



e-FILING REPORT COVER SHEET

COMPANY NAME: NW Natural

DOES REPORT CONTAIN CONFIDENTIAL INFORMATION? No Yes If yes, submit a redacted public version (or a cover letter) by email. Submit the confidential information as directed in OAR 860-001-0070 or the terms of an applicable protective order.

Select report type: RE (Electric) RG (Gas) RW (Water) RT (Telecommunications)
 RO (Other, for example, industry safety information)

Did you previously file a similar report? No Yes, report docket number: RG-13

Report is required by: OAR
 Statute
 Order

Note: A one-time submission required by an order is a compliance filing and not a report (file compliance in the applicable docket)

Other Schedule 320 of NW Natural's Tariff
(For example, federal regulations, or requested by Staff)

Is this report associated with a specific docket/case? No Yes, docket number: RG-13

List Key Words for this report. We use these to improve search results.

NW Natural, 2018-2019 Program Year, Oregon Low-Income Energy Efficiency Annual Report, OLIEE, RG-13

Send the completed Cover Sheet and the Report in an email addressed to PUC.FilingCenter@state.or.us

Send confidential information, voluminous reports, or energy utility Results of Operations Reports to PUC Filing Center, PO Box 1088, Salem, OR 97308-1088 or by delivery service to 201 High Street SE Suite 100, Salem, OR 97301.

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December 27, 2019

VIA ELECTRONIC FILING

Public Utility Commission of Oregon
Attn: Filing Center
201 High Street SE, Suite 100
PO Box 1088
Salem, Oregon 97308-1088

**RE: RG-13 - Oregon Low-Income Energy Efficiency Program (OLIEE)
Annual Report (Program Year 2018-2019)**

Northwest Natural Gas Company, dba NW Natural (NW Natural or the Company), submits herewith its Oregon Low-Income Energy Efficiency Program (OLIEE) Annual Report for the Program Year 2018-2019 in accordance with the Company's Tariff P.U.C. Or. 25, Schedule 320.

Please do not hesitate to contact me should you have any questions about this report.

Sincerely,

/s/ Rebecca T. Brown

Rebecca T. Brown
Regulatory Compliance

Enclosure

NW Natural

Oregon Low Income Energy Efficiency Program Annual Report To the Public Utility Commission of Oregon Program Year: October 2018 - September 2019

I. Summary

The programs supported by the Oregon Low Income Energy Efficiency Program (OLIEE) tariff continued to be strong in the 2018-19 program year. Collectively our partner agencies provided weatherization services to 260 households and engaged several hundred additional NW Natural customers through energy education workshops, energy saver kits and/or received air sealing services.

II. OLIEE Overview

Since October 2002, NW Natural (NWN) has collected public purpose funding for its Oregon Low-Income Energy Efficiency program (OLIEE). Starting with the 2017-18 program year the collection increased. Previously it had been equal to one quarter of one percent (0.25%) of total energy use billed from Oregon's residential and commercial customers, but was equal to one fifty fifth of one percent (.55%) for the 2018-19 program year.

The OLIEE program assists NWN's low income customers by reducing their natural gas needs through the installation of high efficient gas equipment and weatherization. The program also empowers customers through energy literacy in conjunction with weatherization as well as a stand-alone service. The program is applicable to owners and renters of single or multi-family dwellings, who meet income guidelines as established in Oregon's annual Low Income Home Energy Assistance Program (LIHEAP) State Plan¹. On average, the OLIEE program reduces participating customers' gas usage by approximately 20%² annually.

III. OLIEE Community Action Program (CAP) Program

OLIEE partners with CAP Agencies located in each county to administer the OLIEE program. These agencies utilize matching funds derived from the Office of Community Services' Low Income Home Energy Assistance Program (LIHEAP) and the US Department of Energy's Weatherization Assistance Program (WAP). NWN contributes to each eligible gas home's weatherization and energy efficiency efforts as follows:

Expense category	Cap
Weatherization cap per home	\$10,000
Audit and Inspection allotment	\$850
Health, Safety and Repairs	\$1,000
Agency Administrative expense	\$750
Reimbursement per home	\$12,600

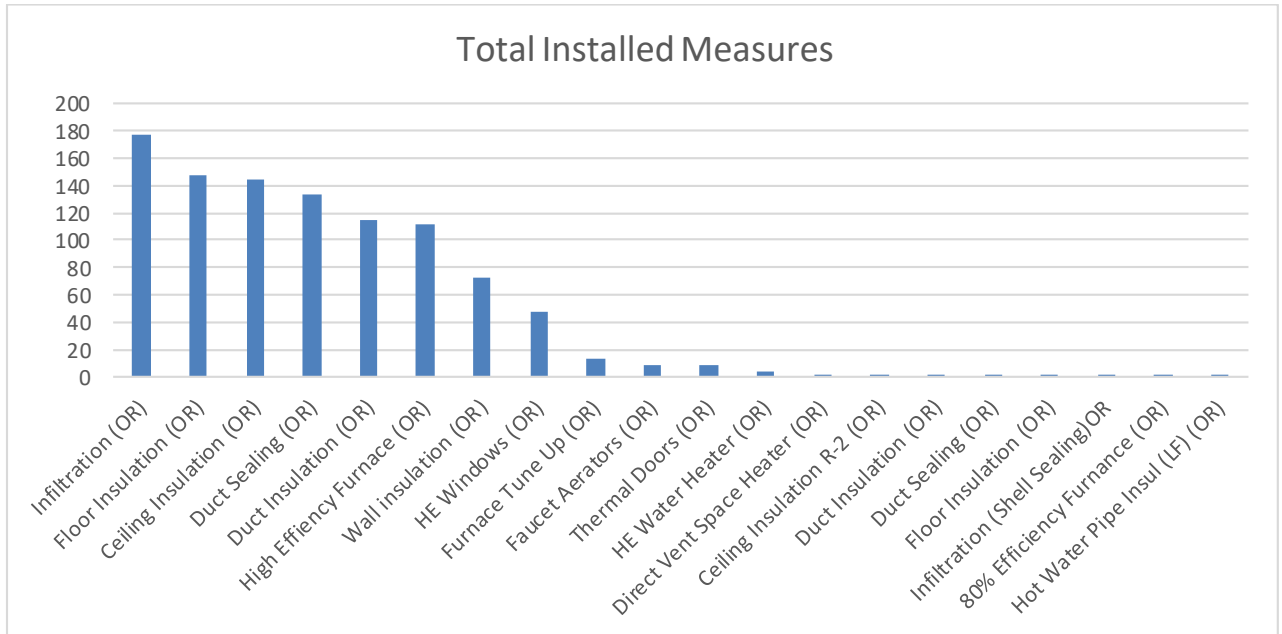
¹ <https://www.oregon.gov/ohcs/pages/low-income-energy-assistance-oregon.aspx>

² According to 2011 Impact Evaluation performed by Forefront Economics.

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Oregon Low Income Energy Efficiency Program Annual Report To the Public Utility Commission of Oregon Program Year: October 2018 - September 2019

The funds supported over 991 measures installed in 260 households.



IV. Current year weatherization results

Table 1 – Prior three program years' CAP results

	<u>2018-2019</u>	<u>2017-2018</u>	<u>2016-2017</u>
Households weatherized (Target)	300	320	300
Households weatherized (Actual)	260	299	260
Reimbursed Measure Costs	\$1,567,192	\$1,935,009	\$1,521,200
Reimbursed HSR	\$242,617	\$289,364	\$237,019
Est. therms	73,441	103,708	59,232
Est. therms saved per home ³	283	347	228

³ Estimated therms saved as calculated by the Oregon Department of Energy (ODOE) -approved modeling software, RemRate.

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Program Year: October 2018 - September 2019

Households/targets: The program has a goal of maintaining 300 agency served households each year. Installation costs were forecasted to be higher which resulted in a project forecast of 289. Labor and equipment shortages shifted the timing of many projects this year which resulted in that target not being met by September 30, 2019.

Table 2: Household targets for 2019

CAP Agency	Counties Served	Targeted Households	Actual Completions
Clackamas County CA	Clackamas	20	12
Community Action Organization	Washington	67	73
Community Action Team, Inc.	Columbia and Clatsop	7	8
Community Services Consortium	Benton, Linn and Lincoln	40	31
Homes for Good Housing Agency of Lane Co	Lane	24	24
Mid-Columbia Community Action Council	Hood River and Wasco	0	0
Mid-Willamette Valley CA	Polk and Marion	29	21
Multnomah County Weatherization & Energy Services	Multnomah	95	88
Yamhill Co CA Partnership	Yamhill	7	3
Oregon Coast Comm Action	Coos	0	0
All Agencies		289	260

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V. Customer Counts

In addition to 2017-18 targets, Table 3 provides customer counts by Agency service territory.

Table 3: Targets and Customer Counts

CAP Agency	Residential Meter Count	% of customers	2017-2018 gas home target	% of completions
Clackamas County CA	87,441	14%	20	7%
Community Action Organization	133,336	22%	67	23%
Community Action Team, Inc.	19,904	3%	7	2%
Community Services Consortium	49,692	8%	40	14%
Homes for Good Housing Agency of Lane Co	37,298	6%	24	8%
Mid-Columbia Community Action Council	5,114	1%	0	0%
Mid-Willamette Valley CA	75,668	12%	29	10%
Multnomah County Weatherization & Energy Services	188,440	31%	95	33%
Yamhill Co CA Partnership	11,547	2%	7	2%
Oregon Coast Comm Action	1,567	0%	0	0%
All Agencies	608,440		289	

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VI. Program Funding⁴

Projects averaged approximately \$8,479 during the 2018-19 program year (inclusive of administrative, audit and inspection costs).

Table 4 – 2018-2019 OLIEE Program Year Funding (12 months revenue)

Program Revenue (10/17-10/18):	
Public Purpose Funding	\$ 2,881,987
Interest and Investment Income	\$ 20,062
Total PY 2018-19 Program Revenue	\$ 2,902,050
Expenses (10/17-10/18):	
Total Agency Cost ⁵	\$ (2,437,064)
Open Solicitation Program (OSP)	\$ (17,092)
NWN Administration	\$ (73,902)
Energy Education	\$ (105,683)
Total PY 2018-18 Expense	\$ (2,429,513)
PY 2018-18 Excess Funding	\$ 472,537

⁴ Expenses are typically paid within a month after being incurred. Due to this timing difference, figures in section III and V will not fully synchronize. Past reports have included October – September posting months. This 2018-19 report includes October to September revenue, but includes November – October spending, since October 2019 account reflects the September 2019 program completions. The result is future program reports will be better aligned with revenue and expense.

⁵ Agency costs include measure reimbursement, health, safety and repair allowance as well as administrative costs.

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Oregon Low Income Energy Efficiency Program Annual Report To the Public Utility Commission of Oregon Program Year: October 2018 - September 2019

VII. Energy Education

The current tariff allows 10% of program collections to be used for client energy education each program year but distributed under 5% in 2018-19 to prioritize weatherization. The Company's goal is to create synergies in the delivery and funding of traditional low income services - weatherization and bill assistance – while better serving this customer group. By targeting customers on the weatherization wait lists (OLIEE) and previous recipients of bill assistance (OLGA⁶), NWN specifically hopes to:

- Provide more immediate attention and services to customers on weatherization wait lists.
- Provide education and direct install measures to customers whose homes do not qualify for OLIEE.
- Show OLGA customers how to use less gas and decrease their dependency on bill payment assistance.
- Encourage eligible households to sign up for weatherization services.

A few agency-specific reports and education materials are included in Appendix 1. Examples include an overview of their offerings and greater detail on:

- Wait list management,
- Education methods,
- Program Impacts, and
- Accounting.

NW Natural is pleased with the agency efforts and seeks to foster inter-agency collaboration to help create an even stronger education program. In addition to providing reports outlined above, agencies have supplied PowerPoints and other teaching materials and testimonials that NWN is making available to the Community Action network.

⁶ Oregon Low Income Gas Assistance

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VIII. OLIEE: Open Solicitation Program (OSP) Overview

The OLIEE Tariff seeks to serve all low income households and allows the Company to partner with organizations serving a similar demographic as the CAP to identify projects that meet the same program intent while providing some diversification of housing stock and, hence, tenant profiles. These projects all fall within the scope of the Open Solicitation Program of the OLIEE tariff.

