

**INVER GROVE HEIGHTS
PLANNING COMMISSION AGENDA**

**Tuesday, July 6, 2010 – 7:00 p.m.
City Council Chambers - 8150 Barbara Avenue**

- 1. CALL TO ORDER**

- 2. APPROVAL OF PLANNING COMMISSION MINUTES FOR June 1, 2010**

- 3. APPLICANT REQUESTS AND PUBLIC HEARINGS**
 - 3.01 CITY OF INVER GROVE HEIGHTS – CASE NO. 10-20ZA**
Consider the prohibition or regulation by performance standards for outdoor wood burners/boilers.

Planning Commission Action _____

- 4. OTHER BUSINESS**

- 5. ADJOURN**

PLANNING COMMISSION MINUTES - CITY OF INVER GROVE HEIGHTS

Tuesday, June 1, 2010 – 7:00 p.m.
City Hall Chambers - 8150 Barbara Avenue

Chair Bartholomew called the Planning Commission meeting to order at 7:00 p.m.

Commissioners Present: Tom Bartholomew
Paul Hark
Dennis Wippermann
Christine Koch
Harold Gooch
Tony Scales

Commissioners Absent: Damon Roth (excused)
Pat Simon (excused)
Mike Schaeffer

Others Present: Allan Hunting, City Planner

APPROVAL OF MINUTES

The minutes from the May 18, 2010 meeting were approved as submitted.

AMAZING GRACE LUTHERAN CHURCH – CASE NO. 10-17PRV

Reading of Notice

Commissioner Hark read the public hearing notice to consider the request for a Major Site Plan Review to reconfigure and reconstruct the existing parking lot, and a variance to allow a five foot side yard setback for a parking lot for the property located at 7160 South Robert Trail. 12 notices were mailed.

Presentation of Request

Allan Hunting, City Planner, explained the request as detailed in the report. He advised that the applicant is proposing to improve and reconfigure their existing gravel parking lot. The lot will be paved, curbed, striped, and stormwater infiltration systems will be added which meet the Northwest Area Stormwater Manual requirements. He advised that the applicants are also requesting a variance as they are proposing a five foot setback from the south property line whereas ten feet is required. Staff is recommending that the applicant dedicate a 66 foot wide public easement to the City for the future alignment of Allen Way. Mr. Hunting advised that this afternoon it was determined that staff would like to recommend adding a condition that the applicant hook up to sewer and water within two years of the approval. The City would be willing to consider various financing options to help spread out the cost of those fees. In regards to the variance request, staff feels there is a hardship in that the future realignment of Allen Way has impact on the church's ability to reconstruct the parking lot, and having to adhere to the requirements of the Northwest Overlay District Stormwater Manual requires a larger footprint to install the infiltration basins in the parking lot islands. Staff feels the request meets the variance criterion and they recommend approval of both requests, with the conditions listed in the report and two additional conditions to 1) require that the applicant hook up to sewer and water within two years of approval and, 2) require that the plans be subject to the approval of the Fire Marshal, including fire lane striping on the internal portions of the lot.

Commissioner Wippermann asked who owned the triangular piece to the northwest of the future

Allen Way, to which Mr. Hunting replied the piece would continue to be owned by the church.

Commissioner Wippermann asked what the future use would be for that property, to which Mr. Hunting replied it was unknown at this time.

Commissioner Wippermann asked what the plans were for the holding pond that was currently located where the future Allen Way would be situated, to which Mr. Hunting replied that would be addressed at such time as Allen Way was rebuilt.

Commissioner Hark asked when Allen Way was expected to be reconfigured, to which Mr. Hunting replied that no specific timeline had yet been determined.

Commissioner Hark asked if the existing fire hydrant on the Inver Glen property was active, to which Mr. Hunting replied he believed it was.

Commissioner Gooch asked if the church would be compensated when the realigned Allen Way cut through their property.

Mr. Hunting replied that the City is requesting that the property be dedicated rather than purchased.

Commissioner Gooch questioned whether the applicants could refuse to let the road go through their property.

Mr. Hunting replied that if the City did not require a dedicated easement at this point they would have to purchase the land at such time as the road was realigned.

Chair Bartholomew asked if the County was requiring that Allen Way be relocated to the proposed location.

Mr. Hunting replied in the affirmative, stating that both the County and the State preferred that Allen Way be moved further away from the 70th Street/South Robert Trail intersection.

Chair Bartholomew asked if the proposed realignment was already accepted by the County, to which Mr. Hunting replied in the affirmative.

Commissioner Koch referred to a recent *Insights* article recommending the use of asphalt-based sealcoat vs. coal tar-based varieties, and asked for clarification on the material being used for this project.

Mr. Hunting replied he was not sure, but assumed the traditional asphalt used for parking lots and streets was the asphalt-based material.

Opening of Public Hearing

Cameron Kruse, 588 Sutcliff Circle, Mendota Heights, stated he was a member of Amazing Grace Lutheran Church and headed their Property Ministry Team.

Chair Bartholomew asked if the applicant was aware of the two proposed additional conditions regarding sewer and water hook-up and striping of fire lanes.

Mr. Kruse advised that he was made aware of the added conditions earlier in the day. He explained that the church has had a gravel parking lot since 1983 and would like to upgrade it in the hopes that it will help attract new members. He advised that the church has been very active in

the community, including in the Northwest Area planning and in helping Inver Glen Senior Living get their site approvals. He stated that asking the church to dedicate the easement for Allen Way is not consistent with the conversations they have had in the past with City staff, and they believe they should be compensated for the property at such time as the road is realigned. He stated when the road is realigned their property will be cut in half and the northwest corner will be minimally usable. Mr. Kruse stated they previously had discussions with the City regarding extending the sewer and water main easement across the church property so as to help the residential areas east of the church to develop. He stated they had an oral and e-mail agreement to do this with the understanding that the church would not have to hook up until such time as there was an easier and cheaper way of hooking up. He stated the church's well and drainfield systems are working well, and they cannot afford the expense of hooking up to sewer and water at this time. He stated they have two 10,000 gallon tanks in their basement for the sprinkler system which was put in in 2003 at the request of the fire marshal. Mr. Kruse stated that while they are anxious to cooperate with the City, they ask that they be treated fairly and be compensated for their loss of property at such time as the road is realigned.

Chair Bartholomew stated a condition of approval for the church addition in 2001 was that the church would hook up to water when available. He asked if the applicant would be willing to hook up to sewer and water when available rather than being required to hook up within two years.

Mr. Kruse replied that would be reasonable depending on the definition of "available". He stated he feels the sewer and water would be "available" at such time as the line is brought across their property. He stated the church does not have the funds to hook up to utilities at this time and they would prefer not to have to make a commitment to hook up at any specified period of time other than at such time as it is extended across the church property.

Chair Bartholomew asked the applicant if it was his understanding that any church property needed for the realignment of Allen Way would be purchased, to which Mr. Kruse replied in the affirmative.

Commissioner Hark asked if fire safety was the primary reason for the proposed two year sewer and water hook-up.

Mr. Hunting replied that was part of it, as the Fire Marshal would always prefer that the church be hooked up to City water. He stated the other factor was that the City Administrator saw this as an opportunity to recoup some of the costs for the trunk lines that have been put in place. He stated because of development slow-down there may not be any sewer and water hook ups for five years or more.

Commissioner Hark stated it sounded like the church had an agreement with the City that they would not have to hook up to sewer and water until it was made available.

Mr. Hunting stated he could not speak to that as he was not involved in any of those discussions.

Commissioner Wippermann asked why the recommendation changed, noting that the staff report states the church would **not** be required to hook up to sewer and water at this time.

Mr. Hunting replied that the City Administrator disagreed with staff's interpretation and wanted to add that condition.

Commissioner Gooch asked where the nearest sewer and water line was currently located, to which Mr. Kruse replied along Inver Glen's northern property line.

Commissioner Gooch commented that that appeared to be the closest point to the church property.

Mr. Kruse advised that the intent was for lines to be extended across the church property to ultimately serve development to the east.

Commissioner Gooch asked how close the existing line was to the church.

Mr. Kruse replied it was approximately 125 feet to the corner of their building, but once the lines were extended to the east it would be approximately 75 feet. Mr. Kruse stated the bigger issue was the timing and that they were not anticipating the large expense so soon. He stated if the City were to force them to hook up to sewer and water at this point it would terminate their project.

Commissioner Wippermann commented that according to the staff report the City cannot require the applicants to connect until lateral lines are extended to the property with individual service stubs.

Planning Commission Discussion

Chair Bartholomew asked for clarification of the City's previous conversations with the applicant and whether there was discussion of it being a dedicated easement or a purchased easement.

Mr. Hunting advised he was not involved in any of the discussions regarding the road easement.

Chair Bartholomew stated there appeared to be a disconnect between the property owners and the City as to the right-of-way and he suggested perhaps tabling the request for more discussion. He asked Mr. Kruse if his understanding was that the Church would be compensated for the road right-of-way.

Mr. Kruse replied in the affirmative. He stated he was extensively involved in the Church's discussions with the City and it was always his understanding that the church would be compensated for the property.

Chair Bartholomew asked if the applicant was certain he did not want to table the request for further discussion.

Mr. Hunting advised that from staff's perspective there was nothing further to discuss as the City Attorney, Community Development Director, Public Works Director, City Engineer, and Assistant City Engineer had no recollection of any conversations regarding compensation for the right-of-way.

Chair Bartholomew stated there seemed to be a lot of confusion regarding the road right-of-way.

Mr. Hunting stated it would be within the Commission's purview to recommend that some of the conditions not be included.

Commissioner Wippermann stated it would be difficult for him to recommend dedication of the property since the realignment of Allen Way seemed to reduce the property value rather than enhance it.

Commissioner Gooch stated the realignment landlocked the church as well, and could hinder future growth.

Chair Bartholomew stated he would be in favor of striking Condition 3 as the easement would not add value to the property.

Chair Wippermann stated he would be in favor of striking Condition 3 as well, and also the proposed additional condition requiring hook up to sewer and water within two years. He stated, however, that he would not be opposed to requiring the dedication of a trail easement.

Chair Bartholomew stated he would support striking a condition regarding hook up to sewer and water as well.

After some discussion, it was determined that a condition requiring the applicants to hook up to sewer and water within two years was not listed as a condition of approval, and therefore the Commission could choose not to add it as an additional condition.

Planning Commission Recommendation

Motion by Commissioner Wippermann, second by Commissioner Gooch, to recommend approval of a variance to allow a five foot side yard setback for a parking lot, with the hardship as stated, and a Major Site Plan Review to reconfigure and reconstruct the existing parking lot, excluding Condition 3 which requires a dedicated right-of-way, and an added condition requiring that the project meet all Fire Marshal recommendations, including fire lane striping on the internal portions of the parking lot.

Motion carried (6/0). This item goes to the City Council on June 14, 2010.

OTHER BUSINESS

Mr. Hunting advised that the June 15, 2010 Planning Commission has been cancelled.

ADJOURNMENT

Chair Bartholomew adjourned the meeting at 7:42 p.m.

Respectfully submitted,

Kim Fox
Recording Secretary

P L A N N I N G R E P O R T
C I T Y O F I N V E R G R O V E H E I G H T S

REPORT DATE: June 21, 2010

CASE NO: 10-20ZA

APPLICANT: City of Inver Grove Heights

REQUEST: Outdoor Wood Burners

HEARING DATE: July 6, 2010

REVIEWING DIVISIONS: Planning

PREPARED BY: Heather Botten
Assistant Planner



BACKGROUND

The City Council directed staff to hold a public hearing regarding the regulation of outdoor wood burners/boilers ("OWB"s). This issue arose from a complaint received regarding an OWB and the concern of health hazards from their emissions.

The City Council has discussed OWBs at three worksessions over the past few months. Additionally, the City Council recently passed a moratorium on the construction of OWBs within the City to permit the City time to further study their potential regulation. City Council directed staff to hold a public hearing and to consider the prohibition of OWBs or regulation of OWBs through establishment of performance standards. These performance standards would only apply to OWBs and not indoor wood stoves, fireplaces, or fire pits. There are currently four OWBs located in the City of Inver Grove Heights.

At this time, staff is looking for public input and direction from the Planning Commission on how to proceed with OWBs. Staff will then bring back an ordinance for a formal recommendation.

ANALYSIS

OWBs are used as water heaters and/or a primary heat source for buildings. OWBs are located outside of the home, typically 30-50 feet (but as far as 500 feet) away from the owner's home or business. Usually, OWBs look like a small shed with a short smokestack. A water jacket surrounds the furnace firebox and heat exchanger and heated water is circulated to the home or building through insulated underground pipes. Water-to-air or water-to-water heat exchangers or direct circulation conveys the heat into the structure's forced-air furnace, boiler, or radiant floor heating system. With the recent increase in the cost of natural gas and oil, the use of OWBs is becoming more common across the nation. Most often, OWBs are used in rural settings. However, in recent years, the use of OWBs has increased in more densely residential neighborhoods.

Staff has researched and gathered information from other sources to provide the Planning Commission with background. This information is provided solely for research purposes.

As stated in *Smoke Gets in Your Lungs: Outdoor Wood Boilers in New York State, August 2005*: “To obtain the most efficient - and thus cleanest - burn from a wood combustion device, dry wood should be burned in a manner that allows airflow and oxygen to the greatest amount of surface area. OWBs create smoldering conditions which in turn produce excess smoke. An efficient fire should produce clear exhaust during warmer months, and white exhaust (steam) during colder months. An inefficient fire produces gray, black, or thick smoke and releases much more harmful particulate matter. Because OWBs are designed to respond to the thermostatic setting by smoldering when less heat is required, they produce heavy smoke emissions more often than most other wood combustion devices.”

The smoke and emissions problems associated with OWBs can be exacerbated if owners use the burner to dispose of trash, tires, or treated wood, potentially releasing toxic chemicals into the air.

During summer months and calm winter days, wood smoke is slow to rise and disperse. With OWB chimneys often not high enough to carry the smoke past the tops of surrounding homes and local terrain, wood smoke, soot, and toxins may enter homes and yards of owners and neighbors who are situated close to OWBs. Due to their small size, wood smoke particulates can remain suspended in the air for long periods of time, can cause a smoky haze, and can easily enter homes through air intakes, cracks, doors, and windows. Effects on neighbors are especially apparent when OWBs are installed at the outermost limit of the owner’s property, and in close proximity to structures on adjacent properties. (*Smoke Gets in Your Lungs: Outdoor wood Boilers in New York State*)

Although no federal or state regulations currently exist, some cities have opted to regulate OWBs on a local level through their nuisance ordinances. A nuisance is generally defined as anything that is injurious to health, indecent or offensive to the senses, or an obstruction to the free use of property so as to interfere with a comfortable enjoyment of life or property.

The Commission has a few alternatives to discuss;

- Do nothing at all. Currently, OWBs are allowed by the state building code and require a City building permit prior to installation;
- *Regulate OWBs with performance standards that could include minimum setbacks and lot size requirements, smokestack heights, time of operation, or allow in certain zoning districts;
- *Prohibit OWBs completely either in the nuisance ordinance or through the zoning ordinance.

Any changes to the Code would require an ordinance amendment and an additional public hearing.

*If regulating or prohibiting OWBs, a decision would have to be made on what to do with the four OWBs that currently exist within the City limits.

DO NOTHING:

Currently the Minnesota Mechanical Code permits the installation of OWBs provided they have been tested and listed by an independent testing agency approved by the Chief Building Official. The City Zoning Code requires OWBs to meet accessory structure setbacks.

REGULATION WITH PERFORMANCE STANDARDS:

If the direction given to staff is to create an ordinance, then additional language to be considered might include but not be limited to, definitions and types of materials allowed to be burned. Listed below are general performance standards taken from regulations in other cities.

Zoning districts

The City of Forest Lake allows OWBs in the agricultural, rural residential and Industrial Zoning Districts. The City of St. Michael allows OWBs in the A-1 and A-2 districts.

The Planning Commission may want to follow a similar path and consider OWBs to only be allowed in A, Agricultural and E, Estate districts, excluding the Northwest Area as this district is planned to develop at urban densities.

The Agricultural and Estate districts are typically larger lots in a rural residential setting.

Setbacks:

Setbacks for the OWB could be from the property line and/or neighboring structures. Some ordinances do one or the other and some ordinances have both setbacks.

