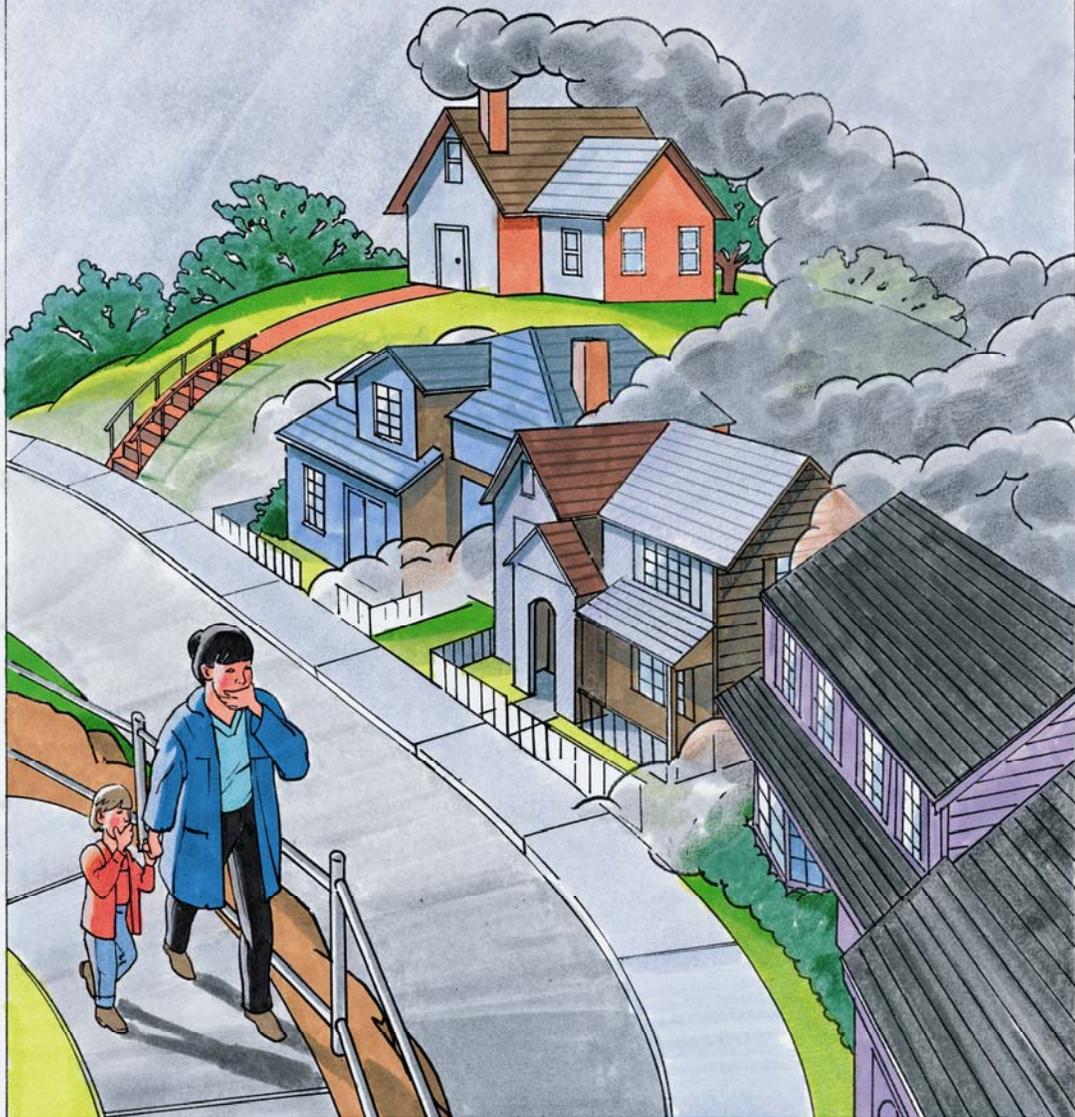


Wood Burning Handbook



**Reduce Wood Smoke Pollution.
Don't Burn Wood.
Switch to Natural Gas.**



BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

Cold nights, with little wind—common weather conditions in the winter months when we heat our homes—often cause smoke and other air pollution to accumulate close to the ground overnight. These stagnant conditions can last for days.