In 2018-19 the Company prioritized on existing agencies and future 2019-20 tariff changes. No new OSP projects were awarded for the 2018-19 Program Year. Projects reported in 2016-17 Report were:

- Community Energy Project (CEP) > DIY Air sealing training and kits.
- Enhabit > Anti-displacement driven efficiency upgrades.
- Portland Community Reinvestment Inc. and Verde > Adding energy efficiency upgrades in homes that would otherwise only receive general repairs.
- Home Forward > Furnace replacement in historic building.
- Oregon Training Institute (OTI) > Weatherization services to Low Income gas customers in Coos County.

IX. Program Oversight

The OLIEE Advisory Committee (OAC) meets semi-annually to provide deliberation and counsel to NWN. Members include agency representatives (2), the Citizens Utility Board (CUB), the Public Utility Commission (PUC) and the Community Action Partnership of Oregon (CAPO). The intent of this body is to provide feedback and recommendations for program changes and performance.

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X. Program Accountability

NWN solicited feedback from program partners through an anonymous 10 question survey. Results on the OLIEE program averaged 1.02 out of 1 to 5 scale where 1 was “extremely satisfied” and 5 was “not at all satisfied.” This was a marginal improvement from last year’s 1.2 and again taken as positive with no glaring areas for improvement.

NWN OLIEE program staff will be looking into continual improvements and focus on “Timeliness” which continues to improve, still very positive, but the only indicator without a perfect score. NWN has been tracking the payment turn-around time starting during the 2017-18 year and has been focused on reducing processing time.

OLIEE	2016-17	2017-18	2018-19
Professionalism	1.25	1.18	1.0
Timeliness	1.5	1.27	1.1
Courtesy	1.25	1.18	1.0
Helpfulness	1.33	1.27	1.0
Knowledgeable	1.33	1.27	1.0

Agencies typically have fewer interactions with other departments at NWN but a question was asked to allow feedback. Other departments of NWN had overall results that averaged 1.67 up from 1.85 last year on a 1 (extremely satisfied) to 5 (not at all satisfied) scale.

Other NWN Dept	2016-17	2017-18	2018-19
Accounting / Payment Processing	1.78	1.5	1.0
Call Center	2	1.33	1.25
Service Technicians	1.5	1.5	1.4
Utility Billing / Data Request	2	2.33	1.4

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Oregon Low Income Energy Efficiency Program
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Some recommendations/comments from the survey:

- Please assist with customer outreach.
- Would like to see OLGA funds allocated towards furnace replacements. Start small maybe a project or two each year. I realize this is a different department but there may be some funds there to support the increased cost of replacement.
- Thanks for all your help in addressing the housing and energy needs of low income Oregonians.
- You guys are wonderful. Thank you!
- No. It is a model program
- I am relatively new to this program. However, I have found it very easy to find acquire the answers I need.
- More money and more flexibility in spending it.
- Increase amount allotted to Health and Safety. Those are the dollars that make the biggest positive impact in lives of our clients and current allocation is not quite sufficient on many projects
- Increase the amount for health and safety. Make the maximum measure rebate of \$10,000.00 an average. Help with customer outreach - prominent flyer in the billing?
- Deemed furnace replacements, no job caps.
- Not really. Rick and Kristel seem to evolve with our needs. It would be nice to be able to expand a bit into multifamily but that isn't in the tariff.

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Appendix 1: Energy Education Example Materials

**NW Natural Energy Education
Program Year 2018-19 Reporting
Clackamas County**

Please provide your report on the OLIEE-funded Energy Education efforts during the 2018-2019 program year using the five focus areas outlined below. Your report provides a window into this program that many stakeholders will not have otherwise. Please send your complete report to Rick Hodges (Rick.Hodges@nwnatural.com) by October 30, 2019. Thank you!

1. Overview: Please provide a paragraph or two explaining your agency’s education program offering at a high level.

Energy education is an important part of Clackamas County’s weatherization services and process. Weatherization will certainly improve the energy efficiency of clients’ homes, however, measures will only be as effective as the knowledge the clients have of how to maximize their savings by operating their homes in a way that best utilizes the upgrades. Weatherization staff provide basic information that clients can use to make informed decisions about living comfortably in their homes, while keeping their costs as low as possible.

2. Waitlist management:

- **Number of total households on your waitlist beginning and end of program year:**
October 2018: **193** September 2019: **379**
- **Of that total, how many of the homes are heated with natural gas?**
October 2018: **49** September 2019: **90**
- **Narrative – Describe any issues or highlight success in addressing waitlist over the past year**
Clackamas County’s ability to address the waitlist over the past year is impacted by the high need for services, as can be seen by the increasing number of households on the waitlist. Staff has been working to update the list by removing households that no longer qualify, those who have moved, and those we are unable to contact after multiple attempts.

3. Education methods:

- **Workshops:**
Total: 126 attendees
Gas Only: We did not conduct any gas only workshops in 2018/2019.
37 of the **126** attendees are gas clients
- **Locations (I.e. libraries, at your agency schools, etc.):**
 - Molalla Senior Center **3**
 - County Facilities **16**
 - Pioneer Senior Centre **21**
 - Hopkins Demo Forest **40**
 - Gladstone Senior Centre **1**
 - Canby Hope Village **24**
 - Sandy Senior Center **5**
 - Pioneer Senior Center **16**
- **Number of people/households attending workshops? Breakdown above**

NW Natural Energy Education
Program Year 2018-19 Reporting
Clackamas County

- **Are these just NWN customers?**
No
- **How did participants learn of the workshops?**
Energy Assistance intake appointments, direct contacts with clients, weatherization energy auditor referrals, and direct coordination with Senior Centers throughout Clackamas County
- **In-home Education visits:**
Number of homes visited and were these stand-alone education visits or a component of the weatherization work?
 - Number of Homes **110**
 - Stand-alone: **66** homes visited
 - **46** households received energy education as part of Weatherization Work
- **How were these homes selected?**
Using USDOE priorities
- **Other methods:**
Workshops & in-home visits - this year alone we collaborated with Energy Assistance to specifically target households with clients that are disabled and housebound.
- **If you provide education via other means, please describe.**
We provided information and demonstrations at Local Resource Fairs
- **Please send along a copy of the PowerPoint presentations used, event flyer or handouts, web video links, etc.** Others can't always attend and we'd like to see what's being presented.
See attachments

4. Program Impacts:

- **Describe the tangible impacts of the program and funding.**
It is important for clients to understand how to effectively use newly installed weatherization measures so they can change their habits and/or understanding of how their home system operates, how to maintain any new equipment, and what they can do to maximize their savings.
- **If you hand out EE kits, describe the contents. How many were distributed? To whom?**

Workshops

Workshop participants receive 4 (four) 800 lumen LED light bulbs, 1 (one) five-minute shower timer, a combo refrigerator/house temperature thermometer, and an energy-saving booklet. NWN customers also receive an "About Natural Gas" booklet. Each household receives 1 (one) kit.

Home visits

During a home visit, we cater to the needs and situation of the customer. They may receive the kit described above, as well as a refrigerator brush, caulking, door seals, window tape, storm window kits, thermometers, and a clothesline.

An indoor air quality check measuring CO₂, relative humidity, and 0.5 to 10 micron air particulate concentration may be performed on a voluntary basis. Additionally, NWN

**NW Natural Energy Education
Program Year 2018-19 Reporting
Clackamas County**

customers learn how to check their furnace air filters, look at the gas flame for the correct blue color, and how to shut off the gas at the meter in case of emergency.

This year, for energy education home visits, we specifically targeted people who are disabled, and not able to travel to a workshop. Clackamas County Energy Assistance provided a list of people for each metro area who are disabled, and we contacted them directly by telephone to arrange a home visit.

Most of these customers have not been well served in the past, and were very appreciative of a special, tailored home energy education visit. They also were able to get a \$50 credit on their utility bill for having a home visit, and filling out an "Energy Action Plan.

- **Were furnaces inspected during the home visits?**

Yes, but not by our energy educator. In the low-income weatherization program, you must be an inspector to examine them. However, as part of the Energy Education workshops and home visits, participants learn what a correct flame color in a gas furnace looks like, as well as the importance of maintaining the furnace air filters, condensate pumps, etc.

Our inspectors examined the following gas furnaces through our Energy Assistance LIHEAP Crisis program and regular weatherization program.

How many? **24** How many were fixed or replaced? **18**

- **Narrative: give examples of the participant feedback, or share a success story or two, or highlight a few education successes:**

Workshop participants have consistently evaluated the workshops very highly. Many comment on how much they have learned, as well as how they are now motivated to save energy and money. Weatherization applicants are always very grateful to live more comfortably in a warmer home with lower bills.

See attached Weatherization customer evaluations and Energy Workshop evaluations.

5. Program Funding/Accounting:

- Amount received from NWN (fiscal year **October 1st, 2018 to September 30th, 2019**)
OLIEE Energy Education: \$9,613.00 (new funds received)
- **Of this, the amount spent – \$ 1,106.67**
- **Breakdown of expenditures (in high level terms)**
 - **Personnel - \$485.01**
 - **Materials and Services - \$49.90**
 - **Admin - \$571.76**
 - **Remaining Funds: \$8,506.33**
- **NWN percent of agency energy education funding:**
NWN funding is approximately 8% of Clackamas County's EE budget for 2018/2019



**Yamhill Community Action
Partnership**

ENERGY EDUCATION

CONSERVATION QUIZ

CCB 50960

Form No. E ED 002 Rev. 07/10/2018

ENERGY CONSERVATION QUIZ

True or False:

- _____ 1. It saves money to turn the temperature down when away from the home and/or at night. This is true even when it takes a while to heat your home back up to a comfortable temperature.
- _____ 2. Putting a dry towel in the dryer with your wet clothing will reduce the total dry time.
- _____ 3. Space heaters that plug in use a lot less energy than an installed baseboard or cadet wall heaters.
- _____ 4. I have a light fixture that says 40-Watt Max on the socket. If I am purchasing an energy efficient replacement I cannot use anything higher than a 40-Watt Equivalent LED, which actually uses 6 watts.
- _____ 5. Open dampers in an unlit fireplace chimneys can increase your heating bill by as much as 30%.
- _____ 6. The best place to put an air conditioner is on the sunny side of your home because the sunny side of your home heats up faster.
- _____ 7. If I have a functioning carbon monoxide (CO) alarm, I should feel pretty safe.
- _____ 8. A toilet with a leaky flapper probably wastes more water than leaving the water running when brushing your teeth.
- _____ 9. Closing registers with a forced air furnace and/or whole home air conditioner saves money because you are heating/cooling less area in your home.
- _____ 10. It is best to change air filters in furnaces every 8-9 months.

11 & 12: **Write #1 and #2** next to your **two highest annual** energy users in your home.

Bonus (Yes, you can get extra credit): Write #3 and #4 for the **next two** highest users in your home.