The Forest Lake ordinance requires OWBs to be located at least 300 feet from any residence not being served by the system.

The City of Oak Park Heights requires OWBs to be setback 100 feet from property lines and 300 feet from the nearest occupied building not served by an OWB.

The Agency of Natural Resources in Waterbury, Vermont requires different setbacks depending on the quality of the OWB; setbacks range from 100 – 200 feet from structures not served by the OWB.

The Planning Commission may want to follow a similar path and consider OWBs shall be setback at least 100 feet from the property line AND 300 feet from any residence not being served by the system.

Stack/chimney height:

The City of Oak Park Heights requires all outdoor wood burning furnaces to maintain a chimney height that extends at least two (2) feet above the highest peak of the residence for which it serves, or the chimney shall extend at least two (2) feet above the highest peak of any residence not served by the furnace within three hundred (300) feet, whichever is greater.

The City of Forest Lakes requires the chimney height to be 2 feet higher than residences within a 500-foot radius.

The Agency of Natural Resources in Waterbury, Vermont requires different stack heights depending on the quality of the OWB; the most restrictive requirement is a permanent stack extending higher than the peak of the roof of the structure served by the OWB, if any residence not served by the OWB is located less than 500 feet from the OWB.

The Planning Commission may want to follow a similar path and consider a chimney height two (2) feet higher than any residence within 300 feet of the OWB, similar to the Oak Park Heights requirements.

Times of operation

The OWB ordinance in Forest Lake prohibits the operation of the systems from April 1 to October 1 each year.

The Planning Commission may want to follow a similar path and consider similar times of operation for Inver Grove Heights.

Certain performance standards such as setbacks, height of structures on the applicant's property, and zoning are easy for staff to administer and enforce. Standards relating to the operation of the OWB, height of structures beyond the applicant's property, and whether a particular complaint is truly a nuisance would be much more difficult for staff to administer and enforce.

PROHIBITING OWBs

As discussed previously, an alternative to the creation of performance standards for OWBs is the complete prohibition of OWBs. If the City deems OWBs to be a nuisance, an ordinance could be drafted prohibiting OWBs within Inver Grove Heights starting from the date the ordinance passes. The City would still have to address the four existing OWBs; the City Attorney provided some information regarding the existing OWBs (see below).

EXISTING OWBs IN THE CITY

Currently there are four known OWBs located in the City. The following table illustrates the lot size, zoning, and estimated setbacks from the nearest property line and the nearest home not served by the OWB.

Address	Lot size	Zoning	Estimated setback of OWB from nearest property line	Estimated setback of OWB from nearest neighboring home	Estimated Lot Width	When a permit was issued for the OWB
11068 Albavar Path	2.5 acres	E-1, Estate residential	≥10'	≥120'	166'	No permit
11780 Albavar Path	5 acres	A, Agricultural	≥100'	≥220'	380'	March 2008
9277 Old Concord Blvd	2.8 acres	PUD	≥30'	≥270'	247'	November 2005
4301 – 64 th Street	0.5 acres	I-1, Industrial	≥13'	≥180'	140'	1997

ATTORNEY COMMENTS - EXISTING OWBs

While Minnesota Statute Section 462.357, Subd. 1c. law forbids cities from enacting, amending or enforcing ordinances that provide for elimination or termination of a non-conforming use by amortization, Minnesota Statute Section 462.357, Subd. 1e permits cities to impose upon non-conformities reasonable regulations to prevent and abate nuisances and to protect the public health, safety and welfare. Accordingly, the City may require existing OWBs to meet certain conditions within a period of time, four months, for example, to abate the nuisance caused by their operation. These conditions could include minimum chimney heights, seasonal operation restrictions, restrictions on the type of fuel burned, and location. If the existing OWB cannot meet the **reasonable** standards imposed by the City, then the OWB cannot be operated.

OTHER CITIES – EXISTING OWBs

The City of Burnsville has a voluntary agreement with the one OWB owner allowing him to keep the OWB for 20 years or until the boiler fails, which ever happens first. Additionally, the owner of the OWB extended the chimney height and installed a re-burner to help reduce the emissions. The OWB is located on a lot about .63 acres in size. In Burnsville, a voluntary agreement was reached with the OWB owner. The City of Oak Park Heights grandfathered in the existing OWBs and the City of Forest Lake required the existing OWBs to be in compliance with the ordinance except if the zoning or setbacks were not met they were grandfathered in for those requirements. The City of Stillwater adopted an ordinance prohibiting outdoor wood burners; they had an OWB located on a lot less than 10,000 sq ft in size, this OWB has recently been removed from the City.

ALTERNATIVES

At this time, staff is looking for direction from the Planning Commission on how to proceed with the issue so that a draft ordinance can be prepared for further consideration and an additional public hearing. The following alternatives are available:

- A. **Do nothing at all.** Currently, OWBs are allowed by the state building code and require a City building permit prior to installation;
- B. **Regulate OWBs** with performance standards that could include minimum setbacks and lot size requirements, smokestack heights, time of operation, or allow in certain zoning districts;
- C. **Prohibit OWBs** completely either in the nuisance ordinance or through the zoning ordinance.

*If regulating or prohibiting OWBs, a decision would also have to be made on what to do with the four OWBs that currently exist within the City limits.

RECOMMENDATION

Planning staff does not have a recommendation at this time. On one hand, the regulatory approach along with the newer models of OWBs may address the health issues, assuming the regulatory objectives are easy to enforce. On the other hand, staff has concerns regarding the enforcement of smoke as a nuisance because it is subjective and hard for staff to adequately enforce. Moreover, banning OWBs clearly addresses the health concerns. Banning future OWBs in Inver Grove Heights is favored by the City Administrator because of the enforcement difficulties and staff resources. This would still allow the City to apply performance standards to existing OWBs. Staff can further research means on how to address existing OWBs.

Attachments:

- FAQ's EPA's Phase 2 Voluntary Partnership Program (2008)
- Article- *Regulating Outdoor Furnaces and Boilers*, Minnesota Cities (2008)
- Article – *Smoke Gets in Your Lungs: Outdoor Wood Boilers in New York State* (2005)
- Brochure- pages from a Central Boiler handout (centralboiler.com)

Examples of OWB ordinances:

- Oak Park Heights
- Forest Lake
- Vermont
- Stillwater



Frequently Asked Questions

EPA's Phase 2 Voluntary Partnership Program: Hydronic Heaters

In January 2007, EPA launched a voluntary program to make cleaner hydronic heaters (also called outdoor wood heaters or outdoor wood boilers) available for consumers. In the first phase of the program, manufacturers produced 15 units that are 70 percent cleaner than unqualified models.

Less than two years later, EPA moved to Phase 2 of the program, aimed at making models available that are 90 percent cleaner than unqualified units. Six of the original 15 models met the Phase 2 levels when EPA announced the program in October 2008. Manufacturers have pledged to produce even more Phase 2 units in the near future.

About Cleaner Hydronic Heaters

What is a Hydronic Heater?

- Hydronic heaters heat water that is piped to a nearby building (usually a home), providing both heat and hot water to the structure. An outdoor wood-fired boiler, which is sometimes called an outdoor wood heater, is an example of a hydronic heater.
- These heaters can be located inside or outside of the building to be heated. Hydronic heaters may use other biomass as fuel, such as corn or wood pellets. The EPA voluntary program does not include gas, oil, or coal at this time. An outdoor hydronic heater resembles a small shed with a short smokestack. An indoor hydronic heater typically is located in the basement, but some are located in the living area.
- Most hydronic heaters are sold for use in rural, cold climate areas where wood is readily available; however, they can be found throughout the United States.

Are outdoor wood-fired heaters a problem?

- They can be. Many outdoor wood heaters are significantly more polluting than other home-heating devices. They can create heavy smoke, which can be a nuisance, in addition to posing risks to public health in populated areas. This is most likely when heaters are used improperly or located too close to homes. Heaters that are qualified under EPA's voluntary hydronic heaters program are significantly cleaner.

How much cleaner are the new heaters than current outdoor wood heaters?

- Units that have a white hangtag meet EPA's Phase 2 emission levels and are 90 percent cleaner than unqualified units.
- Units that have an orange hangtag meet EPA's Phase 1 emission levels and are 70

percent cleaner than unqualified units.

What kind of pollution comes from outdoor wood heaters? How much?

- Wood smoke contains a number of pollutants, the more prevalent of which is fine particles (PM 2.5).
- Most unqualified outdoor wood-fired heaters emit about 2 pounds of fine particle pollution per million BTUs of heat input (i.e., wood burned) -- or about 0.83 tons per year.
- White hangtag units (those qualified under Phase 2 of EPA's voluntary program), must emit no more than 0.32 pounds of fine particles per million BTUs of heat output.

What are the health effects of smoke from hydronic heaters?

- Wood smoke contains both fine particle pollution (PM 2.5) and a number of air toxics. Fine particle pollution is linked to a variety of health problems, including aggravated asthma, reduced lung function, development of chronic bronchitis, irregular heartbeat, non-fatal heart attacks and premature death in people with heart and lung disease. Children, people with heart and lung disease, and older adults are the most vulnerable to the effects of fine particle pollution.
- Residential wood combustion emissions also contain the harmful air pollutants sulfur oxides, nitrogen oxides, carbon monoxide, and air toxics such as potentially cancer-causing compounds including polycyclic aromatic hydrocarbons, benzene, formaldehyde and dioxins. Some of these pollutants are known to cause cancer but their effects on human health via exposure to wood smoke have not been extensively studied.

Several manufacturers of outdoor wood heaters have said the existing heaters are as clean as indoor wood stoves. Is this true?

- No. When we determine how clean or polluting a unit is, we look at total emissions per hour, along with stack heights and proximity to other structures to estimate emissions and their impact on air quality and health. Current outdoor wood heaters burn significantly more wood than wood stoves -- often 10 times as much or even more. As a result, they emit much more smoke -- and that means more particle pollution. Outdoor wood heaters also typically have short stacks that are close to nearby structures, meaning that the stacks are not usually above the roofline. As a result, wood heater emissions do not disperse as well as the emissions from typical wood stoves.

Is it true that to qualify under the EPA voluntary program, a hydronic heater must emit less than a typical EPA-certified non-catalytic indoor wood stove?

- No. The test methods used for hydronic heaters in EPA's voluntary program and for indoor wood stoves in EPA's New Source Performance Standard (NSPS) are closely related, and both originated from the same method but there are differences. The wood stove NSPS emission standard cannot be directly compared with the hydronic heater qualifying emission level, however, because the measurement units are different. Over 85% of non-catalytic woodstoves sold in the US today not only meet the NSPS but emit

less than 4.5 grams per hour and some models emit only 1 or 2 grams per hour. A typical Phase 1 qualifying heater emits 4 to 10 times more particle pollution than a typical new non-catalytic wood stove and a typical Phase 2 qualifying heater emits 1.5 to 3 times more than a typical non-catalytic wood stove.

Do all areas allow hydronic heaters? How do I find out?

- Not all areas allow the use of hydronic heaters. And some areas allow their use but regulate emissions, opacity, location, and stack height. Your state or local air agency can tell you what your area allows. For information on how to reach your air agency, visit EPA's website at www.epa.gov/woodheaters and click on "Where You Live."

What states and local governments regulate or ban hydronic heaters now?

- Many states and local governments use nuisance or opacity regulations to regulate hydronic heaters. A number of local governments ban new hydronic heaters and/or regulate the minimum distance they can be sited from neighbors or public areas. Five states -- Connecticut, Maine, New Hampshire, Washington and Vermont -- have new regulations specific to heater use, and numerous states are considering regulations. Visit www.epa.gov/woodheaters, and click on "Where You Live," to learn more about state air programs and regulations for hydronic heaters.

About the Voluntary Program

Why has EPA created a voluntary program instead of regulating these heaters?

- EPA wants to reduce emissions from these heaters as quickly as possible. EPA's voluntary program has helped bring cleaner heaters to market several years faster than a traditional federal regulation process.
- EPA also provided technical and financial support for NESCAUM to develop a model rule that state, local and tribal governments can tailor to address their specific needs and concerns.

Is EPA encouraging the use of hydronic heaters?

- EPA does not encourage the sale of any particular heating device. However, we urge consumers who choose to purchase a hydronic heater that uses wood or other biomass as fuel to buy one of the cleaner units that qualify for EPA's voluntary program.

How many manufacturers have agreed to make cleaner units? How many models have orange hangtags? How many models have white hangtags?

- Twenty manufacturers have agreed to use their best efforts to make cleaner models. These manufacturers represent more than 80 percent of the current sales in the United States. To date, 15 models have qualified at the Phase 1 orange hangtag level; six of these already meet emission levels at the Phase 2 white hangtag level, meaning they are 90 percent cleaner than unqualified units.

- Currently qualified models and their emission levels are listed on the EPA web site. Check the list frequently for updates.

Who verifies the manufacturers' emission performance results?

- Participating manufacturers have their heaters tested by independent EPA-accredited laboratories and the test reports are reviewed by EPA staff and/or EPA's Environmental Technology Verification Center.

How can a manufacturer join the partnership?

- Review the Partnership Agreement on the website and then contact EPA at wood.gil@epa.gov to apply as a new partner.

Information for Consumers

Should I replace my old outdoor wood boiler or hydronic heater?

- Yes. If you have an old model, consider replacing it with a cleaner heating device that qualifies for the EPA white hangtag.

How do I know which units are the cleanest?

- Look for a white hang tag that indicates that a unit meets the Phase 2 performance level of EPA's voluntary program. These heaters are 90 percent cleaner than unqualified models. These heaters are also marked with a permanent label. Pictures of the labels and tags are on EPA's website.
- Units that have an orange hangtag are Phase 1 models and are 70 percent cleaner than unqualified models.

Where can I purchase a cleaner hydronic heater?

- Manufacturers sell directly to the public and also through dealers. A list of qualified models and manufacturers is available on the EPA web site.

How much does a hydronic heater cost? Will a cleaner heater cost more?

- Hydronic heaters fueled by wood, pellets and other biomass cost between \$8,000 and \$18,000, depending on the size of the unit. The cleaner units may be more expensive – about 15 percent more – because of the changes made to improve the efficiency of these units and reduce their emissions. However, most of these new models are significantly more efficient – meaning they will use less wood to produce the same amount of heat, reducing the cost of wood purchases.

Can I retrofit my existing wood-fired heater to make it cleaner?

- Some heater manufacturers and manufacturers of emission control devices are working on developing retrofits for wood heaters. One model is currently available; however, it

has not yet been tested by an accredited, independent, third-party lab. EPA is encouraging the manufacturers to continue retrofit development and testing efforts.

Does it matter what people burn in hydronic heaters?

- Yes! Use of the wrong fuels in a hydronic heater can decrease the efficiency of your heater, increase pollution, and sometimes can be dangerous. If you have a hydronic heater, only use fuels recommended by the manufacturer – such as seasoned, untreated wood.
- In addition, EPA urges owners of these devices to ensure that they are properly located, operated, and maintained. Short stacks and improper location too close to buildings and too close to neighbors can increase the amount of pollution to which people are exposed.

What about driftwood?

- Never burn driftwood – in a hydronic heater or any other kind of fire. Driftwood contains salt (sodium chloride), which contains chlorine. When improperly burned, salt can form dioxin, which is toxic even at very low levels.

What can I do to burn cleaner and more efficiently?

- Follow the manufacturer's recommendations, especially fuel quality, loading times, and amounts. Visit EPA's website for more information and recommendations for safe wood burning practices at www.epa.gov/woodheaters.

10/15/08

Regulating Outdoor Furnaces and Boilers

By Rachel Carlson

With the recent rise in the cost of natural gas and oil, the use of outdoor wood burners (also known as boilers, furnaces, and heaters) is becoming more common nationally. As a result, cities may be receiving inquiries from homeowners who wish to install outdoor wood burners (OWBs). In addition, cities may receive complaints from neighbors of newly installed OWBs, particularly concerning the smoke they generate.

Generally, OWBs are more common in rural settings. However, in recent years, the use of OWBs has increased in more densely residential neighborhoods. Typically, an OWB resembles a small shed with a short smokestack. It burns wood in a fire box to heat water in a water jacket that surrounds the box. Used as a water heater and/or a primary heat source for the home (typically when attached to a forced air furnace inside the home), the typical OWB is powered by wood. Some OWBs burn corn, pellets, and biomass, but this article will focus on wood-burning OWBs.

