

Woodsmoke Pollution

Oregon's wintertime air pollution

We pride ourselves on clean air, but for many communities in Oregon the clear winter skies are actually full of pollution. Smoke from wintertime residential wood-burning can be so bad that it exceeds the federal health standard. It's a common myth that industry is the major contributor to air pollution. The truth is smoke from fireplaces and woodstoves is one of the largest threats to healthful air in Oregon.

Why worry about air pollution?

Air pollution damages our health, our crops, our property and our environment. It degrades the livability of our communities while costing the state important jobs. In neighborhoods across Oregon, residential wood-burning is a significant source of air pollution. Most wood heaters (woodstoves and fireplaces) release more air pollution, indoors and out, than heaters using other fuels. Woodsmoke also reduces visibility.

The Department of Environmental Quality (DEQ) and your local community are asking you to help clear the air of woodsmoke. Here is information about the air pollutants in woodsmoke, their health effects, how wood burns, why it smokes and how you can produce less wood smoke.

Oregon stories

Woodsmoke affects Oregon communities both east and west of the Cascades. The communities of Medford-Ashland, Grants Pass, Eugene-Springfield, Oakridge, as well as Klamath Falls, Lakeview and La Grande have a common threat to healthful air—woodsmoke. However, woodstoves can be a localized problem in neighborhoods in any city.

DEQ recognized long ago that woodsmoke is harmful to health. In 1986 it began a program to rate woodstoves based on how efficiently they burn fuel, how much smoke they emit and how much heat they put out. All new woodstoves and fireplace inserts sold in Oregon had to meet new smoke standards for particulate emissions.

Oregon was the first state in the nation to certify woodstoves so consumers could make better buying decisions. It wasn't long before the Environmental Protection Agency (EPA) adopted these standards nationwide.

What's in wood smoke?

Woodsmoke is basically fuel from your firewood that doesn't burn and becomes air pollution. Complete combustion gives off light, heat, the gas carbon dioxide and water vapor. Smoke contains these gases and tiny particles known as PM_{2.5}. PM_{2.5} stands for "Particulate Matter less than 2.5 Microns in Diameter." The period at the end of this sentence is about 500 microns across. PM_{2.5} particles are so small that the body's natural defense mechanisms can't keep them from entering deep into the lungs where they can damage and change the structure of lung tissue, which can lead to serious respiratory problems. PM_{2.5} particles are actually made up of very small droplets of wood tars and gases, soot and ash. Smoke also contains the following unburned pollutant gases:

- **CO-Carbon Monoxide:** Reduces the blood's ability to supply oxygen to body tissues. Even small amounts can stress your heart and reduce your ability to exercise.
- **NOx-Oxides of Nitrogen:** May lower a child's resistance to lung infections.
- **HC-Hydrocarbons:** Can injure the lungs and make breathing difficult.

Where does PM_{2.5} come from?

In the wintertime most PM_{2.5} pollution comes from smoke generated by residential wood-burning. As the price of other heating sources increased in the 1970's and 1980's, so did interest in heating with wood. It is estimated that more than 340 thousand woodstoves fire up each winter in Oregon and more than 1.5 million tons of wood is burning in Oregon homes each year.

While there are some advantages to heating with wood, there are also serious problems. Pollution is one.

Burn smart!

Burn only "seasoned," dry fire-wood (with less than 20 percent moisture by weight). Firewood should dry a minimum of 6 to 12 months after splitting. Hardwoods dry slower than softwoods and may take more than a year to dry. To speed drying: split big logs and stack loosely in a crosswise fashion to get good air circulations. Stack a foot or more above the ground and away from building in a sunny, well-ventilated area.



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Cover the top to keep dew, rain and snow off the wood, but leave sides open to breezes.

Small is better: Build small, hot fires instead of large, smoldering ones. Open the damper wide to allow the maximum air in to fuel the fire. Leave damper and other air inlets open for 20 to 30 minutes. It's worth the extra time to get your stove up to temperature and establish a good bed of coals before loading on any logs. Don't jam your firebox full of wood. It reduces your stove's efficiency and fuel economy. Keeping your fuel loads modest will minimize air pollution.

No garbage: Only burn clean, seasoned wood in your stove. No garbage, plastics, rubber, paint or oil, no painted or charcoal briquettes and no glossy or colored paper. Burning these items can foul your catalytic combustor, your flue as well as cause serious health problems for you, your family and neighbors.

Watch those smoke signals: If you're sending up a lot of smoke, that's a sign you are burning wrong. Apart from the half hour after lighting and refueling, a properly burning fire should give off only a thin wisp of white steam. If you see smoke, adjust your dampers or air inlets to let in more air. Remember the darker the smoke, the more pollutants it contains and the more fuel is being wasted.

Don't bed it down for the night: Not only is it a fire hazard, but when you "hold" a fire overnight by cutting down the air supply you create a lot more smoke and creosote. You'll not only pollute the neighborhood, but the smoke can back draft into the house causing a serious indoor air pollution problem. Let your fire burn out completely and rely on your home's insulation to hold in enough heat for the night.

For safety's sake: Periodic inspection of your stove or fireplace is essential to ensure continued safe and clean-burning operation. Certified stoves produce less creosote and provide a safer burn. Each year in Oregon there are between 1,000 and 2,000 home and chimney fires caused by woodstoves. Professionally clean the chimney at least once a year to remove creosote buildup.

Clean or replace plugged catalytic combustors according to manufacturer's instructions. Gaskets on airtight stove doors need replacement every few years. If your stove's seams are sealed with furnace cement, check for broken, missing cement.

These steps will not only reduce smoke output, they will save you money. Proper burning techniques stretch your fuel dollar and provide more efficient heat.

New stoves mean less pollution

Did you know woodstoves that are not certified waste up to 60 percent of the wood burned in them? No one can afford to waste valuable money on an inefficient heating system. If you own an old, inefficient stove, think about replacing it with a newer, cleaner heating system. You can tell if your stove is certified by looking on the back for a certification sticker from DEQ or EPA. If there is no sticker you have an old and potentially high polluting stove.

There's a new generation of home heating devices that provide good efficiency, with moderate to virtually no smoke emissions. These include natural gas stoves and furnaces, hi-tech zonal oil heaters, EPA phase II certified woodstoves and pellet stoves. A new system will pay for itself in fuel and cleaning savings.

Burning questions?

Look to your local air quality planning organization or DEQ for answers to your questions about burning or other clean air issues. Remember, you are your own best resource for cleaner air.

For more information about woodstoves

Contact DEQ at 503-229-5659

For more information about lung disease

Contact the American Lung Association at: 503-246-1997 or 1-800-LUNG-USA

Alternative formats

Alternative formats (Braille, large type) of this document can be made available. Contact DEQ's Office of Communications & Outreach, Portland, at 503-229-5696, or toll-free in Oregon at 1-800-452-4011, ext. 5696.