Clothes Dryer
Oven
Heating System

Refrigerator/Freezer
Washing Machine
Lights

Hot Water Heater
Television
Game &/or Stereo System(s)



Yamhill Community Action Partnership

ENERGY EDUCATION

ANSWERS TO CONSERVATION QUIZ

CCB 50960

Form No. E ED 003 Rev. 08/07/14

ANSWERS TO ENERGY CONSERVATION QUIZ

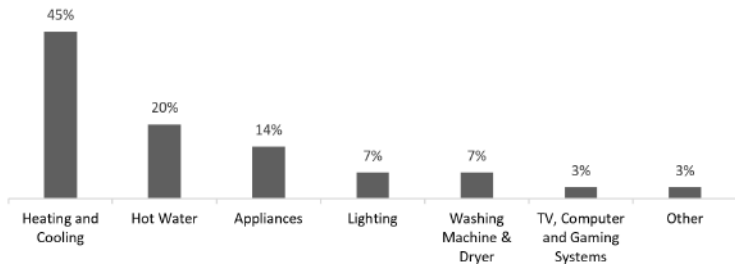
- 1. True:** Even though it takes a while to heat your home up again the heating system doesn't run as much during a 24 hour period. This saves money. <http://www.consumerenergycenter.org/tips/winter.html>
False: If you have a heat pump and your EM HEAT light turns on when you turn your heat up.
- 2. True:** Some web sites and clients tell me that they save 25-50%.
http://www.ehow.com/how_4456338_reduce-cost-running-clothes-dryer.html
- 3. False:** The same amount of electricity creates the same amount of heat. Therefore, the space heater and the installed baseboard or cadet are all equally efficient. <http://www.doityourself.com/stry/baseboard-heaters-vs-space-heaters>
- 4. False:** You need to look at the actual wattage of the light bulbs. A standard incandescent light bulb uses 4 times the amount of energy that a CFL or LED uses. Therefore, you can actually install a 100-Watt Equivalent Energy Efficient light bulb. This can help people who find that they need more light from a fixture.
- 5. True:** Inserting a fireplace chimney balloon will lessen these energy losses.
<http://www.chimneyballoon.us/chimneyballoon.html> **and** <http://www.homeenergy.org/show/article/nav//id/594> **and** http://www.hearth.com/econtent/index.php/articles/should_open_fireplaces_be_illegal
- 6. False:** Your Air Conditions should not be in direct sunlight. It functions more efficiently if placed in a shady location. <http://www.hvac-center.com/air-conditioning-placement.html>
- 7. False:** A carbon monoxide (CO) alarm will protect you and your family from acute CO poisoning. However, the URL rated alarms will not alarm a lower levels of CO, below 70 parts per million (ppm). These low levels of can cause chronic CO poisoning. <http://carbon-monoxide-survivor.com/carbon-monoxide-facts.html>
- 8. True:** Turning off the faucet when you are brushing your teeth can save 4 gallons of water per tooth brushing or 2920 gallons if you brush your teeth twice a day. A leaky toilet can waste up to 135 gallons of water a day or 49,275 gallons a year. <http://www.epa.gov/watersense/pubs/fixleak.html> and <http://www.abtwater.com/MeterCalc.html>
- 9. False:** This actually causes your furnace to work harder and doesn't actually save you any money. If some parts of the house are too warm (typically registers next to the furnace) consider keeping them at least partially open (5-10%). Source: <http://www.consumerenergycenter.org/myths/vents.html>
- 10. False:** Dirty air filters make your furnace work harder which can lead to your furnace breaking down faster. It also increases energy use. YCAP suggests that you check your filter on a monthly basis. Change or clean filters when they become visibly dirty. It is VERY critical to do this with heat pumps and whole house air conditioners as dirty filters can cause them to "freeze" up. <http://ezinearticles.com/?Why-Furnace-Filter-Replacement-is-Important-and-How-it-Affects-Your-Air-Conditioner-Performance&id=4426487>
- 11. & 12 & Bonus::** #1 = Heating System, #2 = Hot Water Heater, #3= Lighting, #4 = Refrigeration



Easy Ways to Save Money on Your Power Bill

Where Does it all Go?

The average annual energy bill in the US is \$2,200.00 (energystar.gov).



Heating Systems:

- Lower your Thermostat

For every degree you lower your thermostat you can save up to 2% on your bill. For example: If your bill was \$100 and you lowered your thermostat from 67° to 65° you would save \$4 every month. Just think how much you would save by turning your heat down to 55 degrees or completely off while you are sleeping.

- Furnace Filters

Be sure to change or clean furnace filters monthly.

- The Sun is a Heat Source

The sun is a heat source, so use your curtains.

Lightbulbs:

- Which is cheaper?

An incandescent bulb for \$0.50 or a CFL for \$2.00? (Assuming 16 hours per day for one year)

In one year you would need 6 incandescent bulbs and pay \$39.00 in power so your cost would be \$42.00. In that same year you would only need 1 CFL and pay \$10.00 in power so your cost would be \$12.00.

- For CFLs

Be sure to leave your new CFL on for the first 3 hours after installing it. This will increase its life.

- LED Bulbs

LED bulbs no longer break the bank to purchase. Generally, you can find quality bulbs for \$2.00 or less.

Vampires:

- What are Vampires?

A vampire is any device that uses power when it is turned off. Examples are televisions, microwaves, computers or battery chargers.

- Find those Vampires

Watch for anything with an internal clock, remote for vampire power.

- Stop those Vampires

Use power strips to turn off devices that use vampire power.

Cooking:

- Burner Size

Match the pan size to the burner size.

- Ovens

Your oven is not a heater, never use your oven to heat your home.

Hot Water:

- Adjust your Hot Water Temperature

The recommended temperature for a hot water heater is 120°. Factories set water heaters at 140°.

For every 10 degree reduction you can save 3-5% on your energy bill. For example: lowering from 140° to 120° could save \$48 per year

- Burns

Hot tap water is responsible for ¼ of scald burns in children. At 140°, it only takes 6 seconds for a 3rd degree burn.

- Baths vs Showers

Every inch of bath water equals 5 gallons of water. By taking installing low flow shower heads you can save 2,000 gallons of water per year.

- 5 Minute Showers

Challenge yourself to limit your showers to 5min each.

- Washing Clothes

Use the cold wash setting for all clothes. Detergents work best in cold water. The hot water setting costs about \$0.59 per load. If you wash 4-5 loads per week that comes out to \$9-\$11 per month. The cold wash/rinse setting cost about \$0.04 per load. If you wash 4-5 loads per week that comes out to \$0.60 - \$0.80 per month. (\$8.40 - \$10.20 savings per month).

- Hand Washing Dishes

Fill a sink or pot with soapy water and let dishes soak. Rise using cold water turning the water on and off as needed.

- For dishwashers

Skip the pre-rinse, only run dishwashers when they are full. Avoid using the dry cycle, let your dishes air dry (air is free).



Form No. E ED 022
Revised: 2/26/2014

Summer Cooling Techniques

General

Many of us in Yamhill County think of high energy bills as being a “wintertime only” occurrence. However, much of the County experiences rather warm summer temperatures. Additionally, the number of air conditioners in use has increased dramatically in recent years. As a result, summer electrical usage is growing, as well as household utility bills. It is easy to save energy (and money) by using simple techniques to help cool your home. As an added bonus, you’ll be helping to protect the environment.

Free Methods

Here are a number of free methods to beat the heat. All are easy habit changes that can make you more comfortable!

- Dress lightly – Loose fitting, absorbent cotton clothing will keep you cooler both inside and outside the home in the summer. You may not need to run the air conditioner as long to be comfortable.
- Close the drapes. Keeping the south and west drapes open is fine for the winter months, but lets in the heat in the summer. Keeping the blinds or drapes shut can make your home cooler by up to 25 percent!
- Turn off unnecessary lights. Think of incandescent lights as little heaters – each puts out 90 percent of the energy used as heat – the last thing you want in a warm house! Compact fluorescent lights produce much less heat than standard bulbs and save energy year round.
- Use the exhaust fans. Use the bathroom and kitchen exhaust fans to get rid of warm, humid air. Reducing humidity makes your home feel cooler and more comfortable. Run the exhaust fans for about 15 minutes after you are finished showering or cooking.
- Use the Grill and the Microwave. Cooking on the grill outside and using the microwave inside keeps unwanted heat out of your house. Avoid inside baking and broiling on hot days.
- Do Laundry when it is cool. Doing the laundry early in the day, or late at night can reduce the heat burden on your home. Washing in cold water, and drying the clothes on an outside clothes line is even better. Make sure your dryer exhaust is vented to the outside and is clear.
- Run your air conditioner on low or medium. Running your air conditioner on these settings reduces the humidity of the incoming air more efficiently than the high setting. Set the thermostat no lower than 78°F to help save energy.
- Open The Windows. Opening the windows at night allows cooler air to enter the home, saving cooling costs. If this is a safety concern, consider cutting PVC pipe so that the windows can only open 3 to 4 inches, no more.

Low Cost Methods

The following are inexpensive things you can do to make you feel more comfortable and save energy at the same time.

- Install ventilating fans. Fans cool by the “wind-chill” effect. They can make a room feel 3 to 5° cooler than it actually is. Ceiling fans produce a cooling breeze over an entire room with very little noise. Window fans can exhaust hot room air, or blow in cool outside air at night. They typically use less than 20 percent of the energy of a window air conditioner.
- Shade the windows. Installing shades on the *outside* of the windows is even more effective than closing the drapes inside. Window awnings can also help keep inside room temperatures down.
- Weatherstrip and caulk. The same techniques used to keep a home warm in winter help keep it cool in the summer. Leaky window and door frames should be weatherstripped to keep warm air out and cool air in. Don’t forget to seal around the window-mounted air conditioner as well!
- Keep the air conditioning filters clean. Changing or cleaning the A/C filters makes your air conditioner work easier. Also check the fins to make sure they aren’t bent flat and restricting airflow.

More Costly Methods

The following are some more costly or long term things you can do to make you feel more comfortable and save energy at the same time.

- Planting shade trees. Plant fast growing leafy trees to the south and west of your home. This will shade your home in the summer during the hottest part of the day but will also allow sun to shine through in the winter.
- Insulate your attic to R-38.
- Insulate your floor.
- Blow insulation into your walls.

Note to renters: You should have landlord approval before making any changes to the home.



Winter Heating Techniques

Form No. E ED 021
Revised: 2-26-2014

General

Heating is the greatest energy user in your home. The no-cost & low-cost measures listed below could result in substantial energy savings.

Free Methods

Here are a number of free methods to beat the cold weather. All are easy habit changes that can make you comfortable!

- **Set Point** is the temperature at which you set the thermostat. Lowering your heating temperature **Set Point** is the most effective way to save energy. For each degree you set your thermostat over 68°F, you can add up to three percent to your heating cost. And, remember, setting the thermostat up higher than your regular **Set Point** will NOT make the room warm up faster.
- **Set Back** is the practice of turning the thermostat down at night or when you will be away from the home. You can save an additional 1% for each degree for each 8 hour period you **set back** your thermostat.
- If you are going on vacation, lower the thermostat to 55 degrees. This will save energy while preventing water pipes from freezing.
- If you have a forced-air furnace, DO NOT close off heat registers in unused rooms. Your furnace is designed to heat a specific square footage of space and can't sense a register closed – it will continue working at the same pace.
- Keep radiators, air registers, and baseboard heaters clean. Be sure furniture or drapes don't block them.
- Keep the compressor units of heat pumps and air conditioners clean.
- Use your drapes or blinds to bring the sun's warmth into your house in the winter. Keep them closed at night to keep cold air out.
- If you have a fireplace or wood stove, keep the damper tightly closed when it's not in use. Leaving the damper open is the same as leaving a good-sized window open.
- Use the ventilation fans in your kitchen, bathroom, and other areas only as needed. Yes, they do a good job of removing moisture and odor, but they also remove a lot of heated air in the winter.
- Open and close exterior doors as quickly as possible. Holding the door open while saying good-bye to visitors or chatting with your neighbors is wasteful.
- Dress in warmer clothing. This will help keep members of the home warm.
- If you have hardwood or tile floors, add area rugs to keep your feet warm.
- **Never** use unvented portable kerosene or propane heaters. Not only are they expensive to operate, they're also very dangerous because they can lead to carbon monoxide poisoning or death.
- When using the fireplace, turn down the furnace to 55 degrees. If you don't, all the warm air from the furnace will go right up the chimney, wasting energy and money.
- Never cover attic vents or recessed light fixtures with insulation, and allow a three-inch clearance around chimneys and flue pipes to prevent overheating and avoid the risk of fire.

Low Cost Methods

Air leaks are the biggest energy wasters in your home. A few hours of time and a few dollars' worth of caulking, sealant, and weather stripping can reduce your energy bill significantly.

Where should you weatherize? Any place warm air can escape or cold air can enter. You can use incense to help you find the air leaks. This works best on windy days. You can reduce the effect of the most important ones by:

- Caulking/weather stripping around entrance doors and any windows that leak air.
- Caulking/sealing where ductwork, electrical wiring, plumbing, or exhaust fans have been installed through floors, ceilings, and exterior walls. (Examples: electrical outlets and switch plates on exterior walls, warm-air registers, water heater and furnace flues, bathroom and kitchen exhaust fans, exterior hose connections. Incense can help you find those leaky areas. It works best if you go around your home on a windy day to diagnose leaky areas.)
- Keep your heating systems well maintained. A small investment in periodic maintenance is good insurance against larger repair bills. Just as important, it will prolong the life of your heating systems and ensure that they operate at maximum efficiency.
- Insulate ducts that pass through unheated spaces.
- Inspect furnace filters at least every other month and clean or replace them as needed.
- Install a programmable thermostat. It will allow you to turn your heat (and air conditioning) up or down with predetermined settings.
- Consider installing individual thermostats in less-used rooms. Highly adaptable to most types of electric heating equipment, they save energy and money by allowing you to turn the heat down or off when the rooms are not in use.
- If you have a wood-burning fireplace, have the chimney cleaned and inspected regularly, and burn only fully dried hardwoods to produce the most heat output.
- Add fire-proof caulking where the chimney meets the wall, inside and outside.
- When fireplace is not in use, make sure fireplace dampers are sealed tight, and keep the glass doors closed. If you never or rarely use your fireplace, plug the chimney with fiberglass insulation or a fireplace pillow. You can also seal the doors with silicone caulk.
- Foam gaskets behind outlet covers and switch plates that are located on the outside facing walls, and use safety plugs in all unused outlets. These are prime places for outside air to leak into your home. Be sure to shut off power at the fuse box or circuit panel first.
- If your home has large, single-pane picture windows, use heavy draperies during the winter to help hold back cold air.
- If drafts sneak in under exterior doors, replace the threshold. If that's not practical, block the drafts with a door snake, rolled-up towel, old rug or blanket.
- If you have a door or window you never use, seal the edges with rope caulk. Don't seal them shut permanently – you might need quick ventilation or escape during an emergency.
- Choose the right kind of caulk for the job. Use latex or acrylic caulk inside – it's easy to clean and more forgiving if you're a beginner. Silicone caulk is great for outside use because it lasts longer and seals virtually any type of surface.

