

Our atmosphere has never been completely free of chemical gases and particulates. Natural occurrences such as wildfires and volcanic eruptions send smoke, gasses and particulates into the atmosphere. However, the rapid development of industry and technology over the last two centuries, along with a growing global population, has both increased the amount and changed the nature of air pollutants. Studies by the National Institute of Environmental Health Sciences (NIEHS) indicate that long-term exposure to air pollutants increases the risk of allergies, asthma, heart disease and lung cancer.

While some might not think of air pollution as a problem in a largely rural area like Fond du Lac County, air quality is of vital concern to the county for both health and economic reasons.

☀ What is Polluting the Air?

Although pollutants are usually more prevalent in cities and industrial areas, pollution can and does occur everywhere. In addition, wind may carry pollution released in one place to many other locations. Major outdoor air pollutants include nitrogen oxides and ozone from vehicle emissions, and fine particulates and wood smoke. Common indoor air pollutants include radon gas, volatile organic compounds and tobacco smoke.



To receive air quality alerts from Fond du Lac County via email or RSS feed, visit
www.FDLHealthyAir.com

Top 5 Reasons Air Quality Matters in Fond du Lac County

1 14% of us have lung diseases like asthma, emphysema, & chronic bronchitis.

These people, in addition to active adults, children and senior citizens, are highly susceptible to air pollution.*

2 Air pollution affects the health of people and the economy.

In Wisconsin, 16% of children and adults have asthma, a disease which costs \$60 million a year in hospital and emergency room visits, not to mention much loss of productivity at school and work.** Reducing air pollution – inside and out – improves health outcomes and the economic costs of preventable diseases.

3 81% of us drive alone to work.

Unfortunately, 80% of Fond du Lac County's ground-level ozone, or "smog," comes from personal miles traveled in gasoline-powered vehicles. Ozone is a major irritant to lungs and can negatively impact anyone who breathes it at levels routinely found in Wisconsin.

4 21% of us work in manufacturing.

As the USEPA tightens air quality standards, our county could face stricter permitting, which can negatively impact job growth and economic development.

5 Our county is a major production site for renewable energy.

81% of Wisconsin's energy comes from burning petroleum, coal, and natural gas, and none of these fuels is naturally found in Wisconsin.*** Fond du Lac County's wind turbines and manure digesters give us a competitive economic edge in producing locally-sourced, cleaner power.

*Source: American Lung Association 2011 State of the Air Report

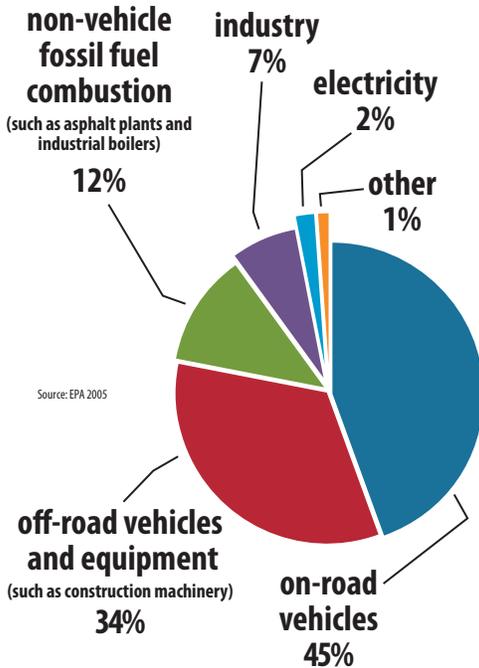
**Source: Wisconsin Asthma Plan, 2009-2014, Wisconsin Asthma Coalition

***Source: WI Office of Energy Independence, 2010 WI Energy Statistics Book

◆ MAJOR OUTDOOR AIR POLLUTANTS

Although pollution from natural sources sometimes affects air quality (for example, smoke from a forest fire), pollution from human activities is by far the more serious and persistent cause of environmental degradation and health problems. To power our vehicles, heat our buildings, manufacture our products and grow our crops, we burn fossil fuels. All of these activities contribute to outdoor air pollution.

