaker when done. Water will take a while to adjust to the new temperature.

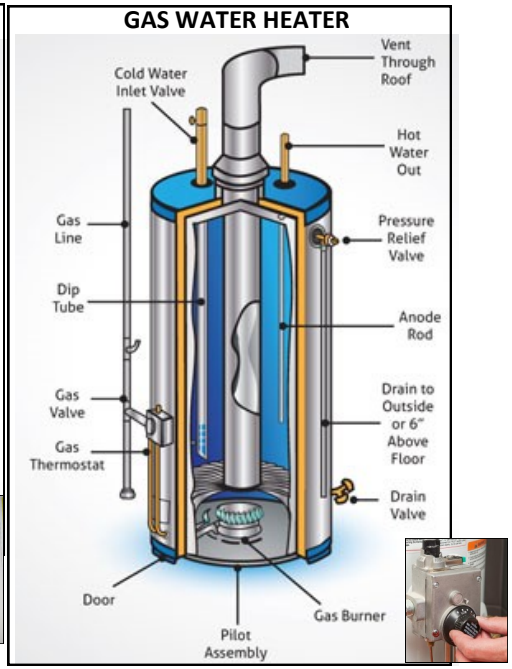
Water temperature	Time to severe burn
120°	5 min
125°	2 min
130°	30 sec
135°	10 sec
140°	5 sec
145°	3 sec
155°	1 sec

Water heaters are complicated and expensive machines. Don't make a change you don't feel comfortable doing. There may be problems that require a plumber. Renters should always talk to their landlords first.

ELECTRIC WATER HEATER



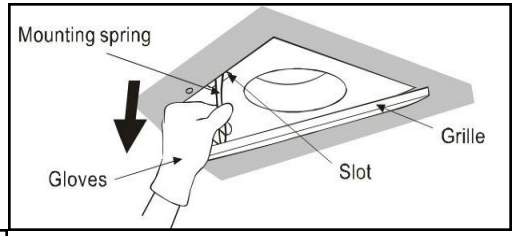
GAS WATER HEATER

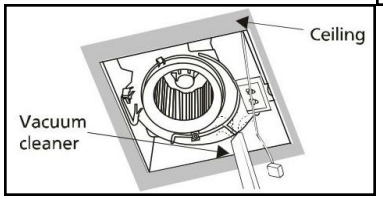


VENTILATION

EXAMPLE OF HOW TO CLEAN A FAN

Pull down the spring loaded fan cover. Squeeze the mounting spring; it should pop out and hang down. Clean the cover with a damp cloth.





Remove plug (unplug) inside the fan to turn off electricity. The exhaust fan doesn't have blades like a typical fan. Blades are around outside edge.

Use a vacuum attachment or toothbrush to thoroughly clean the blades. When you are done cleaning, reinstall the electrical plug and reattach the fan's cover.

WHAT'S A SONE?

Many of us know a decibel is a measure of loudness. A sone is also a measure of loudness. Exhaust fans are rated in sones.

Sone Chart

Sound Level Situation	Sone Level	How We Feel
Traffic Noise	8.0 7.0 6.0 5.0	Conversation with added noise
TV/Radio	4.0 3.0	Normal Conversation
Calm Office	2.0 1.5	
Night in Suburbs	1.0	Comfortable Zone Free from Noise
Rustling Shrubs	0.5	

VENTILATION

ASHRAE FANS

The American Society of Heating, Refrigeration and Air Conditioning (ASHRAE) established a national ventilation standard, ASHRAE 62.2, to improve indoor air quality by providing fresh air and removing moisture and pollutants.

Why is it necessary?

Homes may not "breathe" enough through natural ventilation. Homes with inadequate ventilation may have indoor air quality problems, like high concentrations of pollutants, condensation, mold and mildew, allergens and asthma triggers and odors.

How is this extra mechanical ventilation performed?

Either an existing fan is replaced or a new exhaust fan is installed, usually in the bathroom, but sometimes in the kitchen. The fans run automatically for a set amount of time each day.

Aren't fans noisy?

The fans for the whole house ventilation are very quiet, rated at one sone or less.

Can I turn it off?