This is a big problem in California valleys. As night falls, ground level air cools and cold air also slides down the valley walls, pooling on the valley floors. With little or no wind, temperature inversions can occur. Warm air layers act as a lid over the cold air in the valleys, trapping smoke and other air pollution close to the ground. Smoke from stoves and fireplaces remains at ground level and collects overnight in the air you and your neighbors must breathe, and yes, it DOES seep into your homes.

The California Air Resources Board and the Bay Area Air Quality Management District are asking you to help clear the air of wood smoke.

You CAN Make a Difference!

Take these steps to reduce wood smoke pollution!

- 1. Stop Burning Wood!**
 - Pollute less by finding a cleaner way to heat your home (p.2).
- 2. Switch to a Gas Fireplace or Insert:**
 - Convert your fireplace to gas with a gas fireplace insert (p.6).
- 3. If You Must Use Wood, Burn Less Wood:**
 - Reduce your heating needs by weatherizing your house (p.9).
 - Replace your old wood stove or fireplace with a new certified model, and get more heat and less pollution while burning less wood (p.7).
- 4. Change the Way You Operate Your Stove or Fireplace:**
 - Burn only clean, seasoned wood (p.9).
 - Build small, hot fires instead of large smoldering ones (p.10).
 - Watch your chimney for smoke and have it inspected often (p.12).
 - Follow your wood heater's operating instructions (p.12).
- 5. Don't Use Your Fireplace on Spare the Air Nights:**
 - Don't burn wood when the District issues a Spare the Air Tonight request (back cover).
- 6. Urge Your City or County to Adopt a Wood Smoke Ordinance:**
 - Lobby your local government to adopt the Air District's model wood smoke ordinance to reduce air pollution (p. 14)

Burning Wood Produces Wood Smoke and Air Pollution!

The California Environmental Protection Agency and your local air district are asking you to help clear the air of wood smoke. In this handbook you will find information about the air pollutants in wood smoke, health effects of smoke, how wood burns, why it smokes and how you can prevent wood smoke pollution.

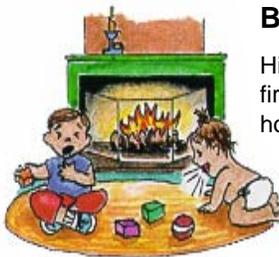
Smoke from neighborhood stoves and fireplaces, a common source of both odor and reduced visibility, greatly contributes to air pollution. When you include the health-related problems caused by inhaling smoke pollutants, health costs for individuals and the community can

be significant. To be a good neighbor, eliminate wood burning. If you do burn, learn to "light it right" and limit the amount of wood smoke produced.



Sources of Wood Burning and Air Pollution...

Air pollution affects millions of Californians every day. It damages our health, our crops, our property and our environment. In neighborhoods everywhere across California, residential wood burning is a growing source of air pollution. Most wood heaters, such as wood stoves and fireplaces, release far more air pollution, indoors and out, than heaters using other fuels. In winter, when we heat our homes the most, cold nights with little wind cause smoke and air pollutants to remain stagnant at ground level for long periods.



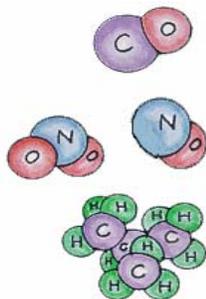
Burning Wood Causes Indoor Air Pollution

High levels of smoke pollutants leaking from stoves and fireplaces have been measured in some wood burning homes. If you or family members suffer from chronic or repeated respiratory problems like asthma or emphysema, or have heart disease, you should not burn wood at all. If you must burn wood, make sure your stove or fireplace doesn't leak and that you know how to operate it correctly.

Remember - If you can smell smoke, you are breathing smoke!

What Happens When Wood Burns?