Fond du Lac County NO_x Sources - 2005



☀️ Ozone

Ozone is created when nitrogen oxides (NO_x) and volatile organic compounds (VOCs) (see Indoor Air Pollutants on pages 4-5) react with sunlight and heat. When ozone is located where it should be, in the earth's upper atmosphere, ozone filters out harmful short-wavelength ultraviolet light. Ground-level ozone, however, is a pollutant, and is of most concern in the summer when there is more sunlight and the temperatures are higher.

According to the USEPA, health impacts of ground-level ozone include airway irritation and inflammation, coughing, pain when taking a deep breath, aggravation of asthma, increased susceptibility to respiratory illnesses like pneumonia and bronchitis and permanent lung damage with repeated exposure. Limiting activities such as painting, lawn mowing, driving and refueling can help reduce ground-level ozone.

☀️ Fine Particles

Fine particles, or particulate matter (PM), are tiny bits of solids or liquids suspended in the air. They are usually referred to according to their size, with PM_{2.5} designating a particle size of less than 2.5 microns, and are found in both rural and urban areas across Wisconsin. The smaller the particle, the deeper it can penetrate into the lungs. Breathing in these particles can aggravate heart diseases, asthma, emphysema and bronchitis, and cause chest pain, palpitations, shortness of breath, fatigue, cardiac arrhythmia and heart attacks.

Combustion of coal, oil, diesel, or wood fuels sends particulate matter into the air. Minimizing the use of fossil fuels and reducing wood burning can help reduce the amount of PM_{2.5} entering the atmosphere. Sensitive individuals should avoid exposure on days when particle levels are high. The WDNR began statewide air monitoring for levels of very fine particulates in 2002.

☀️ Wood Burners

Burning wood releases significant amounts of fine particles, volatile organic compounds (VOCs), carbon monoxide, and other toxic substances into the air. Both older and new USEPA-approved wood heaters pollute the air. Smoke from outdoor wood-fired boilers (OWBs) is of particular concern. This type of boiler is a natural or forced-draft wood stove surrounded with a water jacket. It is typically mounted some distance from the home and connected to a home heating or hot water system through underground piping. OWBs are usually hand-loaded with cordwood or split firewood and allowed to burn around-the-clock. The New York Attorney General's Report on Air Quality states that because these



OZONE – Ozone obscures the horizon in this aerial view of Fond du Lac County, taken on a warm June day in 2009. Ground-level ozone is created when NO_x and VOCs combine.

boilers can burn over long periods with reduced draft, or use green or partially dried wood, they can produce 10 times the smoke of other wood-burning heat sources. When OWBs are used near other houses, excessive amounts of smoke and low chimney heights can create serious health concerns for neighbors. Currently, OWBs are not required to meet USEPA emission standards.

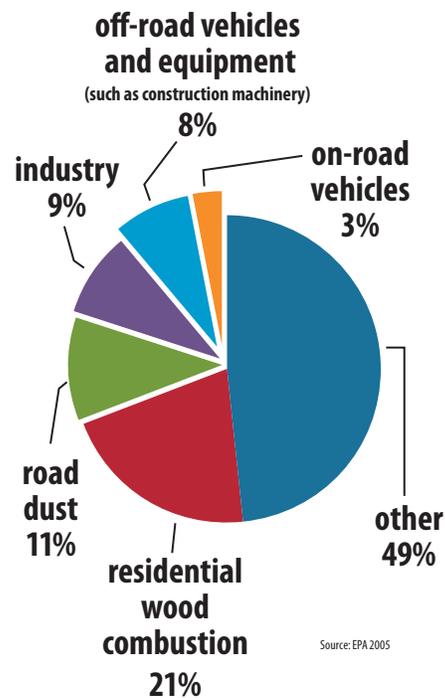
While the operating costs of these appliances can be lower than furnaces using higher-priced fuels (e.g. liquid propane), the high initial purchase price and installation costs can take a long time to recoup. Furthermore, the cost of wood as fuel can vary greatly, as can outdoor wood-fired boiler performance. Homeowners may never achieve the combustion efficiency claims made by manufacturers, due to differences in boiler design, operating procedures, fuel moisture and BTU content. These factors also determine the amount of smoke and other air pollutants created when wood is used as a heating fuel.