Dangers of OWBs. Due to the rapid increase in OWBs in New York, the state attorney general commissioned a study on OWB use. The report, titled "Smoke Gets in Your Lungs: Outdoor Wood Boilers in New York State," found that neighbors of OWB users reported that the OWB smoke:

- Led to a variety of health symptoms, including upset stomach, headaches, dizziness, respiratory effects, and throat and eye irritation.
- Prevented neighbors from using their yards for normal activities such as gardening, hanging clothes out to dry, and playing with children.
- Left a residue and smoke odors on items inside their homes such as clothing, curtains and upholstery.

- Set off their home carbon monoxide detectors.

Federal Environmental Protection Agency studies indicate that OWBs produce over 1,000 times more smoke than traditional interior gas and oil furnaces. Since OWBs tend to be placed in small shacks with very short smokestacks, this dense smoke is often emitted very close to the ground, near windows and in areas where people circulate. The smoke and emissions problems associated with OWBs can be exacerbated when owners use the burner to dispose of trash, tires, or treated wood, potentially releasing toxic chemicals into the air.

Inhalation of wood smoke is noted to cause many unhealthful side effects. Burning wood adds harmful fine particles and toxins to the air, according to the Minnesota Pollution Control Agency web site. These particles can cause short-term eye, lung, and throat irritation problems and long-term health effects (e.g., chronic obstructive lung disease, chronic bronchitis; increased risks of cancer), and may be especially harmful to young children with developing lungs.

What cities can do. Although no federal or state regulations currently exist, many cities have opted to regulate OWBs on a local level through their nuisance ordinance. A nuisance is generally defined as anything that is injurious to health, indecent or offensive to the senses, or an obstruction to the free use of property so as to interfere with a comfortable enjoyment of life or property.

State statute gives cities the authority to regulate nuisances via a local ordinance. In Minnesota, cities' regulation of smoke as a potential nuisance is longstanding. In 1911, the Minnesota Supreme Court upheld a Minneapolis ordinance defining excessive smoke as a public nuisance, noting that "smoke . . . becomes a nuisance when it perme-

ates that air surrounding people and invades their residences and places of occupation."

The council has authority to explicitly define a particular nuisance, and then to provide for its regulation or abolition. This means that a city can choose to either completely prohibit OWBs as a nuisance in an ordinance, or provide detailed guidelines for their use. In cities that choose to regulate OWBs, the regulations usually:

- Limit the use of OWBs to areas zoned for agricultural use.
- Prohibit the burning of treated wood, garbage, and other potentially harmful materials.
- Impose setback requirements from neighboring properties.
- Require smokestacks that are at least as high as neighboring residences.
- Require an annual permit with inspections.

Cities may also attempt to regulate OWBs through their zoning ordinance. Cities could permit or prohibit the OWBs as an accessory or conditional use and establish setback and lot size requirements. If a city chooses to regulate the OWBs through its zoning regulations, it should consider whether existing OWBs must comply or be considered a lawful non-conformity, pursuant to Minn. Stat. § 462.357, subd. 1c. In contrast, pre-existing uses that are declared a nuisance and regulated as such are not protected as lawful non-conformities.

Move information. Sample ordinance provisions related to OWBs are available by contacting the LMC Research Department at (651) 281-1200 or (800) 925-1122. ■

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Smoke Gets in Your Lungs: Outdoor Wood Boilers in New York State



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August 2005

**Smoke Gets in Your Lungs:
Outdoor Wood Boilers in New York State**

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ACRONYMS USED IN THIS REPORT

ASTM	-	Association for Standards and Testing Materials
BTU	-	British Thermal Unit
CDDs	-	Chlorinated dibenzo-p-dioxins
DEC	-	New York State Department of Environmental Conservation
DOH	-	New York State Department of Health
ECL	-	Environmental Conservation Law
EPA	-	United States Environmental Protection Agency
HPBA	-	Hearth, Patio, and Barbecue Association
NYCRR	-	New York Code of Rules and Regulations
OAG	-	New York State Office of the Attorney General
OWB	-	Outdoor Wood Boiler
PAH	-	Polycyclic Aromatic Hydrocarbon
PCBs	-	Polychlorinated biphenyls
PM	-	Particulate Matter

Executive Summary

Homeowners, especially in rural communities, are increasingly turning to wood burning units installed outside the home, known as outdoor wood boilers (OWBs), to heat their homes. OWB sales have tripled in New York since 1999, with over 7,000 OWBs sold from 1999 to 2004.

The New York State Office of the Attorney General (OAG) Environmental Protection Bureau reviewed information on OWBs and analyzed the manufacture, distribution, testing, and sales of OWBs in New York State. We found that while OWBs are advertised as a clean and economical way to heat one's house and water, OWBs may be among the dirtiest and least economical modes of heating, especially when improperly used. Even when used properly, OWBs emit, on an average per hour basis, about four times as much fine particulate matter pollution as conventional wood stoves, about 12 times as much fine particle pollution as EPA-certified wood stoves, 1000 times more than oil furnaces, and 1800 times more than gas furnaces. Such emissions are significant because fine particulate matter pollution has both short-term and long-term health effects.

Currently, neither federal nor New York State regulations address the proper use of, or limit the pollution from, OWBs. Unlike indoor woodstoves and other heating devices, OWBs do not have to meet safety or performance standards. In the absence of such regulations, some local governments have imposed sensible limits on OWBs, which are described in this report.

We recommend that comprehensive testing protocols and emission limitations be enacted. We also suggest practical steps that owners and neighbors can take to mitigate environmental and health problems associated with OWBs.

I. Introduction: The Increasing Use of OWBs

In the 1980s, as the cost of oil and natural gas rose and as Americans attempted to reduce their heating expenses, the prevalence of residential wood burning stoves and furnaces increased. As of 1998, nine percent of the homes in the United States used residential wood combustion units (including wood stoves, fireplaces, pellet stoves, masonry heaters and wood-fired furnaces) for at least a portion of their heating needs.¹ The United States Environmental Protection Agency (EPA) established emissions standards in 1988 for indoor residential wood stoves in an effort to decrease people's exposure to particulate matter, carbon monoxide, and other pollutants.² Consequently, all new residential wood stoves sold in the United States since 1992 require EPA certification and pollution controls.³ OWBs, however, which were rare in 1988, are not covered by the EPA residential wood stove regulations.

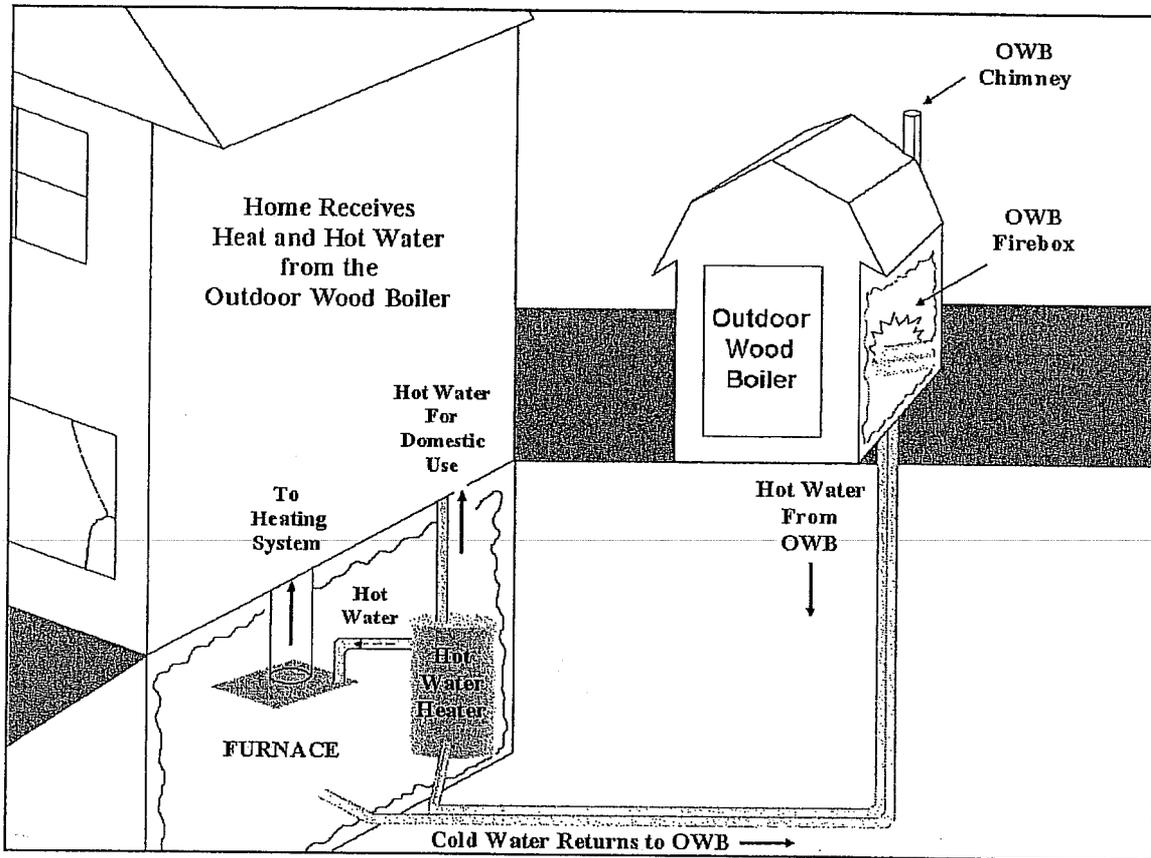
¹ Houck, J., et al., *Air Emissions from Residential Heating: The Wood Heating Option Put into Environmental Perspective*, Proceedings of a U.S. EPA and Air Waste Management Association Conference. Emission Inventory: Living in a Global Environment, V.1, pp. 373-384 (1998).

² Standards of Performance for New Residential Wood Heaters, 40 CFR §§ 60.530-60.539b.

³ A list of EPA approved wood stoves can be found on the EPA website, *available at* www.epa.gov/compliance/resources/publications/monitoring/programs/woodstoves/certifiedwood.pdf (last accessed May 31, 2005).

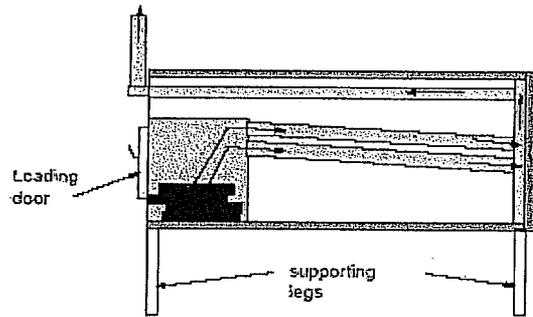
An OWB is a freestanding combustion unit located outside the home or structure to be heated (see Figure 1) that consists of a firebox surrounded by a water reservoir (see Figure 2). While designs vary by manufacturer, a typical OWB resembles a small shed with a short chimney to release combustion gases and an oversized firebox, built to accommodate unsplit logs up to five feet in length. OWBs vary in size, but are typically three to five feet wide, six to nine feet deep, and six to ten feet tall, including the height of the chimney.

Figure 1: Schematic of OWB and Home

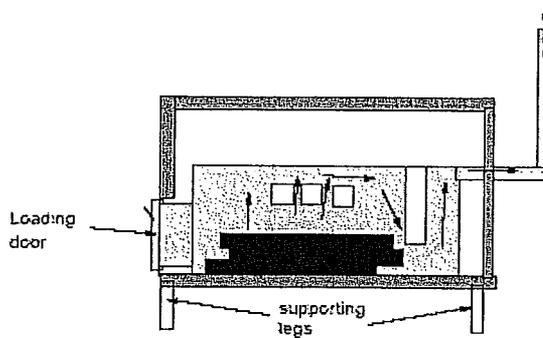


OWBs are designed to accommodate large wood loads which can burn for many hours without tending. Wood is placed in the firebox (combustion chamber) by the OWB operator and is ignited. The water in the reservoir surrounding the firebox is heated when hot combustion gases from the firebox pass, via pipes, through the reservoir to the exhaust stack (see Figure 2). The heated water is pumped through insulated underground pipes from the OWB to the home or building where it is circulated through the home's heating system. Wood in the firebox continues to burn until the temperature in the home reaches the desired level. A thermostat in the home controls the burn rate of the fuel by varying the amount of air that is supplied to the firebox for wood combustion. When the thermostat temperature is reached, the firebox is deprived of oxygen, leaving the wood smoldering, until more heat is needed.

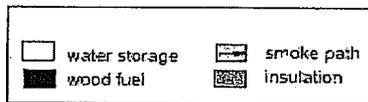
Figure 2: Schematic of Inside OWB ⁴



Double pass furnace schematic.



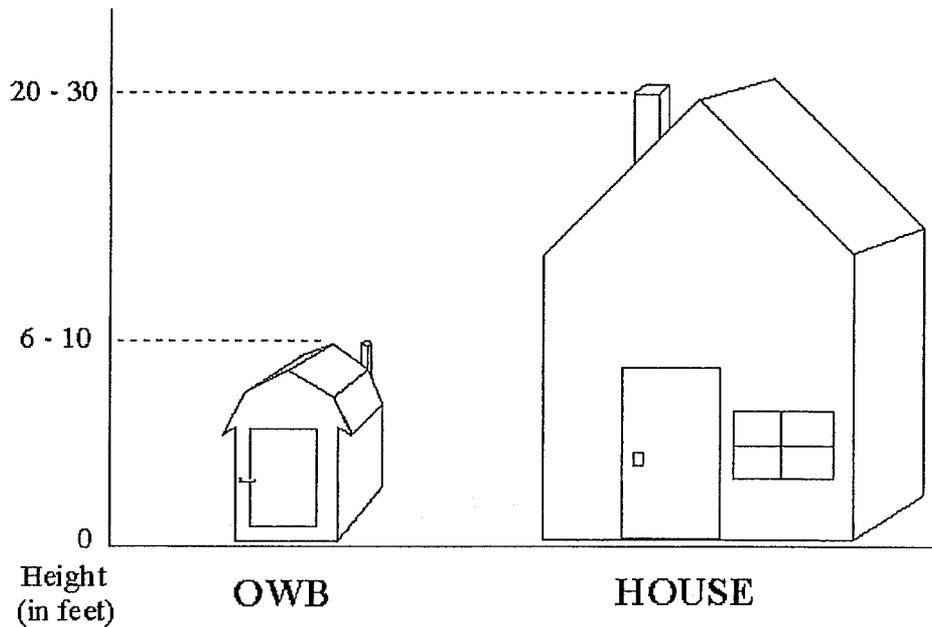
Single pass furnace schematic.



In contrast to indoor wood stoves, which feature chimneys located above the building's roof line, smoke is released from the OWB via a short chimney, typically at a height of approximately six to ten feet (see Figure 3). Chimney extensions are sometimes added to increase the height.

⁴ Adapted from Valenti, J. and Clayton, R., *Emissions from Outdoor Wood-Burning Residential Hot Water Furnaces*, EPA-600/R-98-017 (February 1998).

Figure 3: Comparison of Chimney Heights



OWBs are increasingly becoming a primary method of heating homes in winter and providing hot water year-round. The number of OWBs sold annually in New York State has tripled from approximately 600 units in 1999 to 1,880 units in 2004. Sales across the United States have similarly increased, from about 4,800 in 1999 to over 15,000 in 2003. Based on partial data for 2004, it is estimated that 24,500 OWBs were sold across the U.S. in 2004. Since 1999, of the 77,500 units sold nationwide, nearly 7,500 OWBs have been sold in New York State (see Table 1).