Complete combustion gives off light, heat, and the gases carbon dioxide and water vapor. Because when wood burns complete combustion does not occur, it also produces wood smoke, which contains the following major air pollutants, which are regulated by State and Federal regulations because of their known health effects:



Carbon Monoxide (CO) – An odorless, colorless gas, produced in large amounts by burning wood with insufficient air. CO reduces the blood's ability to supply oxygen to body tissues, can cause stress on your heart and reduce your ability to exercise. Exposure to CO can cause long-term health problems, dizziness, severe headaches, unconsciousness and other serious effects. Those most at risk from CO poisoning are the unborn child, and people with anemia, heart, circulatory or lung disease.

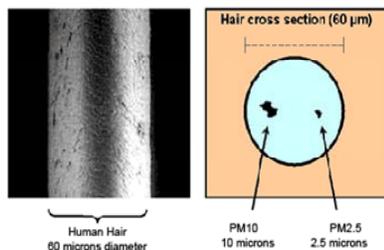
Oxides of Nitrogen (NO_x) – NO_x impairs the respiratory system and its ability to fight infection. NO_x also combines with VOCs and contributes to the formation of ozone and with water vapor to form acid rain or acid fog.

Volatile Organic Compounds (VOCs) – Evaporated carbon compounds which react with NO_x in sunlight to form ozone (photochemical smog). Ozone injures the lungs and makes breathing difficult, especially in children and exercising adults. NO_x and VOCs also form particulate matter through a series of complex reactions.

Toxic Pollutants – Wood smoke also contains VOCs which include toxic and/or cancer-causing substances, such as benzene, formaldehyde and benzo-a-pyrene, a polycyclic aromatic hydrocarbon (PAH). Manufactured fireplace logs, for instance, are not recommended for burning because they produce toxic fumes, including PCBs (polychlorinated biphenyls). Researchers are now studying these and other smoke products to learn more about their effects on human health.



Relative Size of Particulate Matter



Particulate Matter less than 10 microns in diameter (PM₁₀) are very small droplets of condensed organic vapors of wood tar and gases. These particles are a result of unburned fuel and have a diameter of 10 microns or smaller (the diameter of a human hair is about 50 to 100 microns), which allows them to be inhaled into the lungs. Exposure to PM₁₀ aggravates a number of respiratory illnesses.

PM₁₀ includes a smaller group of particles called **PM_{2.5}**, particles with diameters of 2.5 microns and less. These finer particles pose an increased health risk because they can lodge deep in the lungs and contain substances that are particularly harmful to human health, contributing to lung diseases and cancer. Exposure to PM_{2.5} may even cause premature death in people with existing heart and lung disease.

Fireplaces and Old Wood Stoves Are Inefficient, Expensive Heaters!

Why...Because of the Way Wood Burns.

As the fire temperature rises, different stages occur:



Stage 1 – Water Boils Off



As the log heats, moisture contained in the log vaporizes, and escapes through the log's surface as water vapor. More energy is used up vaporizing the moisture than is used to burn the log. That heat energy could be warming your house instead of drying your wood before it burns.

Stage 2 – Vaporizes Wood Gases

Before burning, firewood "cooking" creates and releases hundreds of new volatile organic gases, which contain VOCs, tars and charcoal or carbon. Because the log temperature at this stage is too low to burn gases and tars, they escape up the flue. As they cool, some of the gases will combine with water vapor to form highly flammable creosote that sticks to the flue walls; other gases condense into smoke particles.



Stage 3 – Log Charcoal Burns

At temperatures above 600 degrees Fahrenheit the escaping gases start burning, ignited by nearby flames. As the temperature reaches 1000 degrees, the log charcoal burns and emits heat. Burning charcoal produces most of the fire's heat.

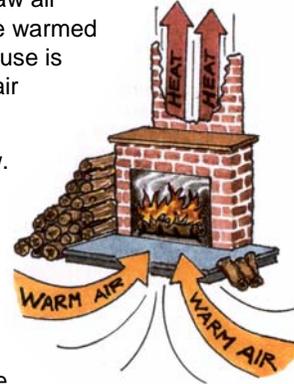
As you can see, most of your investment in wood goes up in smoke. This is an expensive way to produce a little heat!

Most Fireplaces are Not Good Heaters!

Most fireplaces rob your house of heat because they draw air from the room and send it up the chimney! Yes, you'll be warmed if you sit within six feet of the fire, but the rest of your house is getting colder as outdoor air leaks in to replace the hot air going up the chimney.