Air Quality Alerts

The Wisconsin Department of Natural Resources (WDNR) uses the Air Quality Index (AQI) to inform residents about daily air quality, which can vary by season and weather patterns. The index tracks the levels of all air pollutants that are routinely monitored for public health reasons and provides forecasts and alerts when air quality drops to an unhealthy level.

When air quality is forecast to be poor, or has already reached the unhealthy range, people should take steps to limit exposure to harmful pollutants by avoiding exertion. This is particularly true for children, senior citizens, people who suffer from asthma, emphysema, bronchitis, or heart disease and those who are physically active (for work or exercise). Workplaces can also take voluntary actions to reduce non-essential activities, like mowing or vehicle idling, which can contribute to air pollution.

Fond du Lac County Fine Particle Sources - 2005



WOOD AS FUEL – Using wood as a residential heating fuel creates more fine-particle pollution than any other single source in Fond du Lac County.

Visit www.FDLHealthyAir.com for daily air quality forecasts and link to Information on outdoor wood boilers available from the Wisconsin Department of Health Services



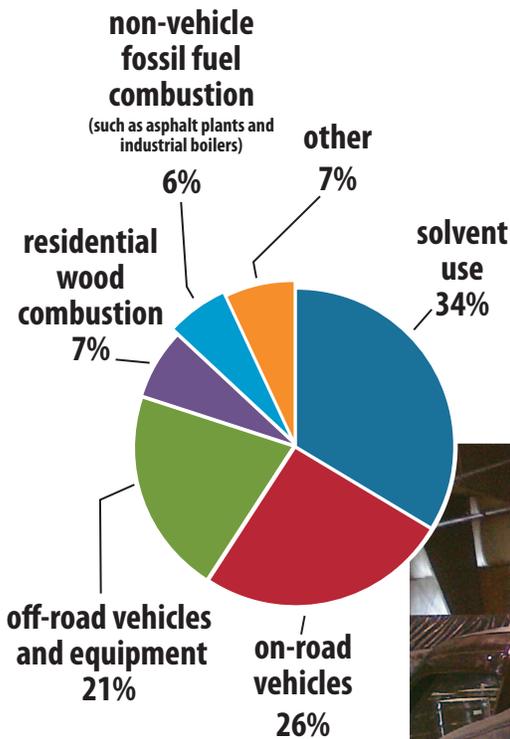
David Leibi

◆ MAJOR INDOOR AIR POLLUTANTS

We spend about 90 percent of our time indoors, and research shows that indoor air can be even more polluted than outdoor air. Radon, mold, appliances, air fresheners, paints and varnishes, fireplaces and woodstoves, cleaning products and smoking all add pollutants to the air. Without proper ventilation or air exchange with the outside, indoor air can cause health concerns especially for the young, the elderly, and those with chronic health problems.

Each of us breathes more than 3,000 gallons of air each day.
 – EPA

**Fond du Lac County
 VOC Sources - 2005**



Source: EPA 2005

☀ Volatile Organic Compounds

Volatile organic compounds (VOCs) are chemical vapors emitted from certain solids and liquids. They are of most concern indoors where there is poor ventilation. Paint, paint strippers, solvents, gasoline, cleaning supplies, adhesives, office supplies, building materials and industrial processes are common sources of these gasses.

High levels of VOCs in the air can last much longer than the actual use of the product. VOCs blend with nitrogen oxides to form ground-level ozone. VOCs can cause eye/nose/throat irritation, headaches, dizziness, nausea, cancer and central nervous system damage. Using low- or no-VOC building materials and paints, using natural cleaning agents, and pouring chemicals carefully to avoid spilling can help reduce the amount of these compounds in the air.



Diana Tischbrock

CLEAN SWEEP – Hazardous chemicals are harmful to breathe and harmful to dispose of. Contact UW-Extension about the next county Clean Sweep hazardous waste collection event.

☀ Radon

Radon is an invisible, radioactive gas that occurs naturally when uranium in soil and rock decays. It is a carcinogen and can seep into homes and other buildings, where it poses significant health risks to occupants if breathed at high levels over time. Radon is the second leading cause of lung cancer and causes an estimated 21,000 deaths per year in the United States. It is the leading cause of lung cancer among non-smokers.