A shut off will be provided to allow cleaning. However, turning off the fan for long periods exposes your home to potential moisture and mold problems. It is best to leave the fan on to ensure good indoor air quality.

How much will it cost to run the fan?

The fans we install are very efficient. It will cost about $1.50 a month to help ensure your home's indoor air quality.

What about maintenance?

The fans need to be cleaned as necessary or at least once a year to keep them running efficiently. Follow instructions provided with fan.

HOT WATER

HOT WATER TIPS

Wash clothes in cold water. Cleaning enzymes in laundry detergent today work best between 60°-75°, the temperature of most cold water taps. Using cold water will help clothes last longer, keep their colors and, of course, save you money.

Wash/Rinse Setting	Electrical Use *(kWh/load)*	Cost per load *(@.11/kWh)*	3 loads/week *(per year)*	6 loads/week *(per year)*
Cold / Cold	0.3	$ 0.03	$ 5.15	$ 10.30
Warm / Cold	1.9	$ 0.21	$ 32.60	$ 65.21
Hot / Cold	2.8	$ 0.31	$ 48.05	$ 96.10
Warm / Warm	3.5	$ 0.39	$ 60.06	$ 120.12
Hot / Warm	4.5	$ 0.50	$ 77.22	$ 154.44

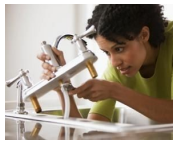
Install water-saving aerators and showerheads. They will save both water and the energy used to heat it. Look for kitchen and bathroom aerators using 0.5-1.5 gpm (gallons per minute) and showerheads using 1.5-2.5 gpm.

Take a 5-minute shower. If that's too much of a challenge, try shortening showers a few minutes each time. If you take a bath, just don't fill it as full.

Wash dishes smarter. In dishwasher, wash full loads. Open the door to dry instead of using dry cycle. If washing by hand, turn on the water only as you need it.

Turn water off. When you brush your teeth, shave or use water in any way, turn water on when you need it and turn it off when you don't.

Repair water leaks. A slow leak can waste 15-20 gallons a day. Leaks can increase water and energy bills and also cause damage to your home.



Insulate water pipes. Add foam pipe insulation to the first 3 feet of water pipes at top of your water heater can help reduce heat loss, prevent freezing, and raise water temperature at the tap by 2°-4°.

APPLIANCES

REFRIGERATORS & FREEZERS

An old refrigerator can use twice as much energy as a new one. Replacing an old refrigerator may not be something you can do, but if you have an extra refrigerator or freezer plugged in that you don't really use, you may want to consider unplugging it.

19 cubic feet	Refrigerator *(top freezer)*	Refrigerator *(side-by-side)*	Freezer *(chest)*	Freezer *(upright)*
Age	**Cost per year of electricity**			
2011-2015	$48	$73	$41	$60
2001-2010	$72	$94	$61	$95
1993-2000	$113	$146	$75	$125
1990-1992	$169	$220	$108	$173
1980-1989	$221	$389	$151	$241

REFRIGERATOR SAVING TIPS

Keep it cold. Refrigerator temperature should be between 37º-40º and freezer between 0º-5º. Use a refrigerator thermometer to check temperature and adjust temperature if necessary.

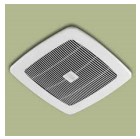
Allow space. Refrigerators will run more efficiently if air is allowed to circulate behind and around them. Refrigerators next to ovens, dishwashers or other heat sources may need more energy to keep cold.

Keep cold inside. Organize items so that what you use most is easiest to reach. Think about what you need before you open the door. Keep gasket around door clean to help door close completely.

Clean condenser coils. Unplug refrigerator before cleaning. If coils are on back, use brush or soft cloth to clean. If coils are not visible, they may be covered or underneath. Plug back in when finished.

MOISTURE & MOLD

TIPS FOR MOLD & MOISTURE



Use exhaust fan. Turn on the fan when you cook, shower, bathe or do laundry. Let it to run 10-20 minutes after you're done. No fan? Open a window. This helps remove moisture and particulate matter.

Check the dryer. Clean lint from trap inside dryer after every use. Clean lint from vent that exits home once a month. This will help your dryer work more efficiently and reduce risk of a home fire.