The key to burning clean and hot is to control the airflow. Most fireplaces waste wood because of unrestricted airflow. A lot of air helps the fire burn fast, but a load of wood will last only one or two hours.

Some older fireplaces actually pollute more if you install glass doors on an old fireplace insert that is not a certified clean-burning model. Restricting the air supply causes the fire to smolder and smoke. Make sure you install a new, EPA-certified clean-burning fireplace insert.



Where Does Your Heat Go? Check your Insulation and Weather-Stripping

Warm air is always escaping from your house, and is replaced by unheated outdoor air. The typical house has one-half to two air exchanges per hour, and more on windy and/or very cold days. If your house has little insulation and many air leaks, you are paying to heat the outdoors. **And if the outside air is smoky, soon your air inside will be too.**

Some air exchange is necessary because of the many sources of air pollution in the home (wood heater, gas stove, consumer products, cigarettes, etc.) Sufficient fresh air inlets are needed to replace air forced out of the house by exhaust fans, dryers, furnaces, water heaters, or wood fires. Here are some suggestions to minimize excess air exchange:

Install Ceiling Insulation. When hot air rises, much of the heat is lost through the ceiling and roof. Wall and floor insulation also reduce heat loss. Recommended amounts of insulation have increased in recent years, so be sure your house has all it needs.



Caulk around all windows, doors, pipes, and any opening into the house.

Weather-strip all door and window openings. Consider installing double-paned glass, outdoor or indoor storm windows, and/or insulated curtains.

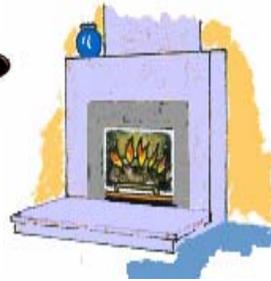
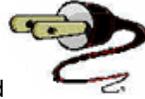
Close the damper tightly when the heater is not in use. Stoves and fireplaces allow air to leak out of the house even when they are not operating, unless they are literally airtight.

Close off unused rooms if you do not use central heating – Don't waste the heat!

Clean up your Air Guzzling Fireplace by Trying Alternate Heating Methods...

Use an Electric Fireplace

Electric fireplaces can be installed anywhere, and no vent is required. They can be plugged into any standard household electrical (120V) outlet and can operate with or without heat. Most fireplaces are made with an adjustable thermostat that maintains room temperatures. The fireplace glass does not absorb heat, so it is safe to touch whether or not the heater is operating.



Switch to Gas

Gas fireplaces are very popular and look like a real wood fire! They are self-contained units, which can be fitted into your existing (vented) fireplace. They send less of your heated air up the chimney. This equipment burns cleaner, is easy to start, convenient, safe and inexpensive to operate, and is a good source of heat. Gas fireplaces are also a good choice if you're remodeling a home and replacing a wood fireplace.

Install a Certified Wood Burning Fireplace Insert

Fireplace inserts have been developed which meet federal emission standards and provide high fuel efficiency. They are available in many sizes and styles to fit into your masonry fireplace. They provide excellent fire viewing and heat output with very little smoke.



Try a Pellet Stove

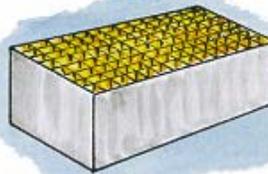
Pellet stoves are the most efficient and least polluting of the new stove designs. Most are exempt from certification because they provide less than 1 gram per hour of particulate emissions. Usually these stoves have some moving parts and require electricity. The fuel, which is made from compressed wood waste and formed into pellets, automatically feeds into the firebox. Combustion air is drawn in and the fire burns hot and clean. Another fan blows room air through a heat exchanger and into the room.

U.S. EPA Certified Wood Stoves Heat More - Pollute Less

The EPA requires wood stove manufacturers to conduct a quality assurance program for wood heaters. Wood heaters must be certified. A permanent label on a wood heater indicates that it meets the emission standards. A consumer information label is also required that specifies the emission rate, the heating range of the wood heater, and overall efficiency. Certified stoves heat better with less wood because they burn more of the combustible gases that would otherwise become smoke in fireplaces and old stoves. There are two types of certified wood stove designs to choose from:

Catalytic Stoves

Similar to the smog control device on new cars, the catalytic combustor in these stoves allows the volatile gases to burn at lower temperatures. Smoke passes through a ceramic honeycomb coated with a rare-metal catalyst, which allows complete smoke combustion and heat release at only 500-700 degrees F. Their efficiency does drop over time and the catalyst device requires replacement after three to seven years of use.