Houses can be inexpensively tested and fixed to be radon-safe. The U.S. Surgeon General, American Lung Association, Environmental Protection Agency, and World Health Organization urge all homeowners and renters to test for radon in the lowest level of the home suitable for occupancy. You should consider installing a system to vent air out the roof from below the basement slab if the test results are above 4 picocuries per liter (pCi/L). This mitigation can be done with little impact to your home's interior construction and is barely noticeable from the exterior.

If your home requires venting for radon, it is important to find a Certified Radon Mitigation Specialist to install the radon removal system. The price of radon mitigation ranges from \$800-\$1,200. Very low-income Fond du Lac County residents who live outside of the City of Fond du Lac can contact the USDA Rural Development program at (920) 907-2976, ext. 4, for grants or loans to help with radon mitigation.

All homes, even brand-new construction, can have radon present. If you are building a new house, require your builder to make it radon-resistant from the start. This will cost between \$400-\$700.

**For more information on
radon measurement and mitigation, visit
www.FDLHealthyAir.com**

To test your home for radon:

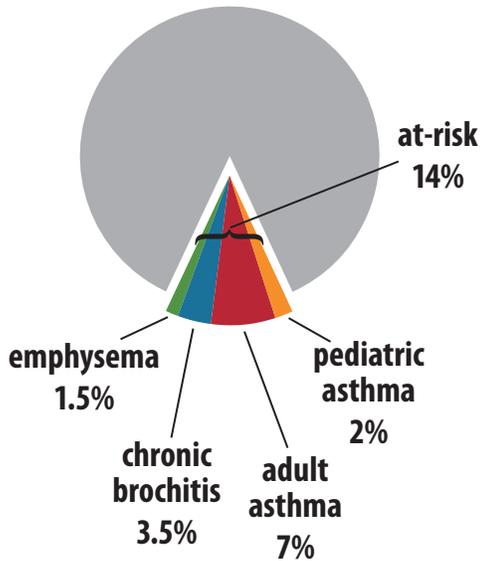
- Pick up a test kit:
FDL County Health Department
160 S. Macy, Fond du Lac, Wisconsin
Phone: (920) 929-3085
Monday-Friday, 8-4:30 p.m.
- Start with a short-term test (48 hours) for \$8.
- Mail back the kit. The lab will mail back your results with recommendations for action.
- Do a long-term test (90 days - 1 year) for \$20 if the short-term test results are high.



RADON-RESISTANT HOME – A venting system reduces radon by allowing air under the basement slab to vent out the roof.

◆ WHO IS AFFECTED MOST IN FOND DU LAC COUNTY?

Fond du Lac County Lung Disease At-Risk - 2010



Source: American Lung Association 2010 State of the Air Report

Air pollution affects people with lung and heart conditions, seniors and children most profoundly. According to the American Lung Association 2011 State of the Air Report, 14 percent of Fond du Lac County residents suffer from lung conditions of adult asthma, pediatric asthma, chronic bronchitis or emphysema. One in 3 county residents has cardiovascular disease. About 2 in 5 residents are over age 65 or under age 18.

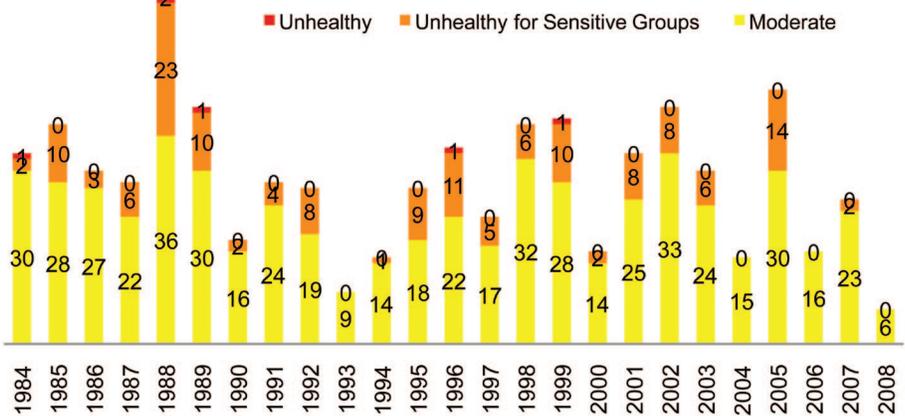
Young children inhale more pollution relative to their size than adults and are generally more active, which makes them more vulnerable.