Dry off window. When warm air hits a cold window, water in the air condenses onto the window. Wipe off window. If the window is covered, raise the covering on a regular basis to check for moisture.

Keep interior doors open. This allows heat and air to enter rooms. It also helps reduce mold growth. Keep closet doors open at least part of every day.

Keep room uncluttered. Spare rooms and closets are often used for storage. If they are over-packed, air can't circulate and moisture may be trapped. This can lead to mold growth, particularly on exterior walls.

Clean mold. Use soap and water to remove mold from hard surfaces like walls or window sills. If you use bleach, dilute with water. Wear a face mask and gloves, if possible. Soft or porous items with mold, like carpet or pillows, may need to be disposed of.

Monitor relative humidity. Buy an inexpensive hygrometer and measure moisture levels in your home. If they're above 60%, find ways to reduce moisture, including running fans and opening windows.

MOISTURE & MOLD

MOISTURE & MOLD

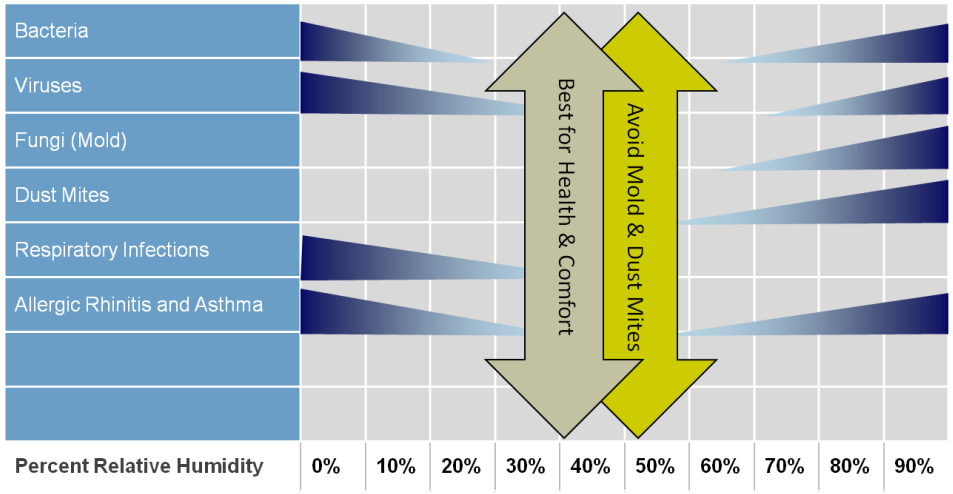
Moisture in our homes is not unusual. We live in rainy Oregon. Plus, we cook, shower and do laundry. We have pets and plants. We may have plumbing problems, a leaky roof or water under our home. Moisture is a problem when there is too much of it or it's in the wrong place.

Relative humidity (RH) is the amount of water vapor in the air as a percent of how much it could hold at the current temperature. Most people are comfortable with RH between 30% and 60%. Levels above or below that may mean reduced indoor air quality and other problems including mold growth.

Mold has the potential to cause or worsen health problems. Inhaling mold spores can cause asthma attacks for people with asthma. Mold can cause allergic reactions for some people. Mold can also damage your home and items in it. Your goal is to reduce the opportunity for mold to grow.

Relative Humidity and Indoor Air Quality

Decrease in bar width indicates decrease in effect



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APPLIANCES

OTHER APPLIANCES

What do your electric appliances cost to use? That depends on a number of factors including wattage and hours on. The chart shows some typical usage. To find out more about your usage:

- **Go to** https://energy.gov/energysaver/estimating-appliance-and-home-electronic-energy-use
- **Go to** local library and check out a Kill-a-Watt meter which will lets you test your appliances
- PGE customers, **go to** https://www.portlandgeneral.com/residential/energy-savings/ways-to-save/energy-tracker