Non-Catalytic Stoves

These stoves are designed with baffles and/or secondary combustion chambers, which route the burnable gases through the hottest part of the firebox and mix them with sufficient air to burn them more completely. They can attain up to four stages of combustion and completely burn the wood smoke before it escapes.

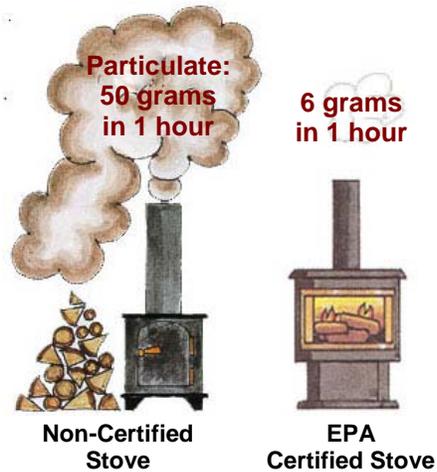
If your wood stove is not EPA-certified, you should consider buying a new certified wood stove. A new EPA-certified stove will increase combustion efficiency, produce far less smoke and creosote buildup, and reduce air pollution. It uses the latest and best technology available on transfer efficiency, and will provide more heat for your house and less for your flue. If you want to pollute less and save money on fuel, you should insist on an EPA-certified device, which will be clearly labeled as such.

For a list of U.S. EPA certified stoves see:

www.epa.gov/Compliance/resources/publications/monitoring/caa/woodstoves/certifiedwood.pdf

U.S. EPA Certified Wood Stoves Release Fewer Particulate Emissions

Because of incomplete combustion, old wood stoves can produce up to 50 grams of particulate per hour. EPA-certified fireplace inserts and EPA-certified wood stoves are considerably more efficient, producing only 6 grams per hour. EPA Certified devices create the right conditions for complete combustion; the right amount of air, high temperature, and time to allow the gases to fully burn.



Check How Much Heat You Get ...

The heating efficiency of any wood heater depends on combining two factors:

- How completely it burns the firewood (combustion efficiency).
- How much of the fire's heat gets into the room, rather than going up the flue (transfer efficiency).

How efficiently your wood heater operates depends on 2 more factors:

- Installation – is it located on an outside wall? Too big for house? Flue draws well?
- Operation – Is the wood green? Is the stove stuffed with wood? Is the fire starved for air?

Your operating techniques account for the largest variations in your wood stove's heating efficiency.

| HEATING EFFICIENCY | |
|---------------------------------------|-------------|
| Masonry Fireplace | -10% to 10% |
| Manufactured Fireplace | -10% to 10% |
| Freestanding Fireplace | -10% to 30% |
| Antique Stove | 20% to 40% |
| Fireplace Insert | 35% to 50% |
| Airtight Stove | 40% to 50% |
| Certified Stoves, Inserts, Fireplaces | 60% to 80% |
| Gas Heater | 60% to 90% |
| Pellet Stove | 75% to 90% |
| Electric Fireplace | 100% |

Check for the Permanent EPA Label on Certified Devices!

For maximum safety and efficiency have a professional installer calculate the correct stove size for the area, install the stove, and design and install the chimney.

If You Still Must Burn Wood, Follow These Tips on Clean Burning – To Heat More Efficiently and Reduce Air Pollution!

➤ Start Your Fire With Softwood Kindling

Softwoods (pine, fir) are generally low in density, ignite easily, burn fast and hot and will heat the firebox and flue quickly. They are ideal for kindling and starting your fires, but form creosote easily due to the high resin (sap) content.