Local health experts also report that even healthy individuals who exert themselves on days when air pollution is high can suffer negative health consequences from air pollution. Air pollution can cause both immediate symptoms (wheezing, coughing, shortness of breath) and long-term problems (cancer, emphysema, chronic bronchitis) depending on levels of contaminants in the air and the amount of time a person is exposed to them.

Odds are that each person in Fond du Lac County either is susceptible to air pollution or knows someone who is. Stay informed about the air quality (AQ) forecast and take actions to improve AQ for your health and the health of others.



Fond du Lac County Historic AQIs – Moderate to Unhealthy



Source: Wisconsin Department of Natural Resources

◆ THE REGULATORY & ECONOMIC ASPECTS OF AIR QUALITY

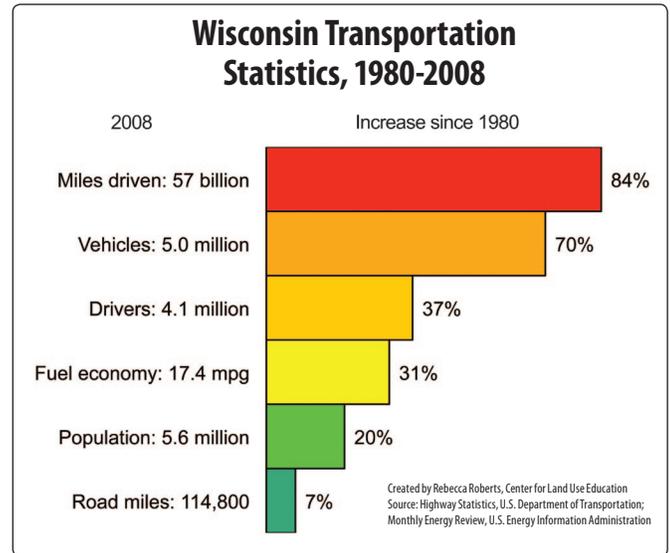
☀ Air Pollution Regulation

With the Clean Air Act (1970), Congress provided the regulatory authority to improve the nation's air quality. In Wisconsin, the Department of Natural Resources administers and enforces air pollution rules. All commercial activity that contributes to air pollution is subject to DNR regulation. Emissions of combustion byproducts from coal or natural gas, emissions of hazardous chemicals, and sources of volatile organic compounds all come under regulatory control. However, with the exception of transportation-related rules in ozone non-attainment areas, private activities of homeowners and others are not subject to these rules.

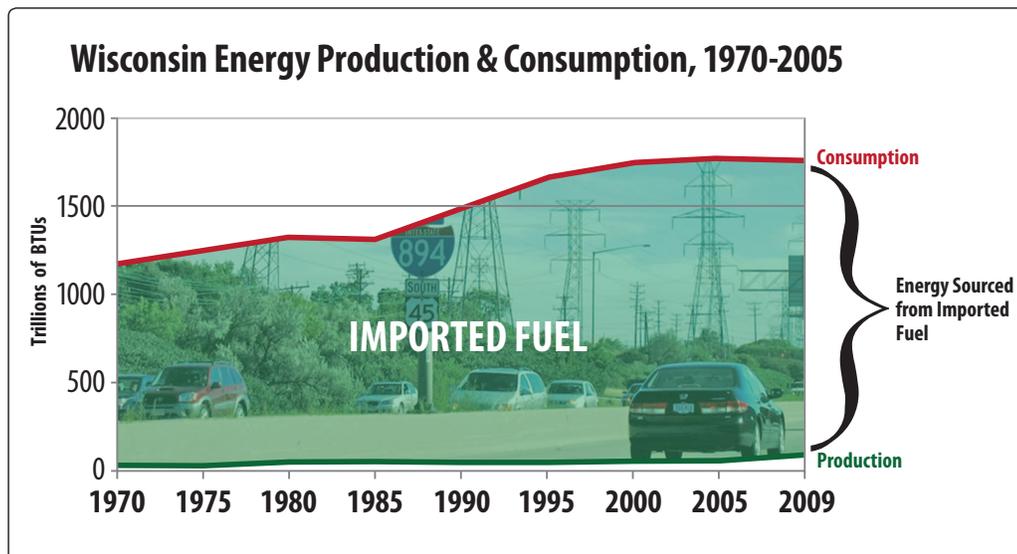
The USEPA, which sets a health standard or a maximum acceptable level of a pollutant, regulates ozone, fine particles, NO_x and VOCs. **Counties that exceed the standard for a certain contaminant are designated with "non-attainment" status and mandated to have stricter permitting and environmental controls on industrial facilities until emissions are within the acceptable range.** This has the potential to inhibit economic development, since it creates an expensive hurdle for companies that they wouldn't necessarily face in other counties or regions. Ozone and fine particles are the two pollutants in Fond du Lac County that are closest to exceeding the USEPA health standard.