Electric Appliance	Watts	Hours On per Month	Monthly kWh	Monthly Cost
Ceiling fan	60	15-180	1-11	$0.11-$1.21
Clothes dryer	5,000	6-28	30-140	$3.30-$15.40
Coffee Maker	900	4-30	3-27	$0.33-$2.97
Dishwasher *(dry cycle off)*	200	8-40	2-8	$0.22-$0.88
Dishwasher *(dry cycle on)*	1,300	8-40	10-52	$1.10-$5.72
Electric blanket	180	30-90	5-16	$0.55-$1.76
Hair dryer	1,500	1-10	2-15	$0.22-$1.65
Iron	1,100	1-10	1-11	$0.11-$1.21
Microwave oven	1,500	5-30	8-45	$0.88-$4.95
Oven	3,500	8-40	28-140	$3.08-$15.40
Slow cooker *(crock pot)*	215	1-40	1-9	$0.11-$0.99
Toaster	1,150	1-3	1-3	$0.11-$0.33
Toaster Oven	1,500	2-24	3-36	$0.33-$3.96
Vacuum cleaner	1,440	2-6	3-9	$0.33-$0.99

Cost estimates based on 11 cents / kilowatt hour

ENERGY EFFICIENT LIGHTS

Most of us grew up with incandescent bulbs and thought how bright a bulb was depended on its wattage. Energy efficient lights, like compact fluorescents (CFL) and light emitting diodes (LED), deliver the same brightness using much fewer watts.

Incandescent	Lumens
100 watts =	1,600
75 watts =	1,100
60 watts =	800
40 watts =	450

Lighting Facts Per Bulb

Brightness	**1600 lumens**
Estimated Yearly Energy Cost	**$2.17**
Based on 3 hrs/day, 11¢/kWh	
Cost depends on rates and use	
Life	
Based on 3 hrs/day	**22.8 years**
Light Appearance	
Warm — Cool	
5000 K	
Energy Used	**18 watts**

"Lighting Facts" on bulb packages have lots of information. Label to the left is for an 18-watt LED that replaces a 100-watt incandescent.

Brightness is shown in "lumens". More lumens = more brightness.

Light appearance is shown on the "Kelvin" scale as warm to cool. Warm is a more yellow light. Cool is more blue or bright white.

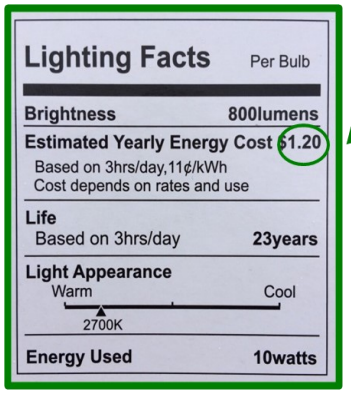
This label shows the LED is expected to last more than 20 years and cost $2.17 in energy use each year. An incandescent bulb with the same brightness would cost $12.00 a year to operate. A CFL with the same brightness would cost $2.77 a year.

LEDs are the most energy-efficient bulb you can find. The price has become more affordable and the shape is more standardized. LEDs fit in most fixtures, are dim-mable and won't break when dropped. They often seem brighter, so you end up using a lower wattage.

CFLs are the next most energy-efficient bulb. They are affordable and have a "twirly" shape. They fit in most fixtures, but won't last as long in an enclosed fixture. CFLs contain about 4 milligrams of mercury. You can dispose of unbroken bulbs at Lowe's or Home Depot. For other disposal sites, call Metro at 503.234.3000.

LIGHT SAVING TIPS

Replace incandescent lights with energy-efficient lights. LEDs and CFLs quickly pay for themselves in energy savings.



LED label

Incandescent Label

Open the curtains or blinds. Natural light coming through a window or skylight may be all the light you need during the day. Natural light can also brighten our mood and help indoor plants to grow.

Decorate with lighter colors. Lighter color walls, curtains and furnishings make your home look bigger and brighter. Add mirrors to reflect light which makes your rooms look brighter.

Turn off the lights. When you leave a room or leave home, make it a habit to turn off the lights. If you are coming right back or want a light for safety or comfort, that's fine. Just don't leave lights on unnecessarily.

Install night lights. Night lights can bring comfort to a child, but they can also help guide adult across a room or down the hall. Look for LED night lights with a sensor to save the most energy.

Look for an Energy Star label. Energy efficient bulbs with and Energy Star label will have a limited product warranty. Proof of purchase is required, so keep your receipt.