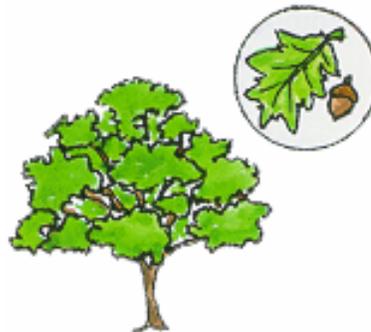


➤ Burn Longer and Cleaner With Hardwood

Hardwoods (oak, cherry) are denser and take longer to ignite, but burn slower and more evenly, producing less smoke. They also provide more heat energy than softwood logs of the same size.

➤ Burn Only "Seasoned" Firewood

Firewood should dry, or "season" a minimum of 6 to 12 months after splitting. Hardwoods dry more slowly than softwoods and may take over a year to dry. Seasoned firewood by definition contains 20 percent moisture or less by weight. Wood dries faster in a warmer storage area with more air circulation.



➤ To Speed Drying:

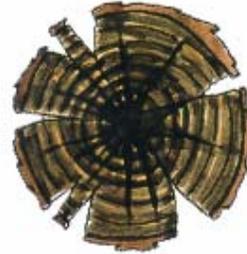
Split and Stack – logs dry from the outside in, so split big logs right away for faster drying. Stack loosely in a crosswise fashion to get good air circulation.



Store High & Dry – Stack a foot or more above the ground and away from buildings in a sunny, well-ventilated area. Cover the top to keep dew and rain off the wood, but leave the sides open to breezes.

➤ **Be Careful when Buying Wood Advertised as "Seasoned"**
Look for:

- **Dark colored, cracked ends**, with cracks radiating from the center like bicycle spokes.
- **Light in weight**, meaning there is little moisture left; hardwood logs will weigh more than softwood.
- **Sound** - Hit two pieces together. Wet wood makes a dull "thud" sound. Dry wood rings with a resonant "crack," like a bat hitting a baseball.
- **Easily peeled or broken bark**. No green should show under the bark.



➤ **Build a Small, HOT Fire First...**



Open Damper Wide - allow for maximum air to fuel the fire. Leave the damper and other air inlets open for 30 minutes.

Start Small and Hot - leave a thin layer of ash for insulation. Crumple a few sheets of newspaper, add some small pieces of kindling, a few at a time, then light. Add bigger kindling a few as the fire grows. Get it burning briskly to form a bed of hot coals. Now add 2 or 3 logs.

Position the next logs carefully - place logs close enough together to keep each hot, but far apart enough to let sufficient air (oxygen) move between them.

➤ **Refuel While the Coals Are Still Hot!**

If a fireplace insert or glass door is present, open it slightly for a minute to prevent a back draft of smoke into the room. When smoke subsides, then open the door carefully.

Pre-heat again by placing a few pieces of kindling onto the red-hot coals. Add more as they catch fire, then add a few larger pieces. Small, frequent loading causes less smoke than a big load in most older stoves.



After refueling, leave the dampers and inlets open for about 30 minutes. The fire will get plenty of air and burn hot, retarding creosote formation (which forms early in a burn).

**Light & refuel your fire quickly and carefully.
These are the times it will smoke the most.**

➤ **Don't Burn Anything but Clean, Seasoned Wood.**

- **No Garbage**
- **No Rubber**
- **No Particle board**
- **No Glossy Paper**
- **No Solvent or Paint**
- **No Charcoal or Coal**
- **No Plastics**
- **No Waste**
- **No Plywood**
- **No Colored Paper**
- **No Oil**
- **No Painted/ Treated Wood**



Burning these materials may produce noxious, corrosive smoke and fumes that may be toxic. They can foul your catalytic combustor, your flue, and the lungs of your family and neighbors.

Warning: Kiln-Dried Lumber vaporizes too rapidly, causing creosote buildup.



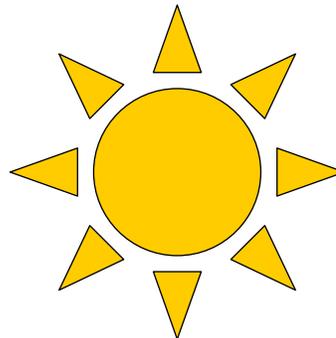
➤ **Overnight Heating**

When using an open fireplace, DO NOT burn overnight unattended—it's a major fire hazard. This can also lead to a back draft of the smoke into your own home, causing very hazardous indoor air pollution.