☀ Energy Use & the Economy

Eighty percent of ground-level ozone in Fond du Lac County comes from vehicles and a majority of our electricity is generated by coal-fired power plants. Over the last 30 years, the amount Wisconsinites drive and the amount of electricity we use have increased. Reversing these trends will become increasingly important over time as our traditional fuel



CAR CULTURE – Miles driven in Wisconsin have far outpaced the number of drivers and the population growth since 1980.



Based on graph created by Rebecca Roberts, Center for Land Use Education
Source: Wisconsin Energy Statistics 2010, Wisconsin Office of Energy Independence

Driving is the Largest Source of Ground-Level Ozone in Fond du Lac County



80% personal miles



20% work miles

Source: WDNR

sources – imported natural gas, oil and coal – become more volatile in price and availability.

Both individuals and businesses have a role to play in improving air quality, especially in Fond du Lac County where the primary industries are manufacturing and agriculture. In the first three quarters of 2010, 21 percent of workers in Fond du Lac County were employed in the manufacturing industry.* Manufacturing is a major source of emissions of volatile organic compounds (VOCs) which are regulated by both the USEPA and WDNR (see page 4). With 51,000 dairy cows, Fond du Lac County is ranked fourth in the state for number of cows and is also the location of the state’s largest single dairy herd.** Livestock agriculture is a source of fine particles and other air pollutants that are emitted from manure during handling and spreading. Locally produced power from area manure digesters is reducing demand for power from coal-fired power plants; however, combustion of manure digester gases for heat or electricity is also a source of NO_x and VOCs. The challenge for Fond du Lac County will be to maintain the profitability of these billion-dollar industries while reducing air emissions and energy use.



In 2009, the WI Office of Energy Independence estimated that renewable fuels make up 5.2% of the energy used in the state. This energy generated through wind, solar, geothermal and anaerobic digestion technologies is generally better for air quality and can be produced locally. Fond du Lac County currently has most of the wind turbines in the state, with 215 erected in the last 3 years. Local businesses are using at least six different kinds of renewable energy technologies and investing in energy efficiency and LEED-certified green buildings. These innovative companies are improving air quality, their financial bottom line, and the environment for their customers and employees.

Tour these businesses on the Local Energy Tour offered periodically by UW-Extension.

More details and a Virtual Tour can be found at www.FDLHealthyAir.com

E85, an ethanol blend used in flex-fuel vehicles and with fewer emissions than gasoline, is available at several gas stations locally. Visit the Fond du Lac Healthy Air website for details about this and other alternative energy sources.

*Source: WI Dept. of Workforce Development
**Source: UW-Extension

◆ WORKING TOGETHER FOR CLEANER AIR

Some of the most important air quality concerns are being addressed by several Fond du Lac County organizations:

☀️ **Asthma Coalition**

The Wisconsin Asthma Coalition of Fond du Lac County was formed in October 2002 with the goal of developing a comprehensive approach to providing support, information and resources for children, adults and their families living with asthma. Their mission is to help people, especially children, manage their symptoms by reducing exposure to allergens, mold, perfumes, pets and other triggers.

About 10% of Fond du Lac County children & adults suffer from asthma.

– American Lung Association, 2010

The Fond du Lac School District, Aurora Health Center, Agnesian Health Care and the Fond du Lac County Health Department have assumed leadership roles. The Coalition has about 25 key members, representing diverse community organizations/agencies, medical providers, schools, local pharmacies, parents, the American Lung

Association and day care centers. These groups have agreed to work together to achieve the vision that individuals with asthma living in Fond du Lac County will attain optimal health and quality of life.