Table 1: Number of OWBs Sold in NYS and Nationwide, 1999 to 2004

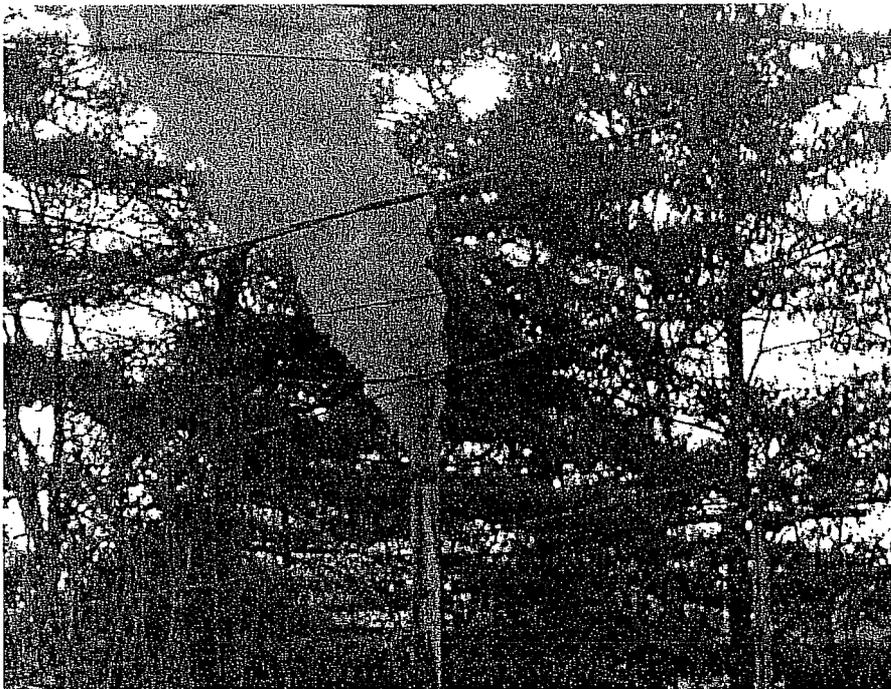
	1999	2000	2001	2002	2003	2004*	TOTAL
NY State	606	1037	1721	947	1272	1880	7463
U.S.	4828	6865	15330	10552	15340	24560	77475

*Estimated based on partial data for 2004 and assuming continued rate of growth

There are at least 23 manufacturers of OWBs that sell units in the United States (see Appendix E for names and contact information). Manufacturers typically sell OWBs to customers both directly and through more than 300 distributors and local dealers in New York State. One manufacturer accounts for approximately one-third of the United States sales since 1999.

II. OWB Pollution

State health and environmental agencies have received a growing number of complaints from owners and neighbors that OWBs produce thick, acrid, foul smoke that permeates buildings and homes, causing not only a nuisance, but also environmental degradation and health problems. Even when operated using clean seasoned wood, OWBs can emit significant pollution because the basic design of the OWB causes fuel to burn incompletely, or smolder, resulting in thick smoke and high particulate emissions. The problem is aggravated when other materials, such as wet wood, processed wood, and garbage are burned. The short OWB chimney and reduced draft often fail to disperse the smoke, resulting in more concentrated pollution at lower heights reaching residents and neighbors. Exposure to this smoke, like other pollutants, can cause or contribute to short-term health harms such as eye, nose, throat, and lung irritation, coughing and shortness of breath, and may exacerbate asthma or trigger asthma attacks. Chronic exposure to smoke can cause long-term effects such as asthma, heart and lung disease, and cancer.



A. OWB Operation and Smoke

Wood smoke is one of the primary contributors to certain types of air pollution in the United States,⁵ especially in rural areas. Even though wood combustion accounts for only about nine percent of the nation's home heating needs, it accounts for an estimated forty-five percent of the total fine particulate matter directly released by all fuel combustion used for residential heating.⁶

To obtain the most efficient – and thus cleanest – burn from a wood combustion device, dry wood should be burned in a manner that allows airflow and oxygen to the greatest amount of surface area. OWBs create smoldering conditions which in turn produce excess smoke. An efficient fire should produce clear exhaust during warmer months, and white exhaust (steam) during colder months. An inefficient fire produces gray, black, or thick smoke and releases much more harmful particulate matter. Because OWBs are designed to respond to the thermostatic setting by smoldering when less heat is required, they produce heavy smoke emissions more often than most other wood combustion devices.

Smoke from OWBs becomes more problematic when the owner burns items other than dry seasoned wood. Burning wet, damp, or green wood reduces the efficiency and heat output of any wood combustion device and increases particulate emissions.⁷ The energy that could be released in the form of heat is instead used to boil off the water content of the wood, which in freshly cut, green wood can be as much as fifty percent of the total weight. Thus, to generate the same amount of heat, more wood must be burned, increasing emissions of carbon dioxide – the most important pollutant responsible for global warming. In addition, when energy is expended to change water into steam, the temperature of the fire is decreased leading to incomplete combustion of the wood fuel. When that happens, increased amounts of unburned particulates will be emitted with the steam and combustion gases.⁸ Finally, all wood combustion, but particularly incomplete combustion such as in OWBs, produces a variety of toxic

⁵ Fisher, L., et al., *Long-Term Performance of EPA-Certified Phase 2 Woodstoves, Klamath Falls and Portland, Oregon: 1998/1999*, EPA/600/SR-00/100 (2000); McDonald, J., et al., *Fine Particle and Gaseous Emission Rates from Residential Wood Combustion*, *Environmental Science and Technology* 34(11): 2080-2091(2000).

⁶ EPA, *National Air Quality and Emissions Trends Report, 2003 Special Studies Edition*, Office of Air Quality Planning and Standards, EPA 454/R-03-005 (September 2003); Houck, J., et al., *Air Emissions from Residential Heating: The Wood Heating Option Put into Environmental Perspective*, Proceedings of the U.S. EPA and Air Waste Management Association Conference. Emissions Inventory: Living in a Global Environment, V.1, pp. 373-384 (1998). While wood accounts for nine percent of residential heating, fossil fuels – most burned in a home furnace but some burned in a power plant to produce electricity – are used for most US residential heating. Electricity-generating power plants emit the majority of their pollution as gases that are, in part, converted in the atmosphere to fine particles so that their overall contribution to fine particulate pollution in the ambient air is greater than that of wood combustion.

⁷ EPA, *Reducing Air Toxics in Your Community*, EPA-453/F-03-001 (October 2004); American Lung Association, *Woodburning* (April 2000).

⁸ Burning wet wood will result in creosote build-up inside the firebox and chimney. Creosote is a flammable sticky tar-like substance that is often responsible for chimney fires if it is allowed to accumulate from an initial gray powdery dusting into a thick crystalized build-up. Cleaning the firebox and chimney regularly will increase air flow in the wood heater, thereby reducing the rate of creosote build-up.

emissions including carbon monoxide, formaldehyde, benzene, naphthalene, and polycyclic aromatic hydrocarbons.⁹

When construction materials, packaging crates, and home garbage (which often includes plastics, rubber, batteries, electronics, and other materials unsuited for disposal by backyard combustion) are burned, the emission of harmful pollutants increases.¹⁰ While emissions from OWBs that burn household items have not been studied, studies of backyard burning of garbage have found that emissions include, but are not limited to, carbon monoxide, hydrogen chloride, hydrogen cyanide, benzene, styrene, formaldehyde, arsenic, lead, chromium, benzopyrene, dioxins, furans, and PCBs. According to a study conducted by EPA, the New York State Department of Health (DOH), and the New York State Department of Environmental Conservation (DEC), burning approximately ten pounds of household trash in a burn barrel releases as much air pollution as a modern, well-controlled municipal waste incinerator burning 400,000 pounds of trash.¹¹

Although OWBs have not been subjected to extensive testing, limited testing (shown in Table 2 and Appendix A) has indicated that emissions of fine particulate matter (defined as particulates smaller than 2.5 millionths of a meter in diameter, and referred to as PM 2.5) from burning wood in OWBs are about four to 12 times higher than the emissions from indoor woodstoves.¹² Conventional wood stoves manufactured prior to 1992, which were not airtight and had no pollution controls, generated an average of 18.5 grams PM 2.5 per hour, whereas the newer EPA-certified wood stoves averaged about six grams per hour.¹³ In similar tests, OWB emissions ranged from 18 to 147 grams PM 2.5 per hour and averaged

⁹ Larson, R. and Koenig, J., *Summary of the Emissions Characterization and Noncancer Respiratory Effects of Wood Smoke*, EPA-453/R-93-036 (1993); Washington State Department of Ecology, *Health Effects of Wood Smoke* (March 1997).

¹⁰ Not surprisingly, for this reason the Hearth, Patio, and Barbecue Association advises homeowners to never use the following: trash, plastics, gasoline, rubber, naptha, household garbage, material treated with petroleum products (particle-board, railroad ties, pressure treated wood), leaves, paper products, and cardboard. Hearth, Patio, and Barbecue Association, *Smoke Troubleshooting Checklist for Outdoor Furnaces*, (April 2004), available at www.hpba.org/govrelations/troubleshootingGuidelines.pdf (last accessed May 31, 2005).

¹¹ Lemieux, P., *Project Summary. Evaluation of Emissions from the Open Burning of Household Waste in Barrels (with Errata)*, EPA/600/SR-97/134 (October 2003).

¹² Particulate pollution is typically measured using EPA Test Method 5 which collects PM as small as 0.3 microns. An additional test can then be used to distinguish between particles larger or smaller than 2.5 microns. Studies have shown that nearly all of the PM emitted in woodsmoke is PM2.5 or smaller. Houck, J., and Tiegs, P., Residential Wood Combustion – PM2.5 Emissions, WESTAR PM2.5 Workshop, Reno, Nevada (July 1998) (93% of the particulate emissions from wood combustion is PM2.5). In its assessment, The Mid-Atlantic Regional Air Management Association assumes that 100 percent of PM emissions from wood combustion is PM2.5 or smaller. See *Technical Memorandum No. 6: MANE-VU Residential Wood Combustion Emission Inventory*, Mid-Atlantic Regional Air Management Association (April 30, 2004).

¹³ Valenti, J. and Clayton, R., *Emissions from Outdoor Wood-Burning Residential Hot Water Furnaces* EPA-600/R-98-017 (February 1998). EPA has established emission limits on indoor wood stoves, distinguishing between those with catalysts (through which the smoke passes, causing additional combustion) and those without catalysts. The EPA limits are 4.1 and 7.5 grams PM 2.5 per hour respectively. As can be seen in Table 2, however, testing indicates that many catalytic stoves are not, in fact, meeting the legal limit.

about 72 grams per hour.¹⁴ In comparison to other emission sources, one OWB produces approximately as much PM 2.5 per hour as two heavy duty diesel trucks, 45 passenger cars, 1000 oil furnaces, or 1800 gas furnaces.¹⁵ A comparison of PM 2.5 emissions from various home heating devices is shown in Figure 4. (Coal, while used extensively for electricity production, is not used extensively in New York for home heating.)

Table 2: Comparison of Emissions from Various Wood Combustion Units

Type of Wood Combustion Unit	Particulate Matter, Average (grams per hour)	Polycyclic Aromatic Hydrocarbons, Average (grams per hour)
OWB	71.6 ⁱⁱ	0.96 ⁱⁱ
Conventional (non-EPA Certified) Wood Stove ⁱ	18.5 ⁱⁱⁱ	0.36 ^{iv}
EPA Certified Catalytic Wood Stove ⁱ	6.2 ⁱⁱⁱ	0.15 ^{iv}
EPA Certified Non-Catalytic Wood Stove ⁱ	6.0 ⁱⁱⁱ	0.14 ^{iv}
EPA Phase-II Certified Woodstove ^v	4.1: EPA limit for catalytic woodstoves 7.5: EPA limit for non-catalytic woodstoves	Not Available

ⁱ Assumes 1.0 kg/hr burn rate.

ⁱⁱ Appendix A.

ⁱⁱⁱ Houck, J. and Tiegs, P., *Residential Wood Combustion Technology Review, Volume 1. Technical Report*, EPA-600/R-98-174a. (1998).

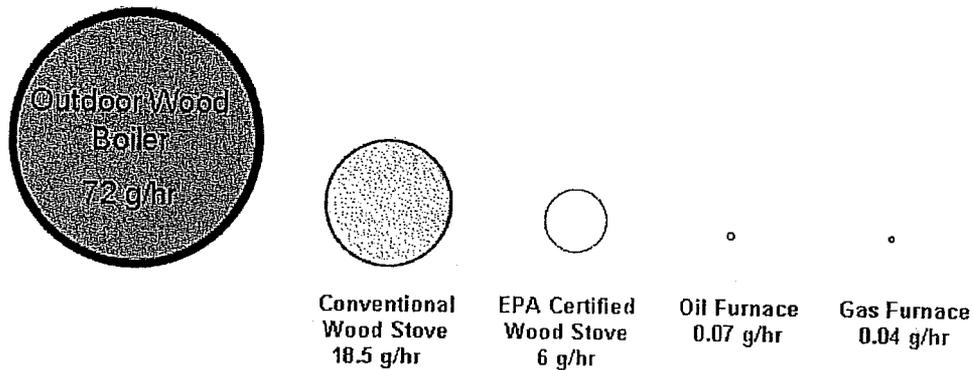
^{iv} Fisher, L., et al., *Long-Term Performance of EPA-Certified Phase 2 Woodstoves, Klamath Falls and Portland Oregon: 1998/1999*. EPA-600/SR-00-100 (2000).

^v Subpart AAA-Standards of Performance for New Residential Wood Heaters, 40 CFR §§ 60.530-60.539b.

¹⁴ These tests were conducted either by EPA or laboratories on behalf of manufacturers. See Appendix A.

¹⁵ OWB, conventional wood stove, and EPA certified wood stove emission rates from Table 2; emission rates of 0.07 g/hr and 0.04 g/hr from *EPA Emission Factors AP-42*, Fifth Edition, Volume 1, available at www.epa.gov/ttn/chieff/ap42/ch01/index.html (last accessed May 31, 2005); EPA, *Emission Standards Reference Guide of Heavy-Duty and Nonroad Engines*, EPA 420-F-97-014 (September, 1997); EPA, *Federal Certification Exhaust Emission Standards for Light-duty Vehicles (Passenger Cars) and Light-duty Trucks: Federal Test Procedure (FTP), Cold CO, and Highway and Idle Tests*, EPA 420-B-00-001 (February, 2000).

**Figure 4: Relative Emissions of Fine Particulate Matter
From Home Heating Devices**



B. Human Health Impacts of OWB Smoke

Exposure to various components of wood smoke and the contaminants found in wood smoke has been associated with adverse human health impacts, as discussed below. The likelihood of health effects depends on many factors, such as the amount of smoke to which one is exposed, the frequency and duration of exposure, and the sensitivity of the individual exposed.

Fine Particulate Matter (PM 2.5)

Exposure to PM 2.5 can cause short-term health effects such as eye, nose, throat, and lung irritation, coughing, sneezing, runny nose, and shortness of breath and can also affect lung function and worsen medical conditions such as asthma and heart disease. While the upper respiratory system will filter out particles larger than ten millionths of a meter (or microns), PM 2.5 can bypass the body's natural filtering mechanisms to lodge deep in the lungs.¹⁶ Scientific studies have linked increases in daily PM 2.5 exposure with increased respiratory and cardiovascular hospital admissions, emergency department visits and deaths. Recent studies suggest that long-term exposure to PM 2.5 may be associated with increased rates of bronchitis and reduced lung function, and increased cancer risk. People with breathing problems (such as asthma, bronchitis, emphysema, or pneumonia) and/or heart problems, and certain members of

¹⁶ EPA, *EPA Announces Final Designations for First Fine Particulate Standard*, Press Release (Dec. 17, 2004), available at www.epa.gov/pmdesignations (last accessed May 31, 2005).

the general population (such as children and the elderly) may be particularly sensitive to PM 2.5.¹⁷ More than 60,000 deaths each year in the United States can be attributed to exposure to air polluted with PM 2.5.¹⁸

Respiratory and cardiovascular diseases have been associated directly with wood smoke emissions.¹⁹ For example, a Seattle area study noted increases in asthma and other respiratory disease and declines in lung function among children exposed to wood smoke.²⁰ Long term exposure to wood smoke, like other emissions containing PM 2.5, can lead to chronic bronchitis, obstructive lung disease, and an increased risk of cancer.²¹

Polycyclic Aromatic Hydrocarbons (PAHs)

PAHs are a group of chemicals that are formed during the incomplete combustion of coal, oil, gas, wood, garbage, and other organic substances such as tobacco. PAHs generally occur as complex mixtures often containing hundreds of different PAHs. Tests on mice show that exposure to PAHs during pregnancy results in higher rates of birth defects, lower birth weights, and difficulty reproducing. Animal studies have also shown that both short-term and long-term exposure to PAHs can inhibit the body's ability to fight disease. Some PAHs have been categorized as probable human carcinogens (cancer causing chemicals) by the U.S. Department of Health and Human Services, and by the International Agency for Research on Cancer.²²

¹⁷ New York State Department of Health Fact Sheet, *Fine Particles (PM 2.5) Questions and Answers* (Feb 2003, revised July 2004), available at www.health.state.ny.us/nysdoh/indoor/pmq_a.htm (last accessed May 31, 2005).