Note to renters: You should have landlord/owner approval before making any changes to the home.



KILL A WATT™

What is a KLL-A-WATT?

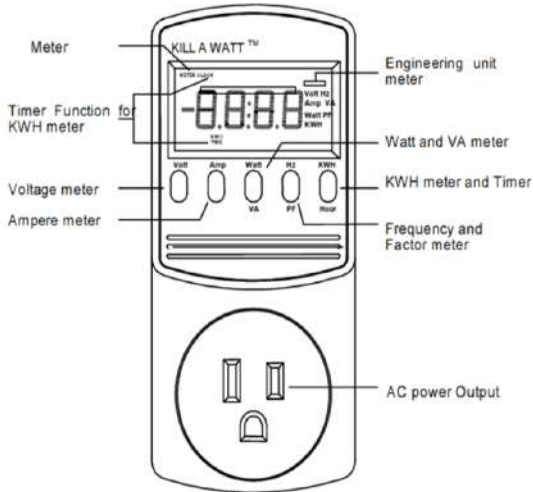
A Kill A Watt® meter can tell you how many watts of electric power your appliances are using. It also tells you an appliance's energy use over time in kilowatt hours (kWh), the measure used to calculate your electric bill. (A typical monthly residential bill runs in the hundreds of kilowatt hours.) Because kilowatt hours add up to dollars, the Kill A Watt® meter can also help figure out how much each appliance is costing you, a first step toward saving both energy and money.

Where can I get one?

All Yamhill County libraries have KILL A WATT® meters available to be checked out for FREE! These models are the P3 style. The newer EZ models can be purchased at most home centers for around \$30.00. They can be a great tool to have, but it is a good idea to check one out from the public library and give it a test run.

How Many Watts Does my Device Use?

1. Plug the KILL A WATT into a standard wall outlet. It may be useful to plug an extension cord into the wall, then the KILL A WATT® into the cord. This may make it easier to see the digital read out.
2. Plug in whatever appliance you want to test.
3. Press the Watt button once. This will display the watts that appliance is using (readout should say Watt).
4. The meter will show the amount of Watts the appliance is using at that moment.



How do I calculate the costs of the appliance:

Once the watts that appliance uses is known, it takes some simple math to figure out the cost. The table below can help. Where it asks for rate for PGE use .11 for McMinnville Water and Light use .06.

$$\frac{\text{Item}}{\text{Watts}} \times \frac{\text{Hours/month}}{\text{convert to KW/h}} \div \frac{1000}{} \times \frac{\text{Rate}}{\text{Cost/ Month}} = \frac{\text{Cost/ Month}}{\text{Months}} \times \frac{12}{\text{Months}} = \frac{\text{Cost /year}}{\text{Cost /year}}$$

Example

$$\frac{\text{Lamp}}{\text{Item}} \times \frac{60}{\text{Watts}} \times \frac{360}{\text{Hours/month}} \div \frac{1000}{\text{convert to KW/h}} \times \frac{.11}{\text{Rate}} = \frac{\$2.37}{\text{Cost/ Month}} \times \frac{12}{\text{Months}} = \frac{\$28.51}{\text{Cost /year}}$$

How Many Watts Over Time?

Some appliances (like your refrigerator) turn on and off all the time. Use the method below to get an accurate reading of how much this appliance will cost.

1. Follow steps 1 & 2 from above.
2. Press the Pink KWH / Hour button. This will show the total KWH this device has used since the Kill-A-Watt was plugged in.
3. Press the Pink KWH / Hour button again and it will show how long the device has been plugged in.
4. The longer the test, the more accurate the results will be. Ideally 2-24 hours is best.
5. Follow the formula below to convert these readings to watts so you can use the formula in the first method.

$$\text{KWH} \div \text{Hours Tested} \div 1000 = \text{Watts}$$

Common Energy Use of Household Appliances

Heating & Cooling	Avg. Watt
Air Conditioning 6,000 BTU	750
Air Conditioning 9,000 BTU	1050
Air Conditioning (central)	3000
Ceiling Fan	85
Dehumidifier	350
Electric Blanket (queen size)	175
Electric Heater (portable)	1500
Fan (portable)	115
Furnace Fan Motor	350
Water Heating	
Water Heater - Family of 4	4500
Water Heater - Family of 2	4500
Refrigeration	
Freezer (15 cubic feet, manual defrost)	350
Freezer (15 cubic feet, automatic defrost)	440
Refrigerator (compact, 2.3 cubic feet)	88
Refrigerator/Freezer (12-16 cubic feet, manual defrost)	325
Refrigerator/Freezer (16-18 cubic feet, automatic defrost)	615
Refrigerator/Freezer (20-23 cubic feet, automatic defrost)	800
Lighting	
40 Watt incandescent bulb	40
40 Watt - CFL equivalent	10
40 Watt - LED equivalent	5
60 Watt incandescent bulb	60
60 Watt - CFL equivalent	13
60 Watt - LED equivalent	10
75 Watt incandescent bulb	75
75 Watt - CFL equivalent	16
75 Watt - LED equivalent	15
100 Watt incandescent bulb	100
100 Watt - CFL equivalent	20
100 Watt - LED equivalent	19
Chandelier, 5 lamp	300
Fluorescent, 2 tubes x 4 feet	70
Holiday lights, snap-in base, 100 lights	36
Holiday lights, large screw-in base, 50 lights	350
Holiday lights, efficient (LED), 100 lights	4
Cooking/Kitchen	
Coffee Maker (brew cycle)	1100
Coffee Maker (warm cycle)	70
Crock Pot	215
Dishwasher (with electric water heating)	1300
Exhaust Fan	200
Microwave	1000
Microwave (standby)	2.9
Range (small burner)	1600
Range (large burner)	2100
Range (standby)	2.7
Oven	3500
Oven (self-cleaning cycle)	3500
Toaster	1150

Laundry	Avg. Watt
Clothes Dryer (1 load = .65 hours)	5000
Iron	1000
Washing Machine, Top Load (cold/cold, 1 = .65 hours)	512
Washing Machine, Top Load (warm/cold, 1 = .65 hours)	4575
Washing Machine, Top Load (hot/cold, 1 = .65 hours)	7650
Washing Machine, Front Load (warm/cold, 1 = .65 hours)	3202
Washing Machine, Front Load (hot/cold, 1 = .65 hours)	5355
Sewing Machine	75
Entertainment	
Computer (data processing unit)	300
Computer (standby)	1.7
Laptop Computer	30
Laptop Computer (standby)	8
Laptop Computer (hibernate)	3
Computer Monitor (15 inch)	120
Computer Monitor (17 inch, flat screen)	60
Computer Monitor (standby)	2
Desktop Printer	50
Desktop Printer (standby)	5
DVD Player	14
DVD Player (standby)	4.2
Radio	10
Stereo System (receiver, CD, Cassette)	80
TV (19 inch tube)	85
TV (25 inch tube)	125
TV (30 inch LED)	101
TV (35 inch tube)	185
TV (36 inch LCD)	144
TV (48 inch Plasma)	361
TV (standby)	5
VCR	30
VCR (standby)	6
Playstation 3	200
X-Box 360	160
Outdoor Equipment	
Domestic Well Pump (.5 horsepower)	500
Domestic Well Pump (.75 horsepower)	750
Domestic Well Pump (1 horsepower)	1000
Domestic Well Pump (1.5 horsepower)	1500
Garage Door Opener (4 times daily)	300
Garage Door Opener (standby)	3
Hot Tub/Spa	12700
Swimming Pool Filter Motor (1.5 horsepower)	1000
Other	
Aquarium (20 gallon, pump, light, heater)	130
Blow Dryer (10 minutes per day)	1500
Clock	2
Curling Iron (15 minutes per day)	40
Electric Shaver (5 minutes per day)	15
Heat Lamp (40 minutes per day)	250
Vacuum Cleaner	640
Water Bed (king size, bed set at 95 degrees F)	400

_____	x _____	÷ <u>1000</u>	x _____	= _____	x <u>12</u>	= _____	
Item	Watts	Hours/month	convert to KW/h	Rate	Cost/ Month	Months	Cost /year
_____	x _____	÷ <u>1000</u>	x _____	= _____	x <u>12</u>	= _____	
Item	Watts	Hours/month	convert to KW/h	Rate	Cost/ Month	Months	Cost /year
_____	x _____	÷ <u>1000</u>	x _____	= _____	x <u>12</u>	= _____	
Item	Watts	Hours/month	convert to KW/h	Rate	Cost/ Month	Months	Cost /year
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Item	Watts	Hours/month	convert to KW/h	Rate	Cost/ Month	Months	Cost /year
_____	x _____	÷ <u>1000</u>	x _____	= _____	x <u>12</u>	= _____	
Item	Watts	Hours/month	convert to KW/h	Rate	Cost/ Month	Months	Cost /year



Your Guide to More Efficient and Money-Saving Light Bulbs

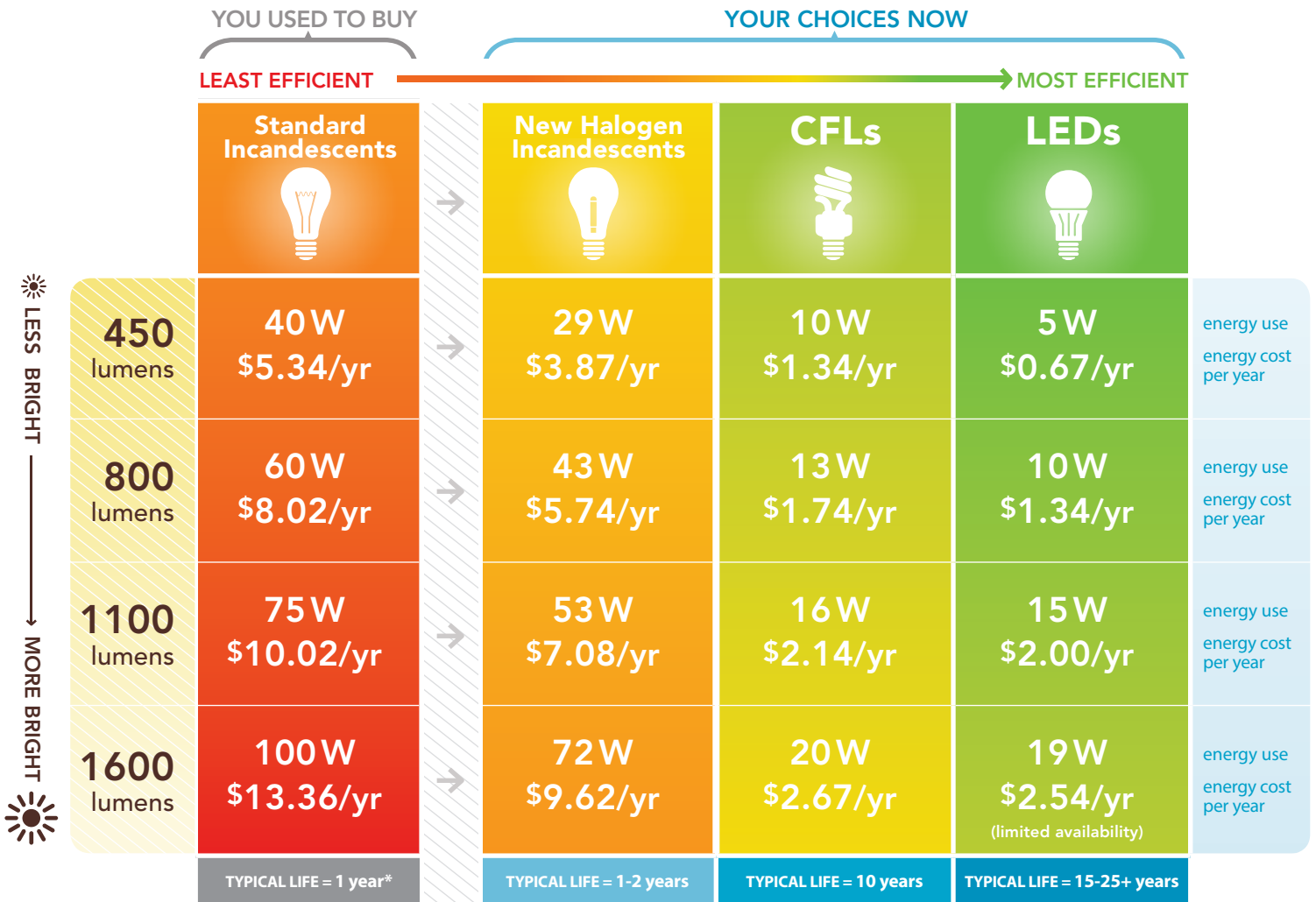
With new energy efficient lighting standards come new kinds of light bulbs and more choices than ever. So how do you decide which bulb is best for your home and budget?