For more information, contact Sandy Bernier, Fond du Lac County Health Department (by phone at 920-906-5537, or email at Sandy.Bernier@fdlco.wi.gov).

☀️ **NEW Air Coalition**

The Northeast Wisconsin (NEW) Air Coalition was organized in Fond du Lac County in 2004 in response to high ozone levels and an increased potential for receiving a “non-attainment” designation from the USEPA. The group’s purpose is to educate the public about actions

the average individual can do to keep ozone levels low and improve the health of all residents. A public education campaign is accompanied by voluntary efforts among the larger manufacturers and institutions in the area to reduce emissions by limiting lawn mowing or other non-essential activities on poor air quality days in the summer. Environmental engineers, education, health and economic development professionals and representatives of local government comprise this group.

For more information contact Diana Hammer Tscheschlok, Fond du Lac County UW-Extension (by phone at 920-929-3173, or email at diana.tscheschlok@ces.uwex.edu).



CAUTION AHEAD – Avoid outdoor activity when the AQ Index is forecast to be high.

Asthma Coalition Core Members:

Agnesian Health Care

Aurora Health Care

Fond du Lac School District

Fond du Lac County Health Department

New Air Coalition Core Members:

ACH Foam Technologies

City of Fond du Lac

Fond du Lac Area Association of Commerce

Fond du Lac County Executive’s Office, Health Dept., & Sheriff’s Dept.

Fond du Lac County UW-Extension

Fond du Lac School District

Mercury Marine

Ripon Area Chamber of Commerce

Sadoff & Rudoy Industries, LLP

Waupun Area Chamber of Commerce

Fond du Lac County Economic Development Corporation

Tobacco-Free Living Coalition Partners:

Fond du Lac County Health Department

Green Lake County Health Department

Marquette County Health Department

Washington County Health Department

Waushara County Health Department

The Council on AODA of Washington County

School Districts

Law Enforcement

FACT (Fighting Against Corporate Tobacco)

Business Leaders

☀️ Five Counties for Tobacco-Free Living: Fond du Lac, Green Lake, Marquette, Washington, Waushara

"Our mission is creating nicotine and tobacco-free environments in which we live, work, and play while promoting healthy lifestyles through education, advocacy, and policy."

This multi-jurisdictional coalition addresses tobacco control efforts through education, advocacy and policy at the local, state and federal levels by promoting and implementing CDC proven best practices focusing on the following key areas:

Youth Prevention

The coalition promotes nicotine and tobacco-free lifestyles by working with the Wisconsin youth advocacy group "FACT" (Fighting Against Corporate Tobacco), to help law enforcement and communities decrease youth access to nicotine and tobacco products, and prevent young people from ever using these products.

Reducing Exposure to Tobacco Smoke and Promoting Tobacco-Free policies

The coalition provides educational information to groups, organizations and the community on the dangers of exposure to tobacco smoke, and provides resources and support to help local businesses develop, implement and support tobacco-free policies.

Smoking Cessation

The coalition has information and resources to help current users quit. Over 80 percent of smokers began as preteens or teenagers, and trying just a few cigarettes is enough for a child to become addicted for life.

Tobacco control coalitions are an essential component of any comprehensive tobacco control program. They are one of the most cost-effective and efficient strategies for achieving social norm change. Through advocacy and education, tobacco control coalitions are critical in mobilizing communities to develop and implement policies and programs that will make tobacco less desirable, less acceptable, and less accessible

For more information contact: Sandy Bernier CSW, Tobacco Control Program Coordinator, Fond du Lac County Health Department (by phone, 920-906-5537 or email sandy.bernier@fdlco.wi.gov).

More than 80% of current adults who smoke started as teens.

– U.S. Centers for Disease Control and Prevention



PREVENTABLE POLLUTION –

Tobacco use is the leading cause of preventable death and disease in Fond du Lac County, causing an estimated 128 deaths every year. Twenty-two percent of adults in the county smoke.

In Fond du Lac County, smoking costs annually \$49.3 million in health care costs and \$30.4 million in lost productivity because of health problems.