¹⁸ Washington State Department of Ecology, Air Quality Program, *Health Effects of Wood Smoke* (March 1997, updated August 2004).

¹⁹ Zelikoff, J., et al., *The Toxicology of Inhaled Woodsmoke*, J. Toxicology and Environmental Health, Part B, 5: 269-282 (2002).

²⁰ Koenig, J., et al., *Pulmonary Function Changes in Children Associated with Fine Particulate Air Pollution*, Environmental Research 63(1): 26-38 (1993); Larson, R. and Koenig, J., *Wood Smoke: Emissions and Noncancer Respiratory Effects*. Annu. Rev. Public Health 15: 133-56 (1994).

²¹ American Lung Association, *Wood Smoke Affects Your Health* (1990); Ammann, H., *Summary Overview of Health Effects Associated with Residential Wood Combustion: Health Effects Issue Assessment*, Internal Report, EPA, Research Triangle Park, NC (1986); Larson, T., et al., *Urban Air Toxics Mitigation Study: Phase I*, University of Washington report submitted to the Puget Sound Air Pollution Control Authority (1988); Morris, K., et al., *Wood Burning Stoves and Lower Respiratory Tract Infections in American Indian Children*, American Journal of Diseases of Children 144: 105-108 (1990); Stevens, R., et al., *Sources of Mutagenic Activity in Urban Fine Particles*, Toxicol. Industrial Health 6: 81-94 (1990).

²² Agency for Toxic Substances and Disease Registry, *Toxicological Profile for Polycyclic Aromatic Hydrocarbons* (August 1995).

Carbon Monoxide

At low concentrations, carbon monoxide can cause fatigue in healthy people and chest pain in people with heart disease. At higher concentrations, it can cause impaired vision and coordination, headaches, angina, dizziness, confusion, and nausea. Exposure can cause flu-like symptoms that stop after exposure ends. It can also be fatal at very high concentrations, due to the formation of carboxyhemoglobin in the blood, which inhibits oxygen uptake.²³

Benzene

Exposure to benzene can cause both short and long term health effects. At high concentrations, exposure to benzene can cause drowsiness, dizziness, rapid heart rate, headaches and tremors. Long term exposure to lower levels are associated with adverse effects in the blood and bone marrow (leukemia), the immune system, the reproductive system, and increased cancer risk.²⁴

Chlorinated Dioxins

Chlorinated dibenzo-p-dioxins (CDDs) are a family of 75 different compounds with varying harmful effects. CDDs are released to the environment during combustion of fossil fuels (coal, oil, natural gas) and wood, and during incineration processes. Burning materials that may contain chlorine, such as plastics, wood treated with pentachlorophenol, pesticides, polychlorinated biphenyls (PCBs), and even bleached paper can produce CDDs. Exposure to CDDs generally occurs through breathing contaminated air, or through skin contact with materials containing CDDs. Effects of exposure depend on the amount, but can range from skin disease, changes in blood, urine, and liver chemistry, as well as potential reproductive or developmental effects. Certain CDDs have been determined to be likely carcinogens.²⁵

Other Chemicals

Wood smoke contains inorganic and organic irritants such as formaldehyde and other aldehydes, nitrogen oxides and sulfur oxides. Inhalation of wood smoke containing irritants can lead to inflammation and swelling of the lung tissue and can contribute to respiratory distress. Irritants can interfere with the normal flow of mucus that removes particles from the respiratory tract, thereby increasing the amounts of particulate matter entering the lungs. These irritants can also contribute to allergic reactions.²⁶

C. Neighborhood Problems Created by OWB Smoke

²³ EPA, *Indoor Air Quality Tools for Schools Kit*, IAQ Coordinator's Guide, available at www.epa.gov/iaq/schools/tfs/guidee.html (last accessed May 31, 2005).

²⁴ Agency for Toxic Substances and Disease Registry, *Toxicological Profile for Benzene*, Public Health Statement (September 1997).

²⁵ Agency for Toxic Substances and Disease Registry, *Toxicological Profile for Chlorinated Dibenzo-p-Dioxins*, Public Health Statement (December 1998).

²⁶ Agency for Toxic Substances and Disease Registry, *TOXFAQs for Formaldehyde* (June 1999), *Sulfur Dioxide* (June 1999), and *Nitrogen Oxide* (April 2002).

During summer months and calm winter days, wood smoke is slow to rise and disperse. With OWB chimneys not high enough to carry the smoke past the heights of surrounding homes and local terrain, wood smoke, soot, and toxins may enter homes and yards of owners and neighbors who are situated close to OWBs. Wood smoke particulates, due to their small size, can remain suspended in the air for long periods of time, can cause a smokey haze, and can easily enter homes through air intakes, cracks, doors and windows. Effects on neighbors are especially apparent when OWBs are installed at the outermost limit of the owner's property, and in close proximity to structures on adjacent properties.

The OAG has received more than 50 complaints from individuals who are affected by OWB-generated smoke and odors.²⁷ The complaints filed with the OAG note the following:

1. Smoke from OWBs has led to a variety of symptoms including upset stomach, headaches, dizziness, respiratory effects, and throat and eye irritation.
2. Smoke from OWBs has prevented residents from enjoying activities inside and around their homes. Residents have been unable to use their porches and backyards or conduct normal activities such as walking the dog, gardening, or hanging laundry outside. Some residents do not allow their children to play outside because of the smoke.
3. Smoke from OWBs has forced residents to close their windows, doors, and air conditioning units, in an effort to keep the smoke and smoke odors from entering their homes. Residents have complained of wood smoke odors on items inside the home, such as clothing, curtains and upholstery. Smoky conditions indoors have sometimes set off carbon monoxide detectors.
4. Materials besides natural wood are burned in the OWBs, producing even greater amounts of noxious smoke and odors.
5. In a few cases, the unhealthy and nuisance conditions created by OWBs have caused complainants to sell their homes.

²⁷ Complaints have been received from people in the following counties: Broome, Cattaraugus, Chautauqua, Chemung, Chenango, Clinton, Dutchess, Franklin, Jefferson, Onondaga, Saratoga, St. Lawrence, Suffolk, Tioga, Ulster, Warren, and Wyoming. One OWB was adjacent to a public school.

III. OWB Efficiency, Costs, and Performance

According to the EPA, since OWBs are “designed to be installed outside of the home, and to heat by an indirect method, they are exempt from the EPA regulation(s)”²⁸ that cover indoor wood stoves. Currently, no standard test methods are available to evaluate the performance of OWBs. Approached by the Hearth, Patio, and Barbecue Association (HPBA) in an effort to make test data on OWBs comparable, the Association for Standards and Testing Materials (ASTM) established a committee to develop a consensus-based standard testing method for OWBs.²⁹

Until a test method is established, it is impossible to assess with precision the claims of manufacturers regarding efficiency and costs of OWBs. Some limited testing information, however, suggests that OWBs may be not only less environmentally sound but may also be less efficient and economical than other common heating sources, such as indoor wood stoves, and gas- or oil-fueled furnaces.

A. Heating Efficiency

Heating efficiency is a measure of heat output relative to the input value of the fuel – the actual heat output in comparison to the potential heat output of the fuel. The EPA has found heating efficiencies of about 54 percent for conventional wood stoves, and 68 to 72 percent for EPA-certified wood stoves.³⁰ In comparison, data obtained from manufacturers on tests conducted on OWBs found that they have heating efficiencies ranging from 28 to 55 percent, with an average of 43 percent (see Appendix B).

B. Costs

One of the benefits of OWBs, as advertised by some manufacturers, is that customers will save thousands of dollars in heating costs over the course of a year. One manufacturer, for example, claims: “Over a ten-year period, a homeowner or business may save \$10,000 to \$50,000 dollars or more on heating costs.”³¹ Another advertises that one can “save 69 to 78% on your heating costs,” and “you will save up to 90% on your heating and hot water bills.”³² However, these claims of cost savings may not withstand scrutiny. The initial cost of OWBs is significantly higher than that of other heating devices such as gas and oil furnaces (see Table 3), many of which will already be installed in the home. In addition, OWB

²⁸ Excerpted language is from an EPA exemption letter provided to an OWB manufacturer in response to a request for determination of exempt status in 1999. Letter from EPA Office of Enforcement and Compliance, Energy and Transportation Division, J. Rasnic, Director, dated November 30, 1999.

²⁹ ASTM, *E06.54.08, Task Group on Outdoor Wood-Fired Hydronic Heaters*, Sheraton Hotel and Convention Center, Madison Wisconsin, December 1-2, 2004. The committee, with representatives from OWB manufacturers, and state and federal governments, is in the process of developing testing methods that can be applied to OWBs. While generally agreeing that a standard test method should be adopted, committee members are deliberating the quantity, quality, moisture content, and stacking position of the wood for the test burns. Ideally the adopted test method will be realistic and reproducible, to enable “factory-tested” comparable results among OWBs.

³⁰ EPA, *Residential Wood Combustion Technology Review*, Volume I. Technical Report. EPA-600/R-98-174a. (December 1998).

³¹ Central Boiler, Inc., available at www.centralboiler.com (last accessed Feb. 18, 2005).

³² Taylor Manufacturing, Inc., available at www.taylorfmfg.com (last accessed Feb. 23, 2005).

manufacturers' claims apparently do not take into account the cost of purchasing or harvesting wood fuel. When the latter cost is accounted for, any savings may vanish (see Table 4).

Table 3: Initial Cost of Various Heating Systems

Type of Heating System	Average Cost ⁱ
Outdoor Wood Boiler ⁱⁱ (43% Efficient)	\$5500
Indoor Wood Stove ⁱⁱⁱ Non-catalytic (68% Efficiency) Catalytic (72% Efficiency)	\$2075 \$2425
Gas or Oil Fueled Forced Air Furnace ^{iv} (80% Efficient)	\$1860
Gas or Oil Fueled Forced Air Furnace ^{iv} (90% Efficient)	\$2690
Gas or Oil Hot Water Radiator ^{iv} (80% Efficient)	\$3320
Gas or Oil Hot Water Radiator ^{iv} (90% Efficient)	\$4260

ⁱ Costs are estimated based on average cost of unit plus installation. Does not include cost of internal home piping or duct work. Actual costs may vary widely based on manufacturer, efficiency, and region of the United States.

ⁱⁱ The estimated initial cost of an OWB is the average of the minimum unit cost of the five largest manufacturers plus the average cost of installation materials, based on information obtained by OAG from manufacturers.

ⁱⁱⁱ Houck, J. and Tiegs, P., *Residential Wood Combustion—PM 2.5 Emissions*, OMNI Environmental Services, Inc., Emission Inventory Workshop, Reno, Nevada (July 1998).

^{iv} The average costs of the gas and oil systems are based on surveys conducted by the Consumer Energy Council of America, reported in March 2001 in a report entitled, "*Oil, Gas, or...? An Evaluation of the Economics of Fuel Switching Versus Home Energy Conservation*," available at www.cec.org/Publications/MiscPub/FuelSwitchingReport.pdf.

Table 4: Fuel Costs for Various Heating Systems

Type of Fuel	Fuel Price ⁱ	Price per million BTU (Dollars)	Efficiency ⁱⁱ	Price per mmBTU adjusted for efficiency (Dollars)	Total Household Energy Cost per year (Dollars) ⁱⁱⁱ
Wood (for use in OWB)	\$170 per cord	\$8.50	43%	\$19.77	\$1,977 (or less if not all purchased)
Wood (for use in catalytic indoor wood stove)	\$170 per cord	\$8.50	72%	\$11.81	\$1,181 (or less if not all purchased)
Wood (for use in non-catalytic indoor wood stove)	\$170 per cord	\$8.50	68%	\$12.50	\$1,250 (or less if not all purchased)
Oil	\$1.99 per gallon	\$14.35	78%	\$18.40	\$1,840
Gas	\$1.13 per therm	\$11.30	78%	\$14.49	\$1,449
Electricity	\$0.094 per kilowatt hour	\$27.46	97%	\$28.31	\$2,831

ⁱ Average efficiencies and price per million BTU for oil, gas, and electricity based on calculations by the Energy Information Administration, United States Department of Energy. "How do I compare Heating Fuels" (April 7, 2005), available at www.eia.doe.gov/neic/experts/expertanswers.html (last accessed May 31, 2005). We note that wood prices may vary widely compared to oil, gas and electricity. The heating fuel comparison calculator (Rev H-c 4/21/05) is available for download in Microsoft Excel format, available at www.eia.doe.gov/neic/experts/heatcalc.xls.

ⁱⁱ Average wood efficiency based on OWB efficiency testing provided in Appendix B of this report, and EPA, *Residential Wood Combustion Technology Review, Volume I. Technical Report*. EPA-600/R-98-174a. (December 1998).

ⁱⁱⁱ The assumed approximate household energy consumption per year (100 million BTU) is based on the 2003 Annual Energy Review by the Energy Information Administration of the United States Department of Energy, available at www.eia.doe.gov/emeu/aer/consump.html (last accessed April 22, 2005).

C. Environmental Performance

OWB manufacturers have made a variety of claims regarding environmental performance, which do not have technical or scientific basis. One OWB manufacturer claims that its devices are smokeless and create “no creosote, no smoke, and no waste.”³³ Another manufacturer claims that “the tangible proof of complete combustion is no visible smoke.”³⁴ However, any combustion device will create gaseous and particulate emissions³⁵ and all wood combustion will create ash requiring disposal.

In addition, certain claims regarding potential fuels may not be entirely accurate. For example, some manufacturers claim erroneously that wood with high moisture content will create an efficient fire. One manufacturer claims that its OWB “doesn’t smolder, it either burns hot or shuts down. Hotter fire will burn almost any material – even green wood.”³⁶ Another states without basis that “we burn up to ½ less wood and emit up to ½ less smoke.”³⁷ Additionally, some manufacturers, distributors, and dealers of OWBs advise their customers, both in print and verbally, that the stove will burn almost anything, including rotten wood, freshly cut and green wood, old building scraps, wood scraps (including nails), newspapers, corrugated cardboard boxes, pine cones, grass, yard trimmings, and sawdust.³⁸ One manufacturer claims that “our injection air furnace burns any type and quality of wood, wet or dry, unsplit and in lengths of up to 72 inches. The burn time average can reach 48 hours or more per fill.”³⁹ One manufacturer claims that its device can help control allergies, stating, “many people suffer from allergies. With the furnace outside, smoke, fuel odors, and fumes are kept outside.”⁴⁰ Manufacturers and dealers also claim that OWBs will heat large structures while “eliminating waste,” without making clear that household waste should not be burned in the OWB.

IV. Current Regulation of OWBs

³³ Dectra Corporation, *available at* www.dectra.net/garn (last accessed May 24, 2005).

³⁴ Turbo Burn, Inc., *available at* www.turboburn.net (last accessed Feb 25, 2005).

³⁵ One claimed benefit of burning wood in OWBs (and wood stoves) is that wood combustion has the potential to contribute less to global warming than the combustion of fossil fuels if the wood burned is replaced by new trees, which remove carbon from the atmosphere. However, the absence of particulate controls on OWBs may negate any such benefit because the black carbon soot emitted by OWBs also contributes to global warming.

³⁶ Aqua-Therm, LLC., *available at* www.aqua-therm.com (last accessed Feb 18, 2005).

³⁷ Heatmor, Inc., *available at* www.heatmor.com (last accessed May 27, 2005), and OWB owner’s manual, page 25.

³⁸ Mahoning Outdoor Furnace, Inc., *available at* www.shol.com/mahoning (last accessed Feb 25, 2005); Taylor Manufacturing, Inc., *available at* www.taylorfmfg.com (last accessed May 31, 2005) and OWB sales brochure; Innotech Developments, *available at* www.outdoorfurnaces.com (last accessed Feb 23, 2005).

³⁹ Outside Heating Systems, *available at* www.wooddoctorfurnace.com (last accessed May 26, 2005).