It's as easy as 1, 2, 3...

STEP 1 Choose bulbs based on how bright you need them to be. ☀️ This is measured in lumens. The higher the lumens, the brighter the light.

STEP 2 Once you've chosen the lumen output you need, determine which bulb has the lowest estimated energy cost per year. These will save you the most money.

STEP 3 Finally, choose the other features you prefer, such as lifetime and light appearance. The ENERGY STAR® logo tells you which CFLs and LEDs meet minimum efficiency, lifetime and quality standards.



* rated life is based on 3 hours of use per day

Where can I find this information?

Nearly all light bulb packages now have labels that tell you what you need to know, much like nutrition labels on food. Want to know if a particular bulb is bright enough to meet your needs? Match the lumens information from its Lighting Facts label to the table above. If a bulb claims to be a "100 watt replacement" but is only 1200 lumens, for example, it's really closer to the brightness of a typical 75 watt bulb.

Front of package

- 1 Brightness
- 2 Estimated energy cost per year

Brightness

800

lumens

Estimated Energy Cost

\$1.69

per year

Back of package

- 3 Other features

Lighting Facts Per Bulb

Brightness 800 lumens

Estimated Yearly Energy Cost \$1.69
Based on 3 hrs/day, 11¢/kWh.
Cost depends on rates and use.

Life 7 years
Based on 3 hrs/day

Light Appearance
Warm ————— Cool
2700 K

Energy Used 14 watts

Contains Mercury
For more on clean up and safe disposal, visit epa.gov/cfl

Why do we have labels on our light bulbs?

In 2007, Congress passed and President Bush signed into law the Energy Independence and Security Act (EISA), improving energy efficiency for many products, including light bulbs. You can still buy incandescent bulbs that look and operate like the ones you are used to—the new ones just use less energy. The law also requires new light bulb labels to help you choose the most efficient bulbs, like LEDs and CFLs.

See the Savings

Lighting Facts Per Bulb	
Brightness	800 lumens
Estimated Yearly Energy Cost	\$1.69
Based on 3 hrs/day, 11¢/kWh. Cost depends on rates and use.	
Life	7 years
Based on 3 hrs/day	
Light Appearance	Cool
Warm ————— Cool	
▲ 2700 K	
Energy Used	14 watts
Contains Mercury	
For more on clean up and safe disposal, visit epa.gov/cfl	

Brightness – The most important information on the label and the only way to know for sure how much light the bulb provides.

ENERGY STAR Logo – Indicates which CFLs and LEDs meet ENERGY STAR requirements for efficiency, lifetime and quality.

Life – Estimates in years how long the bulb will last. Long life bulbs save you the hassle of frequent bulb changes and help ensure that more efficient bulbs pay for themselves over time.

Light Appearance – Tells you the shade of light. Incandescents produce warm white light—between 2700 K and 3000 K. Bulbs that produce cooler or more bluish light will have a higher rating, such as 4000 K to 6500 K. Most buyers will prefer the warm white color to “daylight” or “bright white” colors.

Energy Used (watts) – Measures bulb energy use, not brightness.

Contains Mercury – CFLs contain extremely low levels of mercury, less than 2.5 mg, and are completely safe to use in normal operation. NRDC’s fact sheet (www.nrdc.org/legislation/files/lightbulbmercury.pdf) contains more information.

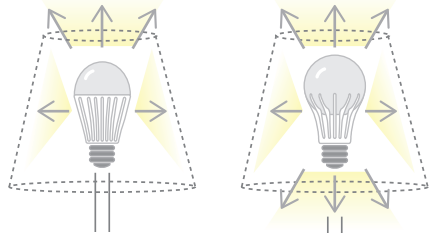
Some bulbs last for 1 year and others last for 10 or more. Which bulbs cost the least in the long run?

Traditional incandescent bulbs are no longer the cheapest to buy, the overall cost of both purchasing and powering the bulb will be higher than an LED. Over the longer life of an LED, those savings can be more than \$75. The following table helps to illustrate why more energy efficient bulbs are the best bargain overall. Over relatively short time periods, CFLs can be a slightly better deal than LEDs, but LEDs win over the long haul due to longer life and lower energy use.

Bulb Types (all approx. 800 lumens)	Life	Costs	Year 1	Cost Annually	Total Costs over 10 years
Standard Incandescent 60 W	1 yr	Bulb Cost*	\$1.24	\$1.24	\$12.40
		Energy Cost	\$8.02	\$8.02	\$80.15
		Total Cost	\$9.26	\$9.26	\$92.55
Halogen Incandescent 43 W	1 yr	Bulb Cost*	\$1.99	\$1.99	\$19.90
		Energy Cost	\$5.74	\$5.74	\$57.44
		Total Cost	\$7.73	\$7.73	\$77.34
CFL 13 W	9 yrs	Bulb Cost*	\$0.99	\$0.00	\$1.98
		Energy Cost	\$1.74	\$1.74	\$17.37
		Total Cost	\$2.73	\$1.74	\$19.35
LED 10 W	23 yrs	Bulb Cost*	\$1.66	\$0.00	\$1.66
		Energy Cost	\$1.34	\$1.34	\$13.40
		Total Cost	\$3.00	\$1.34	\$15.06

* 2017 lightbulb average cost Oregon retail.

Table lamp comparison

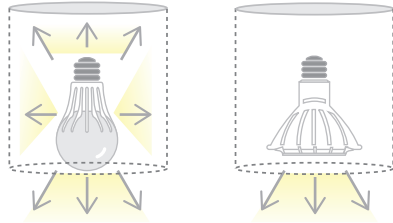


Standard LED bulb
X

ENERGY STAR LED bulb
✓

In table and floor lamps, you want the light to shine in all directions, so look for ENERGY STAR-labeled bulbs that are omnidirectional.

Recessed can comparison



Omnidirectional LED bulb
X

ENERGY STAR Reflector LED
✓

For downlights and recessed cans, install ENERGY STAR reflector LED bulbs. The light going upward from omnidirectional bulbs can be wasted inside the fixture.



Water Conservation Tips

Form No. E ED 032
Revised: 5/1/2014

Lawn and Garden:

Outdoor water use accounts for almost half the water used in the American home. Reducing the amount of water you use outside provides the greatest opportunity for savings.

- Plant drought-resistant lawns, shrubs and plants.
- Put a layer of mulch around trees and plants. This will slow evaporation and discourage weed growth.
- Group plants according to their watering needs.
- Water early in the morning before 10:00 a.m. Watering in the heat of the day allows the water to evaporate and watering late in the day may promote fungus and other lawn diseases.
- Avoid watering when it is windy.
- Depending on the weather, it's generally better to water once a week and give the plants 1 to 1½ inches of water. (If it's hot, you might have to water more often.)
- Time how long it takes to apply one inch of water by placing a flat-bottomed can about six feet away from the sprinkler. Then sprinkle each part of the lawn for that amount of time.
- Mow lawns with the highest mower setting. Taller grass requires less water.
- Consider letting your lawn brown out. It will come back in the spring.
- Consider a drip irrigation or soaker hose system for your garden.
- Direct water from rain gutters and HVAC systems toward water loving plants.

Outdoor Cleaning:

- Use a broom or a leaf blower to clean patios and driveways.
- Consider washing your car on your lawn. The car will get clean and the water will be used twice.
- If you must wash your car over pavement: rinse your car once, wash from a bucket, then rinse quickly again. Do not leave the hose water running while washing from a bucket.

Laundry:

- Wash full loads of laundry.
- If you must wash partial loads, adjust water levels to match the size of the load.
- Avoid the permanent press cycle, which uses an added 5 gallons of water for the extra rinse.
- Use the correct amount of laundry detergent. Many people assume that more is better and add too much. This can lead to clothing being stiff clothing and/or mold in your machine. Using too much laundry detergent can also void the warranty on your washing machine.
- Consider investing in a new Energy Star rated washing machine. They use 35-50% less water and 50% less energy per load.
- Remember to check the hoses leading to your washing machine. Kenmore suggests that you check your hoses every month and replace (even if there is no obvious damage) every 5 years. Also, make sure that the hoses are properly installed with no sharp creases.

Use Your Water Meter to Check for Hidden Leaks:

Turn off all of water in your house. Go out and look at your meter. If it is still turning, you have a hidden leak. Find it and fix it to save water and money.

Repair Leaks:

Check faucets and hose connections for leaks. Inspect pipes for pinhole leaks, and leaking joints. You can lose 15 to 20 gallons a day from a slow leak. This will waste almost 6,000 gallons a year.

Washing Dishes:

- If washing dishes by hand, use the two sink method of washing and rinsing. If you prefer to rinse with running water; turn on the water only when rinsing.
- Wash full loads of dishes in your dishwasher.
- Most dishwashing soap manufacturers recommend not pre-rinsing dishes. Use a plastic spatula to remove most of the food from dishes.
- Many people use too much dishwashing detergent in their automatic dishwasher. They assume that filling the container will ensure extra clean dishes. However, if you don't have extremely hard water filling the container half way full is usually enough. Using too much detergent wastes money and may etch your glasses or leave a film on the surface of your dishes.

Insulate Hot Water Pipes:

If hot water pipes are insulated, the water will heat up quicker at the faucet. This leads to less water being wasted. Consider capturing the water as it heats up and using it to water plants.

Know Where the Shut-Off Valve Is:

If your home does develop a major water leak, knowing where to shut off the water can save your property and your water. Share this information with EVERYONE in your home. Babysitters may need to shut off the water when they are in your home.

Food Preparation and Drinking:

- Minimize the use of a kitchen sink garbage disposal. They use lots of water when operating properly and add considerably to the volume of solids in a septic tank. This can lead to septic tank maintenance problems. Consider starting a compost bucket for food waste.
- Clean vegetables by rinsing them in a stoppered sink or pan of clean water.
- Defrost food using your refrigerator or microwave, not running water.
- Keep a bottle of drinking water in the refrigerator to keep it cold instead of running the faucet until it cools down. This can also help your refrigerator save energy by filling up empty space.
- Drink out of a glass or water bottle instead of out of a water fountain.

Cleaning Yourself:

- Take showers instead of baths if possible.
- Use low-flow showerheads and faucet aerators.
- Take five-minute showers.
- Turn off the water after you have wet your toothbrush. Turn on when rinsing it out.
- Rinse your razor in the sink by filling the sink with a couple inches of water. Swish your razor in the water. This will work just as well while saving a lot of water.
- Consider reusing your towel after bathing or showering. You are clean when you come out of the shower.

Toilets

- Use a water displacement device (dam or toilet tummy) to reduce the amount of water used per flush.
- Check your toilet to make sure the reservoir isn't leaking into the bowl. Put some food coloring into the reservoir (blue, green or red work well as you want an intense color). Wait 20 to 60 minutes. If you see color in the bowl and no one has flushed the toilet, it is leaking.
- Flush only when needed. Do not use your toilet as a trash can for tissues, etc.
- Consider replacing old toilet with new "low flow" or "ultra-low volume (ULV)" model.
- Avoid using caustic chemicals to clean your toilet. These chemicals can damage plastic and rubber toilet parts.