Build a small, hot fire and let it burn out completely. Rely on your home's insulation to hold in enough heat for the night. When the fire is out, close the damper tightly.

➤ **Heating in Warmer Weather**

If you do need extra heat in warmer weather, and a small space heater will not suffice, open the air controls wide, build a small, hot fire using more finely split wood, and let it burn out. DO NOT try to reduce the heat from a big fire by reducing its air supply because this leads to smoldering, creosote buildup and air pollution.



➤ **Maintain Your Fire Properly – Watch the Temperature**

- **Do Not Close the Damper or Air Inlets Too Tightly** - The fire will smoke from lack of air.
- **Follow the Wood Stove or Fireplace Manufacturer's Instructions Carefully**
- Be sure that anyone who operates it is also familiar with these instructions.
- **Your Actions Determine How Efficiently Your Fireplace or Wood Stove Will Operate** - A good wood stove/fireplace is designed to burn cleanly and efficiently, but it can not do its job right if you do not cooperate.



➤ **Watch for Smoke Signals!**

Get into the habit of glancing out at your chimney top every so often. 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. The darker the smoke, the more pollutants it contains and the more fuel is being wasted.

➤ **Inspection and Upkeep - For Safety's Sake**

Periodic inspection of your wood stove or fireplace is essential to ensuring its continued safe and clean-burning operation. Keep in mind the following points when performing your fireplace inspection:



Chimney Caps can be plugged by debris, which will reduce draft.

Chimneys should be cleaned professionally at least once a year to remove creosote buildup.

Remember – Creosote can fuel a chimney fire that can burn down your house!

Catalytic Combustor holes can plug up; follow instructions to clean.

Stovepipe angles and bolts are particularly subject to corrosion.

Gaskets on airtight stove doors need replacement every few years.

Seams on stoves sealed with furnace cement may leak. Eventually the cement dries out, becomes brittle, and may fall out.

Firebricks may be broken or missing.

Grates or stove bottoms can crack or break.

Do You PAY MORE to Heat With Wood?

The chart below shows you which woods will produce the most heat per cord, and will help you compare your conventional home heating fuel to wood. Pound for pound, all woods have about the same heating value. But, hardwood logs are heavier and denser than softwood and burn longer, providing more heat per log.

| Firewood Tree Species | Available Heat (Million Btu/Cord) 60% Efficient Stove |
|--------------------------|---|
| Alder | 1 |
| Almond | 24 |
| Apple | 24 |
| Cedar | 14 |
| Cherry | 19 |
| Eucalyptus | 20 |
| Elm, American | 17 |
| Fir, Douglas | 19 |
| Fir, White | 15 |
| Hemlock | 14 |
| Locust, Black | 24 |
| Madrone | 24 |
| Oak, Live | 24 |
| Oak, Red | 21 |
| Oak, White | 23 |
| Maple | 19 |
| Pine, Ponderosa | 12 |
| Pine, Sugar | 12 |
| Pine, White | 12 |
| Poplar | 12 |
| Redwood | 12 |
| Sycamore | 18 |
| Walnut, Black | 20 |
| Walnut, English | 20 |
| Willow | 12 |

One Million Btu of Fuel* Equals:

293 kilowatt hours of electricity;

12.5 therms of natural gas; or

13.6 gallons of propane.

1. What do you pay for a unit of fuel? Check your utility bill for your unit price.

If you pay \$.99 per therm for natural gas, one million Btu of gas will cost you $12.5 \times \$.99 = \12.38 .

2. What did you pay for a cord of that wood?

You just bought a cord of Almond for \$395. Almond wood has a heat value of 24 million Btu per cord, burned in a 60% efficient stove.

3. How does heating with gas compare to burning a cord of Almond?

You would pay $\$12.38 \times 24 = \297 for gas, \$98 less than you paid for the cord of Almond wood.

In most areas of California you will pay more to heat with wood than with gas, and less to heat with wood than with electricity.