⁴⁰ Freedom Outdoor Furnace, OWB sales brochure.

A. Federal and State Regulations

The EPA does not currently regulate the manufacture, sale, or efficiency claims of OWBs. OWBs are not subject to the federal regulations governing indoor stoves and fireplaces, which are tested and regulated by the EPA for safety, emissions, and efficiency. Any new residential wood stove sold in the United States after July 1, 1992 must be “Phase 2” certified, meaning that it does not emit more than 4.1 grams of particulate matter per hour for catalytic stoves and 7.5 grams of particulate matter per hour for noncatalytic stoves.⁴¹ All of the OWB units tested to date for PM (see Table 2 and Appendix A) far exceed the PM limits that apply to EPA-certified wood stoves.

In New York State, there are no regulations directed particularly at OWBs. DEC regulations provide that “no person shall cause or allow emissions of air contaminants to the outdoor atmosphere of such quantity, characteristic or duration which are injurious to human, plant, or animal life or to property, or which unreasonably interfere with the comfortable enjoyment of life or property.”⁴² Operation of OWBs may also violate the DEC smoke regulation which states, in part, that “no person shall operate a stationary combustion installation which exhibits greater than twenty percent opacity, except for one six-minute period per hour of not more than twenty-seven percent opacity.”⁴³ DEC has taken enforcement actions involving OWB owners on several occasions based on these regulations.

The states of Vermont and Washington do regulate OWBs. The Vermont regulations⁴⁴ include the following provisions:

- (1) Installation of an OWB must be at least 200 feet from the nearest neighboring residence;
- (2) The stack on the furnace must be higher than the roof line if the furnace is between 200 feet and 500 feet from the nearest neighboring home;
- (3) The OWB must comply with local ordinances and its operation must not create a nuisance;
- (4) Dealers and sellers of OWBs must provide buyers with a legal notice stating that: only untreated natural wood may be burned; installation is subject to the distance and stack height requirements stated above; and that the OWB, even if meeting the above requirements, may not be used if the terrain is inappropriate and renders the OWB to be a nuisance or public health hazard. This legal notice must be signed by both the buyer and seller and filed with the Air Pollution Control Division of Vermont prior to delivery of the OWB to the buyer.

⁴¹ Fisher, L., et al., *Long-Term Performance of EPA-Certified Phase 2 Woodstoves, Klamath Falls and Portland, Oregon: 1998/1999*, EPA/600/SR-00/100 (2000); see also, Subpart AAA - Standards of Performance for New Residential Wood Heaters, 40 CFR §§ 60.530-60.539b.

⁴² 6 NYCRR § 211.2.

⁴³ 6 NYCRR § 227-1.3. Opacity is defined as: “The degree to which emissions other than water reduce the transmission of light and obscure the view of an object in the background.” 6 NYCRR § 200.1(ay). The generally applicable opacity limit of twenty percent is roughly equivalent to a light grey smoke.

⁴⁴ Vermont Air Pollution Regulation, section 5-204, Outdoor Waterstoves (September 1997).

The Washington regulation⁴⁵ establishes emission standards, certification standards and procedures, curtailment rules, and fuel restrictions for solid fuel burning devices. OWBs are considered solid wood burning devices, which, after January 1, 1995, must be shown to comply with an emission standard of 4.5 grams PM per hour before they can be offered for sale in the State of Washington. Prohibited fuels include garbage, treated wood, plastic and plastic products, rubber products, animal carcasses, asphaltic products, waste petroleum products, paints and chemicals, and any substance that normally emits dense smoke or obnoxious odors. OWBs, like other solid fuel burning devices, must comply with an opacity standard not to exceed an average of 20 percent opacity for six consecutive minutes in any one-hour period. Retailers must provide information on the proper operation of the unit, including information that opacity levels of ten percent or less are attainable through proper operation.

B. Local Requirements

Some local governments in New York State have deemed OWBs a nuisance because of smoke and toxic emissions. Several towns and villages have placed restrictions on OWBs ranging from meeting certain requirements for setback distances, chimney height, terrain, population density and other factors, to outright bans. These municipal requirements are shown in Table 5.



⁴⁵ Washington Administrative Code 173-433-100 (3), Solid Fuel Burning Devices (January 1995).

Table 5: Municipalities with Requirements Pertaining to OWBs

Town / Village and County	Date	Regulate*	Ban
Barneveld, Village of (Oneida County)	Apr 2005		X
Camden, Village of (Oneida County)	June 1999		X
Canton, Town of (St. Lawrence County)	Dec 2003		X
Edwards, Village of (St. Lawrence County)	June 2003		X
Heuvelton, Village of (St. Lawrence County)	Nov 2003		X
Holland Patent, Village of (Oneida County)	Apr 2005		X
Kingsbury, Town of (Washington County)	Sep 2004	X	
Lowville, Village of (Lewis County)	Dec 2001		X
Marcellus, Village of (Onondaga County)	Jan 2004		X
Moreau, Town of (Saratoga County) (proposed)	Oct 2004	X	
Otego, Village of (Otsego County)	Mar 2001	X	X
Prospect, Village of (Oneida County)	Mar 2005		X
Queensbury, Town of (Warren County)	May 2004	X	
South Glens Falls, Village of (Saratoga County)	Dec 2003	X	
Watertown, City of (Jefferson County)	Oct 2003		X

* See Box on following page for further details on requirements.

Specific Requirements of New York State Municipalities Regarding OWBs.

Town of Kingsbury - Installation of an OWB requires a permit and must meet the following requirements: (a) installed, operated, and maintained according to manufacturer instructions, (b) fueled with natural untreated woods, (c) set back at least 25 feet from nearest property line, and (d) minimum chimney height of 15 feet.

Town of Moreau (proposed) - A permit, issued by the Town Building Inspector or Code Enforcement Officer, is required for operation of an OWB and must meet the following requirements: (a) only firewood and untreated lumber may be burned, (b) may be installed only in permitted zones, (c) must be installed on a lot of three acres or more, (d) must be set back at least 500 feet from nearest lot line, (e) may only be operated between September 1st and May 31st, and (f) must be equipped with a properly functioning spark arrestor.

Village of Otego - The construction and operation of OWBs are prohibited with the exception of OWBs already in operation. No OWB already in operation may be extended, enlarged, or restored beyond 75% of its value, and/or re-established after use is discontinued for more than seven months.

Town of Queensbury - A permit is required for operation of an OWB and must meet the following requirements: (a) only firewood and untreated lumber may be burned, (b) may be installed only in permitted zones, (c) must be installed on a lot of three acres or more, (d) must be set back at least 200 feet from nearest lot line, (e) may only be operated between September 1st and May 31st, and (f) must be equipped with a properly functioning spark arrestor.

Village of South Glens Falls - Installation of any OWB must meet the following requirements: (a) smokestack must exceed four feet and be higher than any adjacent structure within 50 feet of the furnace, (b) must be installed at least 200 feet from the closest residential property line, (c) may only burn wood, and (d) may not be used as a waste incinerator.

V. Recommendations

A. Develop Federal and State Regulations

The adoption of federal regulations is the best way to address effectively the problems identified in this report. Ideally, such regulations would require emissions testing, performance standards, and control technologies to ensure that OWBs are environmentally sound and do not pose a health hazard to users and neighbors. Given the complexities of establishing testing protocols and emission limits, there are significant advantages to manufacturers of federal regulation, instead of a multitude of state and local limits. Consistent with all other Clean Air Act programs, however, it must be clear that any federal regulations only set a floor for health protections, and that states are free to enact stricter protections.

In the absence of federal regulations, DEC could fill the regulatory void by developing an air quality regulatory program that would effectively address OWB problems across the state. DEC could establish siting, operation, and disclosure standards and perhaps emission limits. A DEC rulemaking would offer the additional advantage of providing interested affected parties with the opportunity to shape policy through submission of comments and participation in rulemaking hearings.

B. Adopt Local Requirements

Towns and villages can evaluate the suitability of OWB operation in their jurisdictions. Just as local zoning codes can address activities that create nuisances and require permits or establish conditions for certain activities, communities can consider requiring permits before installation of an OWB, especially in more densely settled areas. In evaluating permit applications, determinations can be made whether local conditions such as setback distances, terrain, and sensitive neighbors such as schools, hospitals and residences are compatible with OWB operation.

Local requirements could limit acceptable fuel to dry, natural, and untreated wood. A document acknowledging that limitation, signed by the OWB purchaser, could be filed with the local code officer, thereby becoming an enforceable condition of the usage of the OWB. The Town of Queensbury's ordinance is shown in Appendix D, as an example.

C. Improve Performance of and Information About OWBs

Even in the absence of regulation, manufacturers can take steps to reduce OWB emissions by adding pollution control devices such as catalytic converters, installing taller stacks for smoke dispersal, or re-designing OWB units to minimize the smoldering and smoke that are inherent in the majority of the OWBs currently on the market.

Even before OWBs are improved, manufacturers should ensure that their advertising and marketing materials reflect the basis for any claims about efficiency, cost, and environmental performance and that handling instructions make clear that only dry seasoned wood be burned. Retailers should help prospective customers assess the suitability of an OWB in light of the customer's property, taking into account such factors as proximity of neighboring residences, terrain, and nearby property uses (residential, commercial, industrial, size of OWB, etc.).

Finally, OWB manufacturers and distributors should commit to provide technical assistance in the event that an OWB creates a smoke nuisance for an OWB owner or neighbors, or is not working as advertised. The manufacturer or distributor, by phone or personal visit, should evaluate the situation and recommend technical solutions, such as extending the smoke stack to a height that is greater than the height of the neighboring roof line or the installation of a control apparatus, such as a catalytic device.

D. Increase Consumer Awareness

Before purchasing an OWB, potential buyers should consider the size and location of their property, their heating needs, and suitable wood availability in addition to local laws and regulations. Consumers should carefully scrutinize manufacturer claims.

For people who have already purchased an OWB or who live near an OWB that is creating smoky conditions, these steps may help resolve the situation:

- (1) OWB owners should make sure they are operating the OWB only with suitable materials. If smoky conditions persist despite burning of proper materials, contact the manufacturer or distributor of the OWB unit. The manufacturer may be able to assess, adjust, and/or retrofit the unit to reduce the smoke or emissions problem by, for example, installing a taller smoke stack and/or catalytic device.
- (2) If the manufacturer or distributor cannot or will not provide assistance, or if the OWB operator will not contact the manufacturer or distributor, contact the regional DEC office that serves the county. The DEC may be able to assist in evaluating the smoke opacity to determine whether excessive smoke is present and may be able to suggest ways to improve the situation. Contact information for local officials, regional offices of the DEC, and county health departments is listed in Appendix C.
- (3) OWBs should not be used to burn pressure treated wood, painted wood, household garbage or other waste materials. Local zoning or building code officers, local fire officials, a regional DEC office, or county health departments should be called for assistance.
- (4) If experiencing conditions detrimental to health (smoke in the home causing respiratory difficulties, for example), contact the public health department that serves the county (See contact list in Appendix C). The county or state DOH may be able to assist in evaluating the situation to determine if a condition exists that is detrimental to life or health.
- (5) If neither DEC nor DOH is able to assist, contact the Environmental Protection Bureau at the New York State Office of the Attorney General for further advice and assistance at 1-518-474-8096 or 1-800-771-7755.

APPENDIX A: EMISSIONS FROM OUTDOOR WOOD BOILERS AS DETERMINED IN EPA OR LABORATORY TESTS ⁱ

OWB	Particulate Matter (grams per hour)	Polycyclic Aromatic Hydrocarbons (grams per hour)	Number of Tests
OWB A ⁱⁱ	73	1.2	4
OWB B ⁱⁱ	26	0.72	4
OWB C ⁱⁱⁱ	84	NA	5
OWB D ⁱⁱⁱ	60	NA	4
OWB E ⁱⁱⁱ	108	NA	2
OWB F ⁱⁱⁱ	18	NA	2
OWB G ⁱⁱⁱ	49	NA	7
OWB H ⁱⁱⁱ	33	NA	2
OWB I ^{iv}	147	NA	2
OWB J ^{iv}	118	NA	2
OWB K ^v	179	NA	1 cordwood
OWB L ^v	269	NA	1 lumber
Average ^{vi}	71.6	0.96	

ⁱ The results from Intertek and Omni laboratories were provided to the OAG by the manufacturers. Note that due to the current lack of an established test methodology, the tests used may have differed. Thus, the results should be considered as a whole; comparisons between boilers may not be appropriate. For this reason, manufacturers' names are omitted.

ⁱⁱ Valenti, J. and Clayton, R., *Emissions from Outdoor Wood-Burning Residential Hot Water Furnaces*, EPA-600/R-98-017 (February 1998); names of OWB manufacturer 'A' and 'B' not provided in report.

ⁱⁱⁱ Intertek Laboratories 2004.

^{iv} Omni Laboratories 2004.

^v Intertek Laboratories 2004. Data provided on behalf of ASTM Committee to develop testing methods, using old 'nameless' OWB; data excluded from calculation of average.

^{vi} Average of OWB units A through J; data excluded for OWB units K and L.

APPENDIX B: HEATING EFFICIENCY OF OUTDOOR WOOD BOILERSⁱ

OWB	Heating Efficiency	Number of Tests
OWB A ⁱⁱ	45%	4
OWB B ⁱⁱ	55%	4
OWB C ⁱⁱⁱ	30%	5
OWB D ⁱⁱⁱ	37%	4
OWB E ⁱⁱⁱ	28%	2
OWB F ⁱⁱⁱ	31%	2
OWB G ⁱⁱⁱ	55%	7
OWB H ⁱⁱⁱ	37%	2
OWB I ^{iv}	55%	2
OWB J ^{iv}	53%	2
OWB K ^v	45%	1 cordwood
OWB L ^v	46%	1 lumber
Average^{vi}	43%	

ⁱ The results from Intertek and Omni Laboratories were provided to the OAG by the manufacturers. Note that due to the current lack of an established test methodology, the tests used may have differed. Thus, the results should be considered as a whole; comparisons between boilers may not be appropriate. For this reason, manufacturers' names are omitted.

ⁱⁱ Valenti, J. and Clayton, R., *Emissions from Outdoor Wood-Burning Residential Hot Water Furnaces*, EPA-600/R-98-017 (February 1998); names of OWB manufacturer 'A' and 'B' not provided in report.

ⁱⁱⁱ Intertek Laboratories 2004.

^{iv} Omni Laboratories 2004.

^v Intertek Laboratories 2004. Data provided on behalf of ASTM Committee to develop testing methods, using old 'nameless' OWB; data excluded from calculation of average.

^{vi} Average of OWB units A through J; data excluded for OWB units K and L.