The Burden of Tobacco in Wisconsin

- Carbone Center, University of Wisconsin School of Medicine and Public Health
- Wisconsin Division of Public Health
- American Cancer Society

Air pollution and the diseases it causes are both avoidable. Each of us can make a choice to pollute less. Learn more at www.FDLHealthyAir.com

◆ WHAT YOU CAN DO

Fond du Lac County residents taking these actions will help all of us breathe easier, especially children, seniors and those with health problems.

☀ Drive Less

Even one or two fewer trips a month will make a difference. Try these alternatives instead.

- Combine your trips. Often an errand can be postponed and combined with another trip you have to make.
- Coordinate your trips. If you're going to be out anyway, run an errand for someone else.
- Carpool. This is a tough one, but the US Census Bureau says 10 percent of us are already doing it regularly.
- Bike.
- Walk.
- Take the bus.
- Avoid idling. Turn your vehicle off if you will be waiting for more than 30 seconds.
- Consider a vehicle that uses fuels with lower emissions like E85 ethanol (flexible fuel vehicles), compressed natural gas or biodiesel.

All local libraries allow patrons to check out a watt meter which can monitor the energy use of specific home appliances. Learn more at www.FDLHealthyAir.com

☀ Get Informed

Subscribe to Fond du Lac County air quality alerts (at <http://www.FDLHealthyAir.com>). Knowing when the air quality is forecast to be poor can help you and your loved ones avoid the serious health effects from air pollution.

☀ Power Down

Turn off electronics and appliances you aren't using. Seventy percent of Wisconsin electricity, and much of our air pollution, comes from coal-fired power plants. Find out if your utility offers lower off-peak rates for electricity used in the evening and night. This could reduce your bill and improve air quality.

References (visit www.FDLHealthyAir.com for links to information from these reference sources)

American Lung Association 2010 State of the Air Report

CDC Best Practices for Comprehensive Tobacco Control, 2007

National Institute of Environmental Health Sciences

NY State Office of the Attorney General, Smoke Gets in Your Lungs: Outdoor Wood Boilers in New York State, October 2005

U.S. Department of Energy Alternative Fuels and Advanced Vehicles Center

U.S. Environmental Protection Agency Ozone and Your Patients' Health Training for Health Care Providers

Wisconsin Office of Energy Independence Statistics Book 2010

Air Pollution Sources Quick Reference

Fine Particles (PM_{2.5}): Fine particles get into the air primarily from the burning of fossil fuels and wood. These particles can aggravate existing lung & heart disease and cause wheezing, shortness of breath, fatigue, coughing and excess phlegm.

Wood Smoke: Burning wood creates more fine-particle pollution/btu than any other heating fuel. See the list of health impacts under Fine Particles (above). The intensity of these health impacts depends on exposure, type of wood used, moisture content, type of stove and proximity to the source. Rule of thumb: if you can see or smell a smoke plume, you are likely breathing in contaminants.

Tobacco Smoke: The Surgeon General has determined that there is no safe level of tobacco smoke for the body. Both smoking & secondhand smoke exposure create lasting cardiovascular damage that results in compromised heart and lung functioning and death.

Radon: This naturally occurring, radioactive gas is the second leading cause of lung cancer after smoking, and the leading cause of lung cancer among non-smokers. Severity of harm depends on time exposed and the radon level in your home.

Volatile Organic Compounds (VOCs): These gasses are released from many everyday substances, such as paints and lacquers, paint strippers, cleaning supplies, pesticides, building materials and furnishings, office equipment, glues and adhesives. They cause eye/nose/throat irritation, headaches, dizziness, nausea, cancer and central nervous system damage.

Ground-level ozone: This greenhouse gas causes airway irritation, coughing and pain when taking a deep breath; wheezing and breathing difficulties during exercise or outdoor activities; inflammation, which is much like a sunburn on the skin; aggravation of asthma and increased susceptibility to respiratory illnesses like pneumonia and bronchitis; and permanent lung damage with repeated exposure (see: <http://www.epa.gov/glo/health.html>). It is formed by the reaction of nitrogen oxides and volatile organic compounds with sunlight and heat.

Nitrous Oxides (NO_x): This is a group of greenhouse gasses produced by fuel combustion and agricultural activities. They can cause airway inflammation; increase asthma, emphysema and bronchitis symptoms; damage sensitive areas of lungs; and aggravate heart disease.

November, 2011

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