Note to renters: You should have landlord/owner approval before making any changes to the home.



A BRIEF GUIDE TO
MOLD,
MOISTURE,
AND
YOUR HOME

*EPA 402-K-02-003
(Reprinted 09/2012)*

**This Guide provides
information and guidance
for homeowners and
renters on how to clean
up residential mold
problems and how to
prevent mold growth.**

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A BRIEF GUIDE TO MOLD, MOISTURE, AND YOUR HOME

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MOLD BASICS

- The key to mold control is moisture control.
- If mold is a problem in your home, you should clean up the mold promptly *and* fix the water problem.
- It is important to dry water-damaged areas and items within 24-48 hours to prevent mold growth.



Why is mold growing in my home?



Mold growing outdoors on firewood. Molds come in many colors; both white and black molds are shown here.

Molds are part of the natural environment. Outdoors, molds play a part in nature by breaking down dead organic matter such as fallen leaves and dead trees, but indoors, mold growth should be avoided. Molds reproduce by means of tiny spores; the spores are invisible to the naked eye and float through outdoor and indoor air. Mold may begin growing indoors when mold spores land on surfaces that are wet. There are many types of mold, and none of them will grow without water or moisture.

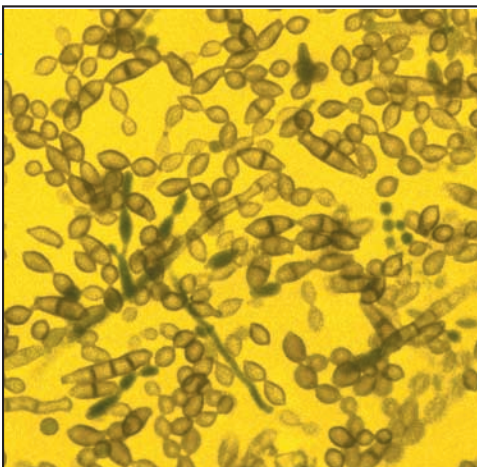
Can mold cause health problems? Molds are usually not a problem indoors, unless mold spores land on a wet or damp spot and begin growing. Molds have the potential to cause health problems. Molds produce allergens (substances that can cause allergic reactions), irritants, and in some cases, potentially toxic substances (mycotoxins).

Inhaling or touching mold or mold spores may cause allergic reactions in sensitive individuals. Allergic responses include hay fever-type symptoms, such as sneezing, runny nose, red eyes, and skin rash (dermatitis). Allergic reactions to mold are common. They can be immediate or delayed. Molds can also cause asthma attacks in people with asthma who are allergic to mold. In addition, mold exposure can irritate the eyes, skin, nose, throat, and lungs of both mold-

allergic and non-allergic people. Symptoms other than the allergic and irritant types are not commonly reported as a result of inhaling mold.

Research on mold and health effects is ongoing. This brochure provides a brief overview; it does not describe all potential health effects related to mold exposure. For more detailed information consult a health professional. You may also wish to consult your state or local health department.

How do I get rid of mold? It is impossible to get rid of all mold and mold spores indoors; some mold spores will be found floating through the air and in house dust. The mold spores will not grow if moisture is not present. Indoor mold growth can and should be prevented or controlled by controlling moisture indoors. If there is mold growth in your home, you must clean up the mold **and** fix the water problem. If you clean up the mold, but don't fix the water problem, then, most likely, the mold problem will come back.



Magnified mold spores.

Molds can gradually destroy the things they grow on. You can prevent damage to your home and furnishings, save money, and avoid potential health problems by controlling moisture and eliminating mold growth.

MOLD

CLEANUP



Leaky window – mold is beginning to rot the wooden frame and windowsill.

If you already have a mold problem – **ACT QUICKLY.** Mold damages what it grows on. The longer it grows, the more damage it can cause.

Who should do the cleanup? Who should do the cleanup depends on a number of factors. One consideration is the size of the mold problem. If the moldy area is less than about 10 square feet (less than roughly a 3 ft. by 3 ft. patch), in most cases, you can handle the job yourself, following the guidelines below. However:

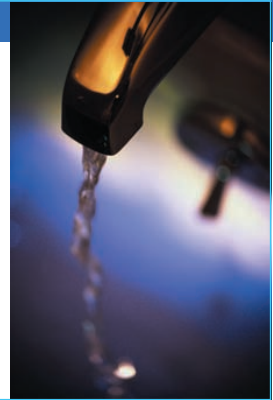
- If there has been a lot of water damage, and/or mold growth covers more than 10 square feet, consult the U.S. Environmental Protection Agency (EPA) guide: *Mold Remediation in Schools and Commercial Buildings*. Although focused on schools and commercial

buildings, this document is applicable to other building types. It is available on the Internet at: www.epa.gov/mold.

- If you choose to hire a contractor (or other professional service provider) to do the cleanup, make sure the contractor has experience cleaning up mold. Check references and ask the contractor to follow the recommendations in EPA's *Mold Remediation in Schools and Commercial Buildings*, the guidelines of the American Conference of Governmental Industrial Hygienists (ACGIH), or other guidelines from professional or government organizations.
- If you suspect that the heating/ventilation/air conditioning (HVAC) system may be contaminated with mold (it is part of an identified moisture problem, for instance, or there is mold near the intake to the system), consult EPA's guide *Should You Have the Air Ducts in Your Home Cleaned?* before taking further action. Do not run the HVAC system if you know or suspect that it is contaminated with mold - it could spread mold throughout the building. Visit www.epa.gov/iaq/pubs to download a copy of the EPA guide.
- If the water and/or mold damage was caused by sewage or other contaminated water, then call in a professional who has experience cleaning and fixing buildings damaged by contaminated water.
- If you have health concerns, consult a health professional before starting cleanup.

MOLD CLEANUP GUIDELINES

BATHROOM TIP Places that are often or always damp can be hard to maintain completely free of mold. If there's some mold in the shower or elsewhere in the bathroom that seems to reappear, increasing the ventilation (running a fan or opening a window) and cleaning more frequently will usually prevent mold from recurring, or at least keep the mold to a minimum.



Tips and techniques The tips and techniques presented in this section will help you clean up your mold problem. Professional cleaners or remediators may use methods not covered in this publication. Please note that mold may cause staining and cosmetic damage. It may not be possible to clean an item so that its original appearance is restored.

- Fix plumbing leaks and other water problems as soon as possible. Dry all items completely.
- Scrub mold off hard surfaces with detergent and water, and dry completely.

Mold growing on the underside of a plastic lawnchair in an area where rainwater drips through and deposits organic material.



Mold growing on a piece of ceiling tile.



- Absorbent or porous materials, such as ceiling tiles and carpet, may have to be thrown away if they become moldy. Mold can grow on or fill in the empty spaces and crevices of porous materials, so the mold may be difficult or impossible to remove completely.
- Avoid exposing yourself or others to mold (see discussions: **What to Wear When Cleaning Moldy Areas** and **Hidden Mold**.)
- Do not paint or caulk moldy surfaces. Clean up the mold and dry the surfaces before painting. Paint applied over moldy surfaces is likely to peel.
- If you are unsure about how to clean an item, or if the item is expensive or of sentimental value, you may wish to consult a specialist. Specialists in furniture repair, restoration, painting, art restoration and conservation, carpet and rug cleaning, water damage, and fire or water restoration are commonly listed in phone books. Be sure to ask for and check references. Look for specialists who are affiliated with professional organizations.

WHAT TO WEAR WHEN

CLEANING MOLDY AREAS



Mold growing on a suitcase stored in a humid basement.

It is important
to take
precautions to
**LIMIT
YOUR
EXPOSURE**
to mold and
mold spores.

- **Avoid breathing in mold or mold spores.** In order to limit your exposure to airborne mold, you may want to wear an N-95 respirator, available at many hardware stores and from companies that advertise on the Internet. (They cost about \$12 to \$25.) Some N-95 respirators resemble a paper dust mask with a nozzle on the front, others are made primarily of plastic or rubber and have removable cartridges that trap most of the mold spores from entering. In order to be effective, the respirator or mask must fit properly, so carefully follow the instructions supplied with the respirator. Please note that the Occupational Safety and Health Administration (OSHA) requires that respirators fit properly (fit testing) when used in an occupational setting; consult OSHA for more information (800-321-OSHA or osha.gov/).

- **Wear gloves.** Long gloves that extend to the middle of the forearm are recommended. When working with water and a mild detergent, ordinary household rubber gloves may be used. If you are using a disinfectant, a biocide such as chlorine bleach, or a strong cleaning solution, you should select gloves made from natural rubber, neoprene, nitrile, polyurethane, or PVC (see **Cleanup and Biocides**). Avoid touching mold or moldy items with your bare hands.
- **Wear goggles.** Goggles that do not have ventilation holes are recommended. Avoid getting mold or mold spores in your eyes.



Cleaning while wearing N-95 respirator, gloves, and goggles.

How do I know when the remediation or cleanup is finished? You must have completely fixed the water or moisture problem before the cleanup or remediation can be considered finished.

- You should have completed mold removal. Visible mold and moldy odors should not be present. Please note that mold may cause staining and cosmetic damage.
- You should have revisited the site(s) shortly after cleanup and it should show no signs of water damage or mold growth.
- People should have been able to occupy or re-occupy the area without health complaints or physical symptoms.
- Ultimately, this is a judgment call; there is no easy answer.

MOISTURE AND MOLD PREVENTION AND CONTROL TIPS

MOISTURE Control is the Key to Mold Control



Mold growing on the surface of a unit ventilator.

- When water leaks or spills occur indoors - **ACT QUICKLY**. If wet or damp materials or areas are dried 24-48 hours after a leak or spill happens, in most cases mold will not grow.

- Clean and repair roof gutters regularly.
- Make sure the ground slopes away from the building foundation, so that water does not enter or collect around the foundation.
- Keep air conditioning drip pans clean and the drain lines unobstructed and flowing properly.



Condensation on the inside of a window-pane.

- Keep indoor humidity low. If possible, keep indoor humidity below 60 percent (ideally between 30 and 50 percent) relative humidity. Relative humidity can be measured with a moisture or humidity meter, a small, inexpensive (\$10-\$50) instrument available at many hardware stores.

- If you see condensation or moisture collecting on windows, walls or pipes - ACT QUICKLY to dry the wet surface and reduce the moisture/water source. Condensation can be a sign of high humidity.

Actions that will help to reduce humidity:

- ◆ Vent appliances that produce moisture, such as clothes dryers, stoves, and kerosene heaters to the outside where possible. (Combustion appliances such as stoves and kerosene heaters produce water vapor and will increase the humidity unless vented to the outside.)
- ◆ Use air conditioners and/or de-humidifiers when needed.
- ◆ Run the bathroom fan or open the window when showering. Use exhaust fans or open windows whenever cooking, running the dishwasher or dishwashing, etc.

Actions that will help prevent condensation:

- ◆ Reduce the humidity (see preceding page).
- ◆ Increase ventilation or air movement by opening doors and/or windows, when practical. Use fans as needed.
- ◆ Cover cold surfaces, such as cold water pipes, with insulation.
- ◆ Increase air temperature.

Mold growing on a wooden headboard in a room with high humidity.



Renters: Report all plumbing leaks and moisture problems immediately to your building owner, manager, or superintendent. In cases where persistent water problems are not addressed, you may want to contact local, state, or federal health or housing authorities.



Rust is an indicator that condensation occurs on this drainpipe. The pipe should be insulated to prevent condensation.

Testing or sampling for mold Is sampling for mold needed? **In most cases, if visible mold growth is present, sampling is unnecessary.**

Since no EPA or other federal limits have been set for mold or mold spores, sampling cannot be used to check a building's compliance with federal mold standards. Surface sampling may be useful to determine if an area has been

adequately cleaned or remediated. Sampling for mold should be conducted by professionals who have specific experience in designing mold sampling protocols, sampling methods, and interpreting results. Sample analysis should follow analytical methods recommended by the American Industrial Hygiene Association (AIHA), the American Conference of Governmental Industrial Hygienists (ACGIH), or other professional organizations.

HIDDEN MOLD



Mold growing on the back side of wallpaper.