APPENDIX C: NEW YORK STATE CONTACTS FOR OWB PROBLEMS

(1) Local Zoning, Health, and Code Enforcement Officials

New York State County, City, Town, and Village Contact Information is available in local telephone directories or is *available at*

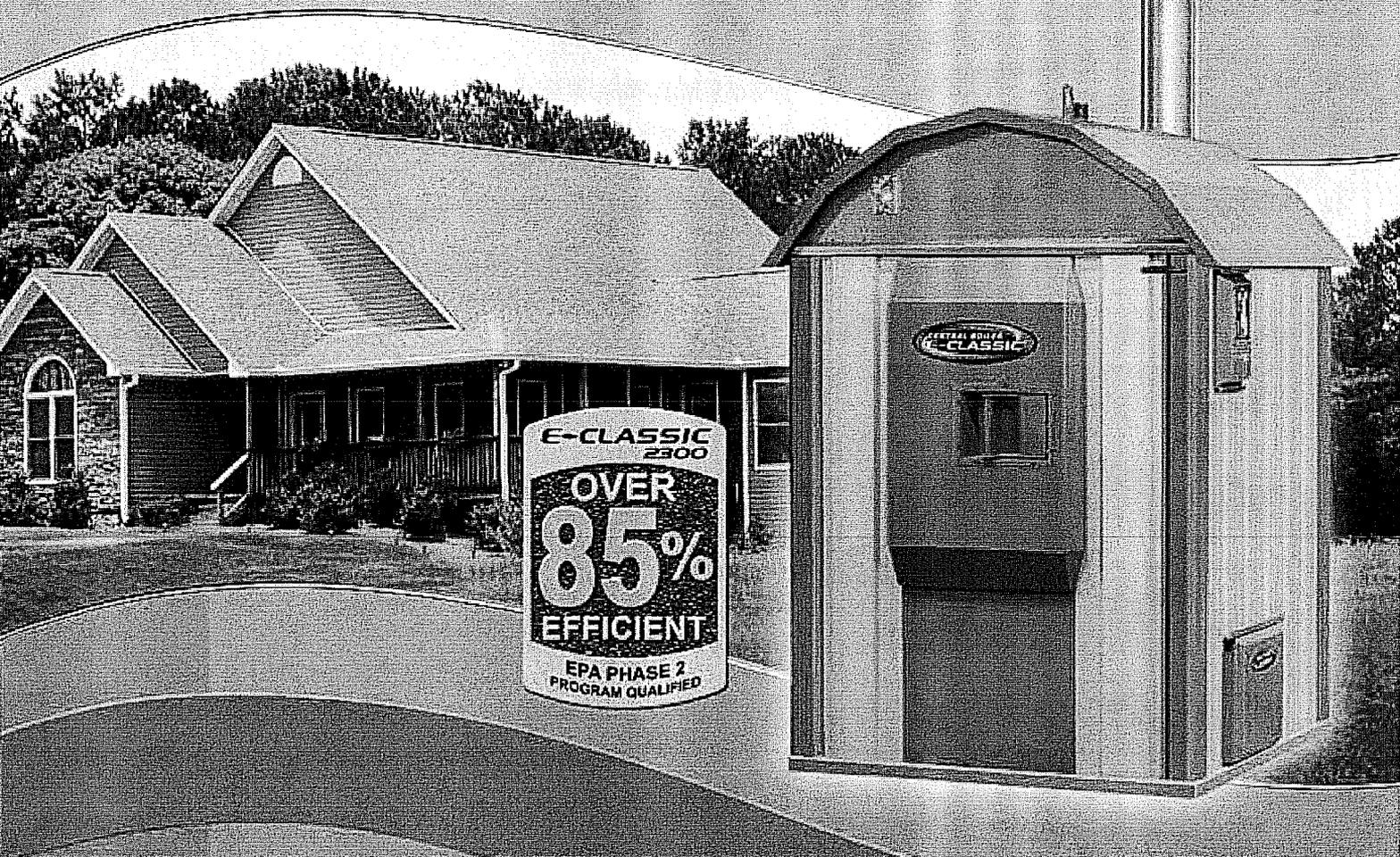
www.nysgov.com/citguide.cfm?context=citguide&content=munibycounty

(2) Regional Department of Environmental Conservation (DEC) Offices

Region	County	DEC Regional Office
1	Nassau and Suffolk	631-444-0205
2	Bronx, Brooklyn, Manhattan, Queens, and Staten Island	718-482-4944
3	Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster, and Westchester	845-256-3045
4	Albany, Columbia, Delaware, Greene, Montgomery, Otsego, Rensselaer, Schoharie, and Schenectady	518-357-2350
5	Clinton, Essex, Franklin, Fulton, Hamilton, Saratoga, Warren, and Washington	518-623-1212
6	Herkimer, Jefferson, Lewis, Oneida, and St. Lawrence	315-785-2513
7	Broome, Cayuga, Chenango, Cortland, Madison, Onondaga, Oswego, Tioga, and Tompkins	315-426-7552
8	Chemung, Genesee, Livingston, Monroe, Ontario, Orleans, Schuyler, Seneca, Steuben, Wayne, and Yates	585-226-5311
9	Allegany, Cattaraugus, Chautauqua, Erie, Niagara, and Wyoming	716-851-7130

CENTRAL BOILER E-CLASSIC[®]

Outdoor Wood Gasification Furnace



E-CLASSIC
2300
OVER
85%
EFFICIENT
EPA PHASE 2
PROGRAM QUALIFIED



We Build Excellence[®]

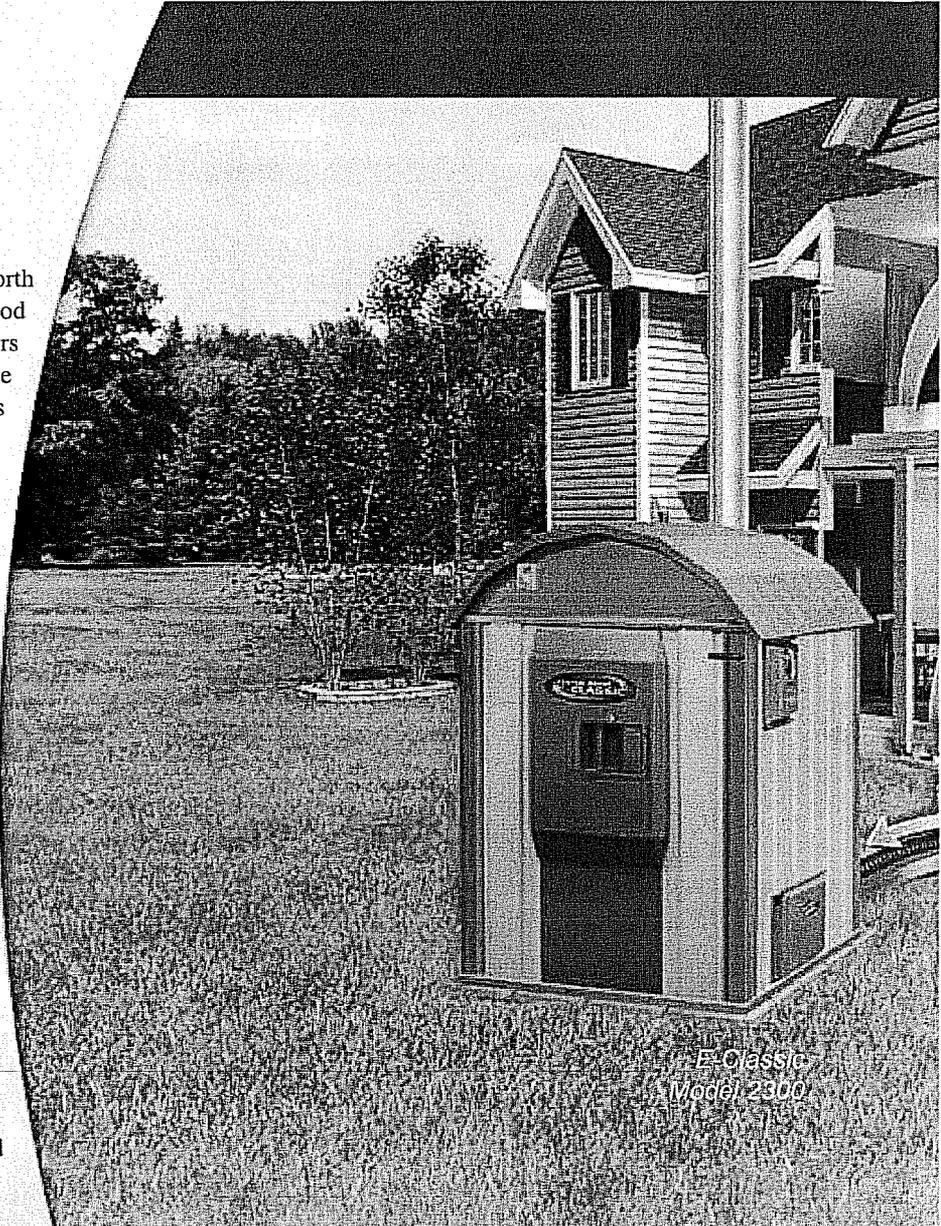
CentralBoiler.com

Up to \$1500*
Federal Tax
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for details



Welcome to Central Boiler

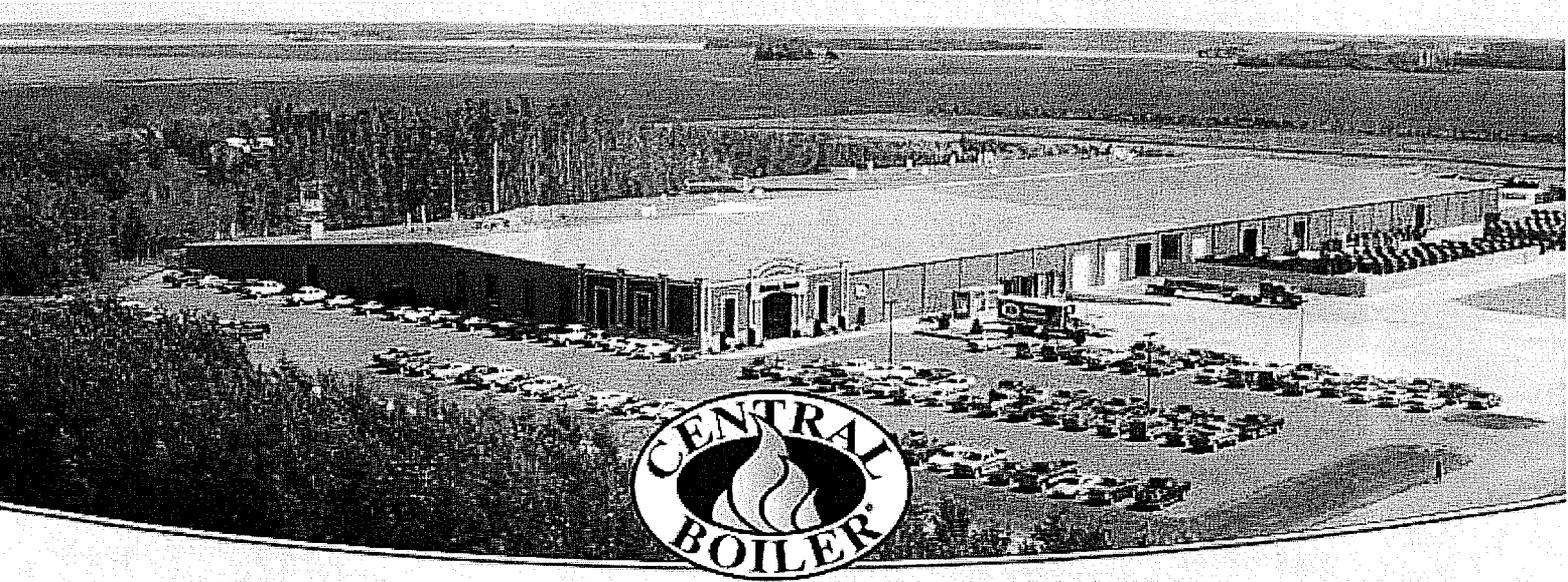
Central Boiler was established in 1984 and is North America's largest manufacturer of outdoor wood furnaces. We make it our goal to provide our customers with the finest outdoor wood furnaces available anywhere. For you as a consumer, wood heat offers many advantages. Wood is renewable, inexpensive, carbon neutral and often free. Conventional sources of heat such as propane, natural gas, fuel oil and electricity deplete our irreplaceable fossil fuels. They are also subject to constant price fluctuations. The E-Classic outdoor wood gasification furnace provides a heat source free of foreign nation influence and "the grip of big oil." It takes the age-old idea of heating with wood and modernizes it. By keeping the fire outside the home, the E-Classic eliminates the dangers and mess associated with traditional indoor wood stoves. The E-Classic uses a three-stage combustion process to burn wood so completely that combustion efficiencies approach 100%. With the patent-pending, self-cleaning heat exchanger, the E-Classic produces extremely low emissions per Btu of heat delivered and is one of the cleanest ways to heat with wood. Our E-Classic offers you an alternative that will save you money. This brochure will provide answers to questions you may have about our clean, efficient approach to wood heat. Please browse through this brochure to learn how you can benefit from an E-Classic outdoor wood gasification furnace for your home or business.



E-Classic
Model 2300

The E-Classic Can Work for You.

The E-Classic outdoor wood gasification furnace is located outside, typically 30 to 50 feet (but as far as 500 feet) away from your home or business, and works with any existing heating system. A water jacket surrounds the furnace firebox and heat exchanger and heated water is circulated to the home or building through insulated underground pipes. Water-to-air or water-to-water heat exchangers or direct circulation conveys the heat into the structure's forced-air furnace, boiler or radiant floor heating system. This allows for normal thermostatic control for safe, even, clean and comfortable heat. The ability to heat multiple buildings and water can eliminate your heating bills. Outside burning removes the threat of devastating chimney fires, dangerous carbon monoxide or oxygen depletion which affects your indoor air quality. It also eliminates the smoke, ashes, odors and soot buildup on walls and ceilings inside your home that indoor burning creates.



Why You Should Choose The E-Classic by Central Boiler

It's the alternative that eliminates the negative effects of burning wood indoors and increases the advantages of wood heat. It's a choice that can improve your family's living environment and standard of living while eliminating the fire hazards and time-consuming chore of tending a traditional wood stove. The Central Boiler E-Classic 2300 outdoor wood gasification furnace can provide 100% of the heat and hot water for a typical home. Your Central Boiler dealer can assist you in determining the actual heat and hot water needs for your home and the criteria for proper installation of the system. Actual Btu output and burn time will be affected by the type of wood burned, its moisture content and other factors. By virtually eliminating your heating costs, the E-Classic can often pay for itself in the first two years of use. Over a ten year period, a homeowner or business may save \$20,000 to \$100,000 or more in heating costs. The E-Classic uses 25% to 70% less wood compared to traditional wood furnaces or other brands of outdoor wood furnaces. The E-Classic saves you time and means less work because it burns larger pieces of wood. There's less splitting which significantly reduces the time you spend preparing the wood. The large firebox is designed for easy loading of wood.

20502 160th Street • Greenbush, MN 56726
(800) 248-4681 or (218) 782-2575

CentralBoiler.com

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Printed in the United States 8/09

For the maximum performance and life of your furnace, always insist on using Central Boiler authorized system parts and accessories.

See Owner's Manual for proper chimney height and installation. Minimum chimney height is determined by proximity to other buildings. Consider location and direction smoke may travel with prevailing winds before installing your furnace.

Content of this brochure is information in possession of Central Boiler at the time of the design of this publication and may not represent what was previously manufactured. Product specifications and appearance subject to change.

*Central Boiler, Inc. is not a tax advisor. Taxpayers claiming a tax credit should consult a tax professional with any questions. Central Boiler is not responsible or liable for the taxpayer's ability to receive tax credits.

Ask your dealer about Outdoor Furnace Best Burn Practices.

p/n 2536

Qualified Individuals Working Together for a Common Purpose: A High Quality Finished Product

Central Boiler is located in Greenbush, Minnesota and was established in 1984 and is North America's largest manufacturer of quality outdoor wood furnaces. Based upon a desire to create safer and more efficient heating products, the company's innovations and patents have established Central Boiler as a leader in product quality. The uncompromising attitude to manufacture the best and always strive to make it better is at the core of the company's growth. Central Boiler has a dealer network that has now established itself throughout the United States and Canada.

Authorized Central Boiler Dealers located across the U.S. and Canada

When you're looking for a wood heating system for any need, your Central Boiler dealer is there to serve you. Your Central Boiler dealer can answer your questions, provide you with literature about the E-Classic outdoor wood gasification furnace and help you choose the model right for your heating needs. To locate a Central Boiler dealer in your area, visit the dealer locator at CentralBoiler.com.

Free 25 Year Limited Warranty

A free 25 year limited warranty is available on the E-Classic if registered at the time of purchase. Central Boiler leads the industry with its commitment to stand behind its outdoor wood furnaces.

See Warranty Registration form for details.

Using wood as a heating fuel is endorsed by the U.S. Forestry Service.

Your Authorized Central Boiler Dealer

AN ORDINANCE RELATING TO THE REGULATION OF
OUTDOOR WOOD BURNING FURNACES

THE CITY COUNCIL OF THE CITY OF OAK PARK HEIGHTS, WASHINGTON COUNTY,
MINNESOTA, DOES ORDAIN:

1125.01 Purpose.

To promote the health, safety and welfare and to safeguard the health, safety and welfare of the citizens of Oak Park Heights with regards to the potential negative effects from outdoor wood burning furnaces.