However, if you get a new, certified stove with a heating efficiency of 80%, you can increase the Btu heat energy available in each cord of wood by 20%. Using the example above, a cord of Almond burned in an 80% efficient stove would have 28.8 million Btu of heat, not just 24. You would pay $\$12.38 \times 28.8 = \356 for 28.8 million Btu of gas, or \$39 less to heat with gas than with your \$395 cord of almond wood.

* Assuming an energy conversion process efficiency of 100% for an electric heater, 80% for a natural gas furnace, and 80% for a propane furnace. New model gas furnaces achieve up to 95% efficiency.

Model Wood Burning Ordinance

In 1998, the Bay Area Air Quality Management District developed a model wood burning ordinance to guide cities and counties wishing to regulate wood smoke in their communities. Studies continue to demonstrate a link between particulate pollution and an increased incidence of disease and mortality. On an average winter day, about 30 percent of all Bay Area particulate pollution comes from wood smoke.

If adopted by a Bay Area city or county, this ordinance would allow the installation of gas fireplaces, pellet stoves, or EPA-certified wood stoves in new housing or in the remodeling of homes with fireplaces.

The ordinance also includes a provision that prohibits wood burning when the Bay Area Air District issues a Spare the Air Tonight advisory (see back cover).

For information on the model wood burning ordinance, contact the Bay Area Air Quality Management District's Public Information Office at (415) 749-4900.



BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

Need More Information? Contact Us!

Bay Area Air Quality Management District
939 Ellis Street San Francisco, CA 94109

Important Phone Numbers

Public Information Office (415) 749-4900
Bay Area Air Quality Reports (800) HELP AIR

- Daily Air Quality Readings
- Spare the Air Tonight Requests
- Agricultural Burn Days

Industrial/Residential Complaints (800) 334-ODOR
Report Smoking Vehicles (800) EXHAUST
All Other Air District Business (415) 771-6000

Websites

www.baaqmd.gov
www.sparetheair.org

The Bay Area Air Quality Management District was founded in 1955 to help reduce air pollution from industrial operations, motor vehicles, and residential sources in the Bay Area. The Air District covers Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, southwest Sonoma, and southern Solano counties.

Permission to use these materials was
provided by the California Air Resources Board
www.arb.ca.gov

 **California Environmental Protection Agency**
Air Resources Board

Good Air Quality Begins at Home

Air pollution in the Bay Area doesn't just come from heavy industry and automobiles. It's also produced in your neighborhood during the winter months by wood burning.

On cold, still nights, it's common for an air inversion to cause a blanket of wood smoke to hug the ground. While the smell of wood smoke may conjure up festive thoughts, its health effects are anything but charming. Wood smoke contains harmful gases such as carbon monoxide, hydrocarbons, and oxides of nitrogen; toxic substances like formaldehyde, benzene, and dioxin; and microscopic particles that are harmful to your health.

An even greater amount of these pollutants is emitted into the night air if your wood is burned improperly. **To minimize wood smoke pollution from your fireplace or wood stove, LIGHT IT RIGHT!**

Call the Air District for:

- ◆ Daily Air Quality Reports
- ◆ "Spare the Air Tonight" Advisories via e-mail
- ◆ Tips for Your Home, Car and Community

Light It Right!

HOW BEST TO LIGHT YOUR FIRE!

If you choose to burn wood, burn only dry, seasoned wood. Much of a log's energy must be used to burn off excess moisture, energy that would otherwise go toward heating your home. Less-seasoned wood also produces more harmful air pollutants.

Start a small fire using softwoods. Softwoods (such as pine and fir) ignite easily and burn fast to heat up the flue and firebox quickly.

Add larger hardwood logs after the fire is going. Denser, split woods (such as oak and madrone) will burn longer and more evenly, thus producing more heat energy than softwood logs.

Don't burn garbage, plastic, glossy paper, or wood that has been painted or chemically treated. These materials can release harmful toxic chemicals.

Excess smoke is a good sign that your fire wasn't lit properly or isn't being burned correctly.

1-800-HELP-AIR

Spare the Air Tonight

On nights when the pollution level is expected to approach unhealthy levels, the Air District asks Bay Area residents not to burn wood. A "Spare the Air Tonight" advisory will be issued at 10:30 A.M. for that night. Call 1-800-HELP AIR for the latest report.