Suspicion of hidden mold You may suspect hidden mold if a building smells moldy, but you cannot see the source, or if you know there has been water damage and residents are reporting health problems. Mold may be hidden in places such as the back side of dry wall, wallpaper, or paneling, the top side of ceiling tiles, the underside of carpets and pads, etc. Other possible locations of hidden mold include areas inside walls around pipes (with leaking or condensing pipes), the surface of walls behind furniture (where condensation forms), inside ductwork, and in roof materials above ceiling tiles (due to roof leaks or insufficient insulation).

Investigating hidden mold problems Investigating hidden mold problems may be difficult and will require caution when the investigation involves disturbing potential sites of mold growth. For example, removal of wallpaper can lead to a massive release of spores if there is mold growing on the underside of the paper. If you believe that you may have a hidden mold problem, consider hiring an experienced professional.

Cleanup and Biocides Biocides are substances that can destroy living organisms. The use of a chemical or biocide that kills organisms such as mold (chlorine bleach, for example) is not recommended as a routine practice during mold cleanup. There may be instances, however, when professional judgment may indicate its use (for example, when immune-compromised individuals are present). In most cases, it is not possible or desirable to sterilize an area; a background level of mold spores will remain - these spores will not grow if the moisture problem has been resolved. If you choose to use disinfectants or biocides, always ventilate the area and exhaust the air to the outdoors. Never mix chlorine bleach solution with other cleaning solutions or detergents that contain ammonia because toxic fumes could be produced.

Please note: Dead mold may still cause allergic reactions in some people, so it is not enough to simply kill the mold, it must also be removed.

Water stain on a basement wall — locate and fix the source of the water promptly.



ADDITIONAL **RESOURCES**

For more information on mold related issues including mold cleanup and moisture control/condensation/humidity issues, visit:

www.epa.gov/mold



Mold growing on fallen leaves.

This document is available on the Environmental Protection Agency, Indoor Environments Division website at: www.epa.gov/mold

NOTES

Acknowledgements

EPA would like to thank Paul Ellringer, PE, CIH, for providing the photo on page 14.

Please note that this document presents recommendations. EPA does not regulate mold or mold spores in indoor air.





Mold and Mildew Quick Facts

Form No: E ED 031
Revised: 8/5/2014

General

Indoor mold is a common problem in the Pacific Northwest. Mold spores naturally exist both indoors and outdoors and cannot be eliminated. Normally, they do not grow or reproduce on indoor surfaces. Often the primary causes of mold growth are too much moisture generation, too little moisture removal, or cold surfaces. **For example:** Mold often grows around windows because blinds or shades are always kept closed. This cools the window area and prevents the free flow of air, causing mold growth. If you have a mold problem, you also have a water leak or moisture problem. To reduce mold and mildew, there are several steps that you can take;

1. Keep indoor humidity low:

- Use bathroom fans during and for at least 30 minutes after showering and bathing (preferably one hour). If no fan is available, open windows slightly for ventilation for the same amount of time.
- Consider using a shower squeegee to remove water droplets from the shower surround. This will send the water down the drain.
- Use the exhaust fan above the stove whenever cooking or boiling liquids. If no fan (or if a recirculating fan exists that does not exhaust outdoors), open a window slightly for ventilation during cooking or boiling.
- Use the fan in the laundry area during and for 20 minutes after using the washer (not the dryer if it exhausts outdoors), or if there is no fan, open a window slightly for ventilation.
- Consider purchasing a de-humidifier.
- Cover fish tanks.
- Do not use unvented combustion space heaters, such as kerosene heaters, indoors (also a CO hazard).
- Do not use your gas oven for space heating (also a CO hazard).
- Do not have an excessive number of house plants.

2. Prevent cold surfaces that promote mold growth:

- Raise the blinds or shades as often as possible each day (extremely important!)
- Allow at least 1 inch (4 inches is better) between furniture and walls to warm wall surfaces and allow air flow.

3. Keep indoor temperatures moderately warm at all times:

- Keep heat above 60 degrees Fahrenheit. Low temperatures promote mold growth.
- Do not turn off the heat for prolonged periods of time (especially in the bedrooms).
- Open closet doors.

4. Attend to spills or flooding:

- Immediately dry any water that spills or overflows from showers, tubs, toilets, sinks, etc.
- Immediately clean up and thoroughly dry and spills onto carpets, rugs and/or floors.

5. Fix (or notify management) immediately if there is any excessive moisture:

- Any water leakage; leaking plumbing, tubs, showers, or toilets.
- Any running water; plumbing, tubs, showers or toilets.

6. Clean regularly and thoroughly:

- If mold appears on any indoor surfaces, immediately **scrub** it off with soap and water or a 50%:50% white vinegar: water solution (bleach is not necessary), and then rinse and dry the surface.
- Check, clean and dry window tracks and keep them free from condensation buildup.
- If the mold reappears or you are not able to remove it immediately, report the mold to management or hire a professional.

7. Humidity levels:

- 0-30 %—Too Low
- 30-50%—Just Right
- 50-60%—A Little High
- 60-70%—Try to reduce the humidity in your home to prevent mold and mildew growth
- 70-100%—Mold and Mildew problems are probable.

Note to renters: You should have landlord/owner approval before making any changes to the home.



Hot Water Heater Maintenance

If your hot water heater is overheating, making strange noises or performing unusually, it's EXTREMELY IMPORTANT that it is not allowed to run; the longer the hot water heater continues running, the worse the problem could get and the more likely the tank is to leak, flood or worse. Even if a plumbing or heating contractor has been called to look at the problem, it is still better to turn off the hot water heater before the technician arrives to look at the appliance.

Do-it-yourselfers who perform their own hot water heater maintenance will want to drain water from their hot water heater tank every EVERY YEAR to prevent sediment build-up and improve performance and energy-efficiency. It is VERY IMPORTANT to turn off the hot water heater before draining it to avoid the risk of scalding, electrocution or breaking your hot water heater.

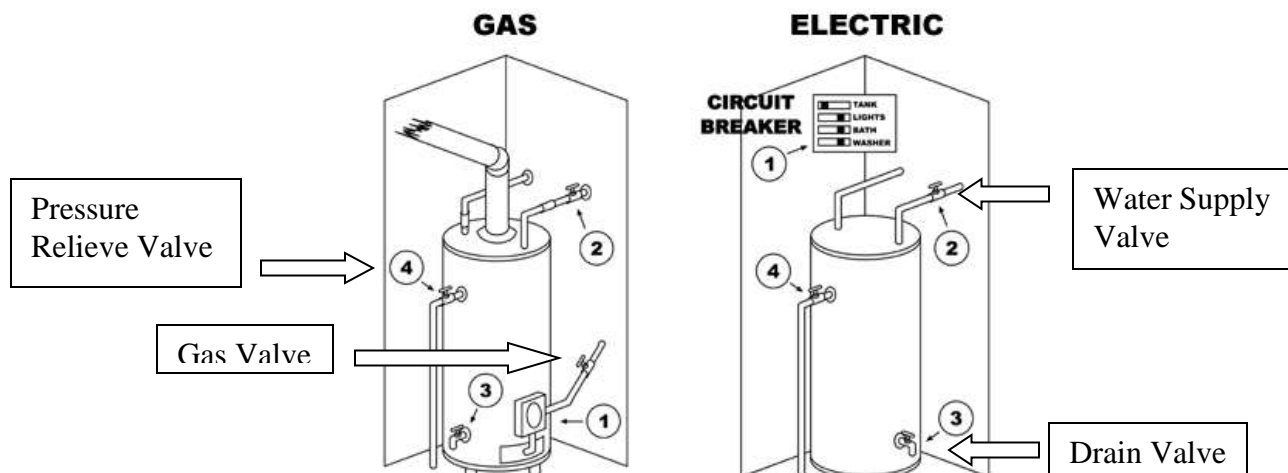
Follow these instructions any time it is necessary to shut off the hot water heater. A diagram is provided below to assist in the shut down procedure. If the hot water heater was being drained for maintenance and the hot water heater was functioning properly, turn the hot water heater on again.

Hot Water Heater Shutdown and Drain Instructions:

1. TURN OFF GAS OR ELECTRICITY:
 - **Gas:** Twist the dial on the top of the thermostat from the ON to the OFF position.
 - **Electric:** Switch the circuit breaker for the water heater to the OFF position.
2. TURN OFF WATER SUPPLY. Turn the handle on the water valve CLOCKWISE until it stops. If the water does not stop, turn off the main water valve for the entire house. If you only need to shutdown, STOP HERE.
3. DRAIN WATER HEATER. Attach a hose to the drain valve at the bottom of the tank. Run the other end of the hose to a lower place where you can drain rusty, hot water without causing damage. Open a hot water faucet in the house to let air into the tank. (**CAUTION: Hot water will be released, this can cause scalding.**)
4. OPEN THE RELIEF VALVE. Flip handle so it is sticking straight out or up. (**CAUTION: Scalding hot water may be released.**)
5. TURN ON WATER SUPPLY. This will stir up any additional sediment and help it drain out. Let water run until it runs clean.

Hot Water Heater Turn-On Instructions:

1. TURN OFF THE WATER HEATER DRAIN. Remove the hose.
2. FLIP THE PRESSURE RELIEF VALVE CLOSED.
3. TURN ON WATER SUPPLY.
4. TURN ON A HOT WATER TAP IN THE HOUSE. Fill the hot water tank until water flows out of the hot water tap. The water should flow smoothly. If it is "spitting" there is still air in the line—let it flow longer.
5. TURN ON THE GAS OR ELECTRICITY:
 - **Gas:** Twist the dial on the top of the thermostat to the PILOT position and light the pilot light. Turn the dial up to the correct setting.
 - **Electric:** Switch the circuit breaker for the water heater to the ON position.

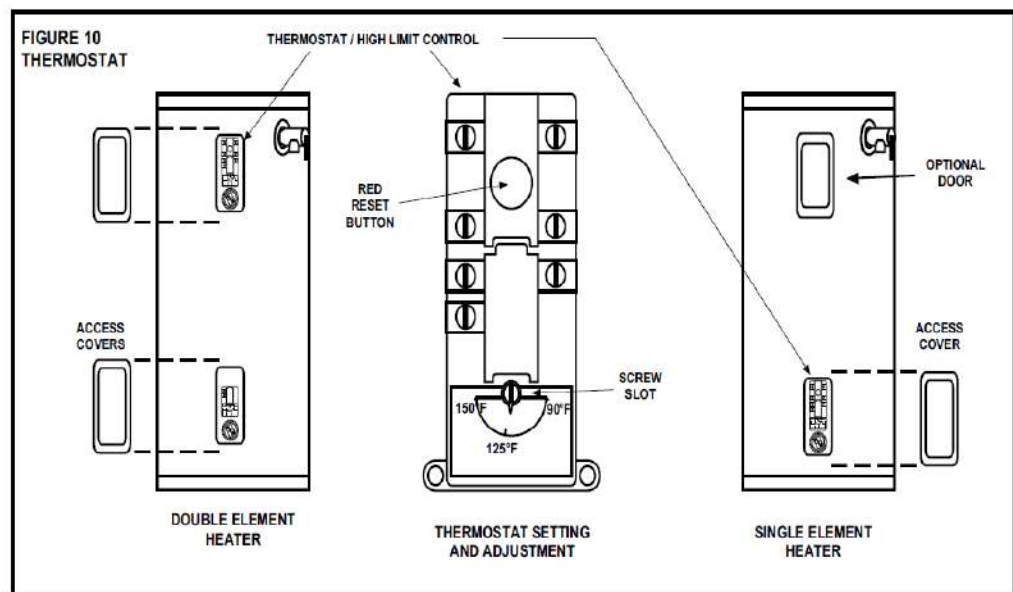
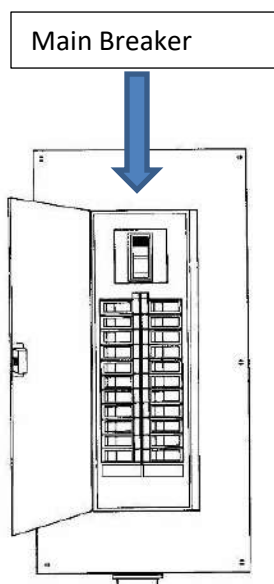




How to Adjust Your Electric Water Heater Temperature

1. **Turn off the circuit breaker for the water heater at the electrical box.** Electric water heaters use 240 Volts so it is usually two circuit breakers that switch together. If it is not listed on the location sheet inside of the panel, be on the safe side and turn off all the power by switching the main breaker for the whole house.
2. Remove access panel on the water heater with a screwdriver.
3. Carefully remove the insulation or pull it up to expose the thermostat.
4. Turn the screw slot to change the place where the arrow is pointing. Turn it down to where you think it will produce 120 degrees. Do not necessarily believe the temperature that the arrow shows, it could be misleading!!! Your thermostat may look different than the diagram shown below. The diagram shows 95, 125 and 150 degree settings. I have seen some hot water heaters with these markings: (1) "Warm, Hot, Very Hot," (2) "A, B, C, D, E," or (3) "1, 2, 3, 4, 5." Different models of water heaters may have you turn the dial either clockwise or counter-clockwise to turn down the temperature.
5. If your hot water heater has two access panels and two thermostats, repeat steps 2-4 so that both thermostats are set to the same temperature.
6. Replace the Insulation and access panel(s)?
7. Turn the circuit breaker on.
8. Let the temperature in your water heater adjust to the new settings. Check the temperature after 24 hours at the faucet farthest from the hot water tank with a meat thermometer. It should read 120 degrees Fahrenheit. If it is hotter or colder, go back to step 1 and adjust as necessary.
9. If your home has a dishwasher without a heating element, it is important to set your water heater to 140 degrees Fahrenheit. However, this is a scalding risk and causes your hot water heater to use more electricity.