1125.02 Definitions.

- A. "Outdoor Wood Burning Furnace" means any equipment, device, appliance or apparatus, or any part thereof, which is installed, affixed or situated outdoors for the primary purpose of combustion of fuel to produce heat or energy used as a component of a heating system providing heat for any interior space or water source. Not included in this definition are outdoor fireplaces or fire pits, and fireplaces and wood stoves that are installed within a principal or accessory building.
- B. "EPA Phase II Qualified" means an outdoor wood burning furnace that has been certified by the U.S. Environmental Protection Agency as being EPA Phase II qualified. The furnace has met the Phase II emission requirements and is labeled accordingly.
- C. "Clean Wood" means natural, dry wood which has not been painted, varnished or coated in any way, has not been pressure treated with preservatives and does not contain resins or glues as in plywood or other composite wood products.
- D. "Refuse" means any waste material except clean wood.

1125.03 Regulations.

- A. Administrative Permit Required.
 - 1. Outdoor wood burning furnaces may be allowed in the City subject to the approval of an Administrative Permit. The consideration involving the approval or denial of such permit shall include:
 - a. The notification of immediately abutting property owners (including those located across a street) and an assessment of the possible negative impacts upon such properties.

- b. The adequacy of the site to accommodate the proposed outdoor wood burning furnace.
 - c. The public health, safety and general welfare concerns posed by the proposed outdoor wood burning furnace.
 - 2. The property owner must submit an application for an Administrative Permit which includes documentation of the type of furnace proposed and a site plan showing proposed furnace location in relation to property lines and existing structures.
 - 3. The Administrative Permit shall be renewed on an annual basis.
- B. All outdoor wood burning furnaces shall be setback at least 100 feet from all property lines and at least 300 feet from the nearest occupied building not served by an outdoor wood burning furnace.
- C. All outdoor wood burning furnaces shall maintain chimney height that extends at least two (2) feet above the highest peak of the residence for which it serves, or the chimney shall extend at least two (2) feet above the highest peak of any residence not served by the furnace within three hundred (300) feet, whichever is greater.
- D. All requirements for installation and maintenance shall be met including, but not limited to, local, state and federal regulations and manufacturer's specifications.
- E. All outdoor wood burning furnaces installed after the effective date of this ordinance shall be EPA Phase II qualified.
- F. Only clean wood shall be burned in an outdoor wood burning furnace.
- G. All firewood stored on a property shall be stored in the side yard or rear yard and stacked neatly.
- H. An outdoor wood burning furnace shall not be operated or maintained in a manner which creates a public nuisance.
- I. Outdoor wood burning furnaces shall be fully screened from adjacent neighbors and the public right-of-way in accordance with fencing and screening requirements of Section 401.15.E of the Zoning Ordinance.

1125.04

Right of Entry and Inspection.

- A. An officer, agent, employee or representative of the City may inspect any property for the purpose of ascertaining compliance with the provisions of this section.

- B. If the City determines that the operation of a wood boiler system is creating a nuisance or is being operated in a manner hazardous to persons or property, or is not meeting the requirements of this section, the City may revoke Administrative Permit after a hearing is held by the City Council upon ten (10) days written notice given to the property owner.

§ 153.260 OUTDOOR WOOD BOILER SYSTEMS.

(A) *Purpose.* This section is intended to ensure that outdoor wood boiler systems are utilized in a manner that does not create a public nuisance and is not detrimental to the health, safety and general welfare of the residents of the city.

(B) *Definitions.* For purposes of this section, the following terms shall have the definitions indicated unless the context clearly calls for or indicates a different meaning:

(1) **CLEAN FUEL.** Natural dry wood which has not been painted, varnished or coated with a similar material, has not been pressure-treated with preservatives and does not contain resins or glues as in plywood or other composite wood products and other Environmental Protection Agency approved fuels.

(2) **OUTDOOR WOOD BOILER SYSTEM.** An appliance installed out-of-doors and designed to transfer or provide heat, via liquid or other means, through the burning of clean fuel for heating purposes. **OUTDOOR WOOD BOILER** does not include a fire pit or wood-fired barbeque.

(3) **PUBLIC NUISANCE.** Any **PUBLIC NUISANCE** as defined in §96.01.

(C) *Area of operation.* An outdoor wood boiler system may be installed and used in the Conservancy, Agriculture, Rural Residential and Industrial Zoning Districts only.

(D) *Certificate of Compliance.* A Certificate of Compliance shall be obtained from the city prior to installing, altering or relocating a wood boiler system.

(E) *Application for a Certificate of Compliance.*

(1) An Application for a Certificate of Compliance shall be made to the city upon forms furnished by the city. The application shall include the following data:

(a) Name and address of applicant and property owner;

(b) Legal description of the property;

(c) A site plan or survey, if deemed necessary by the city, illustrating the dimensions of the property, including location of buildings and the wood boiler relative to the lot lines and distances from neighboring residences that are within 300 feet; and

(d) Manufacturer's specifications for installation.

(2) All Applications shall be accompanied by an application fee.

(F) *Application for Building Permit.* A building permit must be obtained to assure that all outdoor wood boiler systems meet all building and fire codes, and manufacturer's specifications for installation.

(G) *Minimum requirements for all outdoor wood boiler systems.*

(1) All requirements for installation and maintenance shall be met including but not limited to local, state and federal regulations and manufacturer's specifications.

(2) An outdoor wood boiler system shall be located at least 300 feet from any residence or principal building which is not on the same property as the outdoor wood boiler system.

(3) An outdoor wood boiler system shall only be placed in a location meeting the minimum required setbacks of an accessory structure within the applicable zoning district.

(4) An outdoor wood boiler system shall have an attached permanent stack extending 2 feet higher than the roof line of the structure being served and residential or principal buildings within a 500-foot radius of the wood boiler system.

(5) An outdoor wood boiler system shall not be operated or maintained in a manner which creates a public nuisance.

(6) An outdoor wood boiler system shall burn clean fuel only. An outdoor wood boiler system shall not be operated in a manner which creates any dense smoke, noxious fumes or noxious gas or releases soot or cinders in unreasonable quantities.

(7) An outdoor wood boiler system shall be equipped with properly functioning spark arresters.

(8) An outdoor wood boiler system may not be operated from April 1 to October 1 in each year.

(H) *Right of entry and inspection.*

(1) An officer, agent, employee or representative of the city may inspect any property for the purpose of ascertaining compliance with the provisions of this section.

(2) If the city determines that the operation of a wood boiler system is creating a nuisance or is being operated in a manner hazardous to persons or property, or not meeting the requirements of this section, the city may revoke the Certificate of Compliance after a hearing is held by the City Council upon 10 days written notice given to the owner.

(I) *Existing outdoor wood boiler systems.* Outdoor wood boiler systems installed prior to the adoption of this section shall be operated in compliance with the minimum requirements of this section except that the distance requirement of division (G)(2) above shall not apply; and for any existing outdoor wood boiler system not located in a Conservancy, Agriculture or Rural Residential District, the requirements of division (C) above shall not apply. The owner(s) of the property on which the outdoor wood boiler system is installed shall make an application for a Certificate of Compliance within 30 days of adoption of this section.

(Ord. 570, passed 12-10-2007)

AGENCY OF NATURAL RESOURCES
Waterbury, Vermont

ENVIRONMENTAL PROTECTION REGULATIONS

CHAPTER 5

AIR POLLUTION CONTROL

Subchapter II. Prohibitions

5-204 OUTDOOR WOOD-FIRED BOILERS

(a) Applicability.

- (1) This section shall apply to any person who owns, operates, installs, allows the installation or operation of, purchases, ~~distributes or sells, or manufactures any outdoor wood-fired boiler~~ for use in Vermont, except as provided below.
- (2) Except for the requirements in subdivision (c)(3) of this section, this section shall not apply to any person who owns, operates, installs, allows the installation or operation of, purchases, ~~distributes or sells, or manufactures:~~
 - (i) Any continuously fed *outdoor wood-fired boiler* that is specifically designed to burn pellet type fuels with metered fuel and air feed and controlled combustion engineering and that is distributed or sold for use in Vermont before March 31, 2010.
 - (ii) Any *outdoor wood-fired boiler* that is or has been owned by such person for his or her own personal use and is distributed or sold to another for his or her own personal use, provided that the installation requirements in subdivision (c)(2) of this section are met. For the purposes of this section, "personal use" means the use of an OWB by an individual solely for residential space or domestic water heating and not to service a commercial or institutional establishment.

(b) Definitions. For the purposes of this section, the following definitions apply, in addition to those of Section 5-101 of this chapter.

"*Biomass Fuel*" means solid biological material derived from living, or recently living, vegetation, including natural wood or wood pellets made from *natural wood*.

"*Distribute or Sell*" means to distribute, sell, advertise for sale, offer for sale, hold for sale, ship, deliver for shipment, release for shipment, or receive and (having so received) deliver or offer to deliver. This term also includes conditional sales and long-term leases.

"Manufacturer" means any person who constructs, markets as their own, or imports into the United States an outdoor wood-fired boiler.

"Model" means all outdoor wood-fired boilers offered for distribution or sale by a single manufacturer that, in the judgment of the Air Pollution Control Officer, have the same heat output capacity and are similar in all other material respects.

"Outdoor Wood-Fired Boiler" (a.k.a., OWB, outdoor wood-fired hydronic heater or outdoor wood furnace) means a fuel burning device: (1) designed to burn primarily wood; (2) that the manufacturer specifies should or may be installed outdoors or in structures not normally occupied by humans, such as attached or detached garages or sheds; and, (3) which heats spaces or water by the distribution through pipes of a fluid heated in the device, typically water or a mixture of water and antifreeze. In addition, as used in subsection (c) of this section only, this term also means any wood-fired boiler that, after October 1, 2009, is actually installed outdoors or in structures not normally occupied by humans, such as attached or detached garages or sheds, regardless of whether such use has been specified by the manufacturer.

"Phase I OWB" means an OWB that has been certified by the Air Pollution Control Officer as meeting the particulate matter emission limit specified in Section 5-204(e)(2)(i) of this chapter.

"Phase II OWB" means an OWB that has been certified by the Air Pollution Control Officer as meeting the particulate matter emission limits specified in Section 5-204(e)(2)(ii) of this chapter.

"Untreated Natural Wood" means natural wood that has not been treated with any preservative, herbicide, pesticide, adhesive, paint, stain, oil or other chemical or coating.

(c) Requirements for Purchasers, Installers, and Owners/Operators

(1) Requirements for Purchasers

- (i) On or after October 1, 2009 to March 31, 2010, no person shall purchase any OWB unless it is a Phase I OWB or a Phase II OWB.
- (ii) On or after March 31, 2010, no person shall purchase any OWB unless it is a Phase II OWB.

(2) Installation Requirements

- (i) After October 1, 1997, no person shall install or allow the installation of any OWB that is not a Phase I OWB or a Phase II OWB unless the OWB:

- (A) Is located more than 200 feet from any residence that is neither served by the OWB nor owned by the owner or lessee of the OWB; and,

- (B) Has a permanent stack extending higher than the peak of the roof of the structure(s) being served by the

OWB, if any residence, which is not owned by the owner or lessee of such *OWB*, is located more than 200 but less than 500 feet from the *OWB*.

- (ii) No person shall install or allow the installation of any *Phase I OWB* unless it is located more than 200 feet from any residence that is neither served by the *OWB* nor owned by the owner or lessee of the *OWB*.
- (iii) No person shall install or allow the installation of any *Phase II OWB* unless it is located more than 100 feet from any residence, school or health care facility that is neither served by the *OWB* nor owned by the owner or lessee of the *OWB*.
- (iv) No person shall install or allow the installation of any *OWB* unless it complies with all applicable laws and regulations, including but not limited to local ordinances, and its operation does not create a public nuisance.

(3) Operation Requirements

- (i) No person shall cause, suffer, allow or permit the operation of any *OWB* unless it was installed in accordance with the applicable requirements of subdivision (c)(2) of this section.
- (ii) Allowable fuels. No person shall cause, suffer, allow or permit the burning of any material in an *OWB* except for the following:
 - (A) *Untreated natural wood*, as defined herein;
 - (B) Wood pellets made from *untreated natural wood*;
 - (C) Home heating oil, natural gas or propane that complies with all applicable sulfur content limits and is used as a starter or supplemental fuel for dual-fired *OWBs*; or
 - (D) Other biomass fuels in *Phase II OWBs* certified for such fuels or in *OWBs* described in subdivision (a)(2)(i) of this section.
- (iii) No person shall cause, suffer, allow or permit the operation of any *OWB*, except in conformance with the manufacturer's operating and maintenance instructions.
- (iv) No person shall cause, suffer, allow or permit the operation of any *OWB* unless it complies with all applicable laws and regulations, including but not limited to local ordinances, and its operation does not create a public nuisance.

(d) Requirements for Sellers

- (1) On or after October 1, 2009 to March 31, 2010, no person shall *distribute or sell* any *OWB* unless it is a *Phase I OWB* or a *Phase II OWB*.
- (2) On or after March 31, 2010, no person shall *distribute or sell* any *OWB* unless it is a *Phase II OWB*.
- (3) Notice to Buyers.
 - (i) After October 1, 1997, no person shall *distribute or sell* any *OWB* unless prior to any retail sales or lease agreement, the seller or dealer provides the prospective buyer or lessee with written notice stating that:
 - (A) Only allowable fuels, as specified in Section 5-204(c)(3)(ii), may be burned in an *OWB*;
 - (B) Installation of the *OWB* is subject to the applicable *stack* height and/or distance requirements provided in Section 5-204(c)(2)(i)-(iii). [Each notice shall expressly disclose each such requirement];
 - (C) Use of an *OWB* that meets the applicable *stack* height and/or distance requirements provided in Section 5-204(c)(2)(i)-(iii) is not appropriate in some areas due to terrain that could render the operation of an *OWB* to be a nuisance or a public health hazard;
 - (D) All *OWBs* must be operated in conformance with the manufacturer's operating and maintenance instructions.
 - (ii) The written notice shall be signed and dated by the prospective buyer or lessee to verify timely receipt of the notice prior to the sale or lease and shall contain the name, address and telephone number of both the seller or dealer and the prospective buyer or lessee, the location where the *OWB* will be installed, and the make and model of the *OWB*. Prior to making delivery of an *OWB* into the possession of any buyer or lessee, the seller or dealer shall mail or otherwise provide a copy of the signed notice to the:

Air Pollution Control Division
103 South Main Street
Building 3 South
Waterbury, Vermont 05671-0402.

ORDINANCE 1016

**AN ORDINANCE AMENDING STILLWATER
CITY CODE SECTION 38-1 PUBLIC NUISANCES**

THE CITY COUNCIL OF THE CITY OF STILLWATER DOES HEREBY ORDAIN:

1. **INTENT AND PURPOSE.**

- (a) It is recognized and found that smoke is hazardous to an individual's health and may affect the health of the general public when they are involuntarily exposed to the presence of wood smoke.
- (b) Reliable scientific studies, including studies conducted by the Environmental Protection Agency (EPA) and the New York State Attorney General Office, have shown that breathing wood smoke is a significant health hazard particularly to children, elderly people, individuals with cardiovascular disease, and individuals with impaired respiratory functions, including asthmatics and those with obstructive airway disease.
- (c) It is recognized that free-standing furnaces are designed and intended to be a primary heat source and therefore burn, and emit smoke, on a continual basis. A distinction is drawn between free-standing furnaces and indoor wood stoves and fireplaces that, by nature, provide supplemental heat and are generally used on a less-frequent basis.
- (d) This ordinance is adopted for the purpose of protecting the public health, safety, comfort, and the general welfare of the people of the City of Stillwater.

2. **AMENDING.** City Code Chapter 38-1, Subd. 2, (2) is hereby amended by adding the following:

nn. Installing or operating of an outdoor wood boiler. "Outdoor wood boiler" means any equipment, device, appliance or apparatus, or any part thereof, which is installed, affixed or situated outdoors for the primary purpose of combustion of solid fuel, including but not limited to wood, wood pellets, and corn, that produces heat or energy used as a component of a heating system providing heat for any interior space or for domestic water consumption. Outdoor wood boilers do not include natural gas-fired fireplace logs, wood-burning fireplaces or wood stoves in the interior of a dwelling nor do they include BBQ grills or outdoor open air recreational fires.

3. **SAVING.** In all other ways the Stillwater City Code will remain in full force and effect.
4. **EFFECTIVE DATE.** This Ordinance will be in effect from and after its passage and publication according to law.

Adopted by the City Council of the City of Stillwater this ___ day of _____, 2010.

CITY OF STILLWATER

Ken Harycki, Mayor

ATTEST:

Diane F. Ward, City Clerk