Note : If you are a renter, check with you landlord before changing the temperature setting on your hot water heater.



How to Adjust Your Gas Water Heater Temperature

Before starting, make sure you know how to re-light the pilot in your gas hot water heater. Of course, it's best to consult your owners' manual, but if you don't know where it is, this is a general how-to for setting your hot water heater's temperature. **Remember, don't use any open flames near your gas appliance. Do not use any type of flame for light or smoke tobacco near your gas hot water heater.**



1. Find your gas valve and temperature adjustment dial.



2. Turn the adjustment dial to change the temperature. Different models may have the Vacation, Warm and Hot setting in a different configuration. Some models may have approximate degrees, "A, B, C, D, E" or "1, 2, 3, 4, 5" instead of the markings on this dial. Turn the dial so that the temperature setting lines up with the mark at the top of the control. (This one is set WAY too hot.)

3. Remember, the setting on your water heater dial may be incorrect. Set the dial to 120 degrees Fahrenheit (to the best of your ability). Let the temperature adjust for 24 hours and check the temperature at the faucet farthest from you hot water heater with a meat thermometer. It should read 120 degrees. If the temperature is hotter or colder, go back to Step 1 and adjust as necessary.

4. If your home has a dishwasher without a heating element, it is important to set your water heater to 140 degrees Fahrenheit. However, this is a scalding risk and causes your hot water heater to use more electricity.

Note : If you are a renter, check with you landlord before changing the temperature setting on your water heater.

Setting the water heater thermostat to 120-degrees is an easy way to save money and energy. It also helps keep your family safe!!!

January 2009

Fact sheet



Preventing Carbon Monoxide Poisoning

Information for Older Adults and Their Caregivers

Do you know that carbon monoxide (CO) is the most common cause of poisoning death in the United States? Unintentional CO poisonings are responsible for about 500 deaths and 15,000 visits to emergency rooms annually. Older adults over 65 years of age are especially vulnerable to unintentional CO poisoning due to their high frequency of pre-existing medical conditions.¹ While CO alarms can save lives, fewer than one third of American homes have them installed.²

What Is Carbon Monoxide (CO)?

CO is an odorless, colorless gas that can cause illness and death. It is produced whenever any fuel such as natural gas, propane, gasoline, oil, kerosene, wood or charcoal is burned. Devices that produce CO include cars, boats, gasoline engines, stoves and heating systems. CO from these sources can build up in enclosed or semi-enclosed spaces. When people inhale CO, the toxic gas enters the bloodstream and blocks oxygen

from being absorbed into the body, which can damage tissues and result in death.³

What Are the Symptoms of CO Poisoning?

For most people, the first signs of exposure to low concentrations of CO include mild headache and breathlessness upon moderate exercise. Continued or acute exposure can lead to flu-like symptoms including more severe headaches, dizziness, tiredness, nausea, confusion, irritability, and impaired judgment, memory and coordination.⁴ CO is called the "silent killer" because if these early signs are ignored, a person may lose consciousness and be unable to escape the danger.

You May Be Symptom Free and Still Exposed to Unsafe CO Levels

Breathing low concentrations of CO may not result in obvious symptoms of CO poisoning, yet exposure to low levels of CO can cause long-term health damage, even after the

Everyone is at risk of being poisoned by carbon monoxide exposure. Older adults with pre-existing conditions, such as chronic heart disease, anemia, or respiratory problems, are even more susceptible to the effects of this odorless, colorless gas.

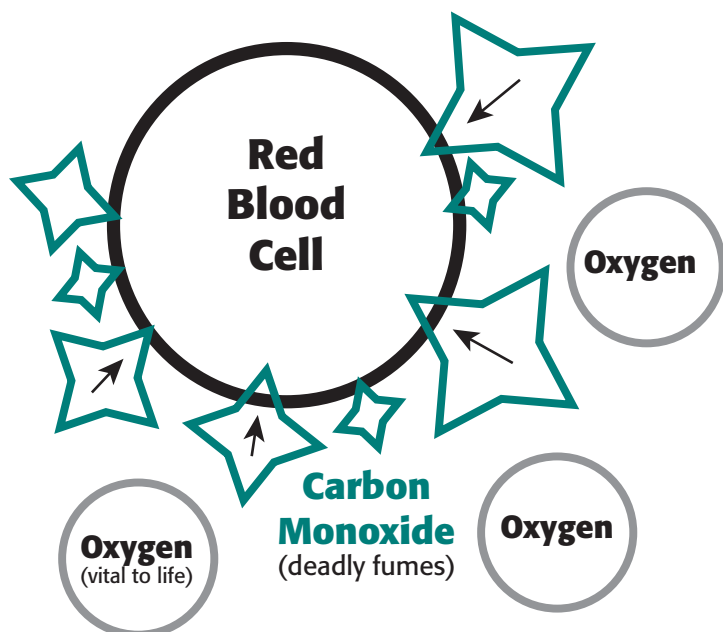
CO source is removed. These health effects include long-term neurological damage such as learning and memory impairments, emotional and personality effects, and sensory and motor disorders.⁵

Who Is at Risk from CO Poisoning?

People of all ages are at risk for CO poisoning. Persons living with chronic heart disease, anemia, or respiratory problems are more susceptible to its effects.⁶ Older adults more frequently have these pre-existing conditions, which lower their tolerance and increase the risk of a fatal exposure.⁷ CO poisoning can also be highly dangerous for unborn children, greatly increasing the risk of fetal death and developmental disorders.^{8,9}

More Common among Minorities

A study conducted in Washington State among minority populations showed that Hispanic populations had a four times greater risk and black populations had a three times greater risk than white populations for CO poisoning. The most common source of CO poisoning among those populations was burning charcoal briquettes. Approximately 66% of Hispanic



victims and 40% of black victims became poisoned as a result of indoor burning of charcoal briquettes.¹⁰

If You Experience Symptoms You Think Could Be from CO Poisoning:

- Get fresh air immediately. Open doors and windows and turn off stoves, ovens, heaters and similar appliances and leave the house.
- Call a poison center immediately at 1-800-222-1222. The poison experts there will let you know if you need to seek further medical attention.

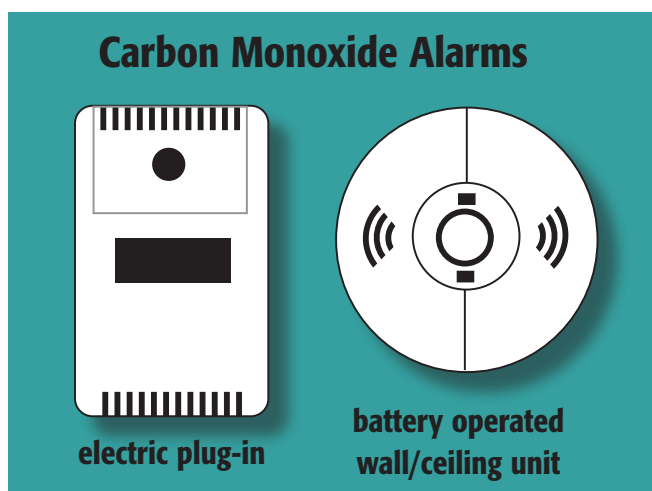
To Prevent CO Poisoning, Remember I CAN B:

- **I**nstall CO alarms near sleeping areas.
- **C**heck heating systems and fuel-burning appliances annually.
- **A**void the use of non-vented combustion appliances.
- **N**ever burn fuels indoors except in devices such as stoves or furnaces that are made for safe use.
- **B**e Attentive to possible symptoms of CO poisoning.

Other Tips for Preventing CO Poisoning:

- Keep gas appliances properly adjusted.
- Consider purchasing a vented space heater when replacing a non-vented one.
- Use proper fuel in kerosene space heaters.
- Install and use an exhaust fan vented to the outdoors over gas stoves.
- Open flues when using the fireplace.
- Choose properly-sized wood stoves that are certified to meet EPA emission standards. Ensure wood stove doors fit tightly.
- Have your heating system and chimney inspected and cleaned by a qualified technician annually.

- Make sure all interior fuel-burning appliances are in good condition and have proper ventilation.
- Never idle the car in the garage, even if the garage door is open to the outside.
- Use portable generators outside and far away from buildings. Never use portable generators on balconies or near doors, vents or windows. Never use portable generators near to where you sleep or your family sleeps.
- Never use a charcoal grill indoors, even in a fireplace.
- Propane heaters or heaters using other fuels placed in enclosed hunting and fishing shanties, should be vented to the outside.
- Never heat your home with a gas oven.



CO Alarms

Half of all unintentional CO poisoning deaths could be prevented with the use of CO alarms. Alarms should be Underwriters Laboratories (UL) approved and are generally available at local hardware stores.¹¹ The cost is minimal and in view of the possibility that it may save the lives of you and your family it is a bargain. Install a CO alarm on every floor of your home and within hearing range of each sleeping area. Carefully follow manufacturers' instructions for their placement, use, and maintenance. Unlike smoke alarms, CO alarms may expire after several years.

How to Tell the Difference between CO Poisoning and the Flu

Since many of the symptoms of CO poisoning are similar to those of the flu, you may not think that CO poisoning could be the cause. Symptoms could be the result of CO poisoning when:

- You feel better when you are away from your home.
- More than one person in the home gets sick at the same time (it usually takes several days for the flu to pass from person to person).
- Family members who are most affected spend the most time in the home.
- Symptoms occur or get worse shortly after turning on a fuel-burning device or running a vehicle in an attached garage.
- Indoor pets also appear ill, exhibiting symptoms such as drowsiness and lethargy (human flu viruses are not transmitted to pets).
- Generalized aching, low-grade fever, or swollen lymph nodes (these are typical of a cold or flu).¹²

Don't let buying a CO alarm lull you into a false sense of security. CO alarms should only be considered a back-up for proper use and maintenance of your fuel-burning appliances. CO alarms are not designed for low-level CO monitoring and there have been questions about whether CO alarm standards are protective enough, especially for sensitive groups such as older adults.¹³

Aging Adults and Environmental Health Issues

EPA's Aging Initiative is working to protect the health of older adults from environmental hazards through risk management and prevention strategies, education and research. For more information about EPA's Aging Initiative, visit www.epa.gov/aging

Printed copies of this fact sheet can be ordered at: <http://www.epa.gov/aging/resources/factsheets/order.htm>

Additional Resources

Your Local Poison Center

■ 1-800-222-1222

■ Internet: www.aapcc.org

U.S. Environmental Protection Agency

Carbon Monoxide

<http://www.epa.gov/iaq/co.html>

CDC

Carbon Monoxide

<http://www.cdc.gov/co/>

Consumer Product Safety Commission

Home Heating Equipment Safety

www.cpsc.gov/cpscpub/pubs/heatpubs.html

Carbon Monoxide Alarms

www.cpsc.gov/cpscpub/prereel/prhtml01/01069.html

Portable Generators

www.cpsc.gov/cpscpub/pubs/portgen.html

Endnotes

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12 U.S. Department of Housing and Urban Development. Healthy Homes Issues: Carbon Monoxide, Healthy homes Initiative Background Information, December 2005. http://www.healthyhomes training.org/Documents/HUD/HUD_CO_Brief.pdf.

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