SUSTAINABILITY COMMITTEE NEWSLETTER

AIR QUALITY

DECEMBER 2011

OVERVIEW

Air quality and air emissions are issues that have come to the forefront of public opinion. Wineries that have a detrimental effect on the quality of air can face negative publicity. People now realize the quality of the air they breathe can affect their own personal health as well as the natural environment.

Environment Canada has defined an aggregate measure of air quality, which is known as the Air Quality Index. It typically measures the level of contaminants that affect human health and the natural environment. Key contaminants included in this measure are:

- Ozone
- Fine particulate matter
- Nitrogen dioxide
- Sulphur dioxide
- Carbon monoxide
- Total reduced sulphur compounds

The index has a strong focus on human health and may not include all contaminants that impact the natural environment. Several other pertinent issues related to air quality include

WHAT'S YOUR STORY?

Help Ontario's wine industry become more 'green'. Share a story on how your winery has benefited from applying the principles of sustainability in your facility. We are also interested in what specific topics you would like to see addressed in these newsletters.

Please contact Regina Foisey with your stories or requests at:

regina.foisey@winesofontario.org

greenhouse gases, smog, ozone depletion, particulate matter and acid rain.

Greenhouse gases are generally produced by a winery due to its consumption of energy. They contribute to climate change or global warming by preventing the sun's radiation from exiting the atmosphere after it reflects off the earth. It is an issue that is at the forefront of present environmental concerns. Compounds such as carbon dioxide, carbon monoxide, methane, volatile organic chemicals and others are included in this category.

Photo-chemical smog is mostly an urban issue that is produced when pollutants from automobiles react with ultraviolet ration to produce ground level ozone and particulate matter. The largest impact that a winery has on photo-chemical smog is through the combustion of fossil fuels from the transportation of its wines to urban centers.

Ozone depleting substances are the cause of the depletion of the ozone layer, which protects organisms on the planet from harmful ultraviolet ration from the sun. The main compounds responsible for ozone depletion are chlorofluorocarbons (CFCs) and to a lesser degree hydro chlorofluorocarbons, which are used in refrigeration systems.

Particulate Matter is aerosols, liquids or solids suspended in the air. They can be emitted from natural sources or human activity. The most harmful form is fine particulate matter that can enter the respiratory system and lead to cardiovascular and respiratory illnesses. The most common human source of this material is electricity generation and transportation by burning fossil fuels.

Odour & Noise can affect both human health and disrupt neighbours and the community. Often odour comes from wastewater and compost piles and disruptive noise comes from winery equipment and discouraging bird pests.

Acid rain is mostly a result of the combustion of fossil fuels from electricity generation, and to a lesser degree transportation, which produces sulfur dioxide and nitrogen dioxide as pollutants. These chemical react with water vapour to form acids, which precipitate as acid rain. It directly affects wineries by destroying plant material and soil microbes. The effects of acid rain raid may be reduced by alkaline soils (such as those with limestone near the Niagara Escarpment).

Indoor air quality is defined by Health Canada as the chemical, physical, and biological characteristics of air in non-residential workplaces. It is an issue that can strongly affect the health and welfare of your employees, which every employer is required to protect as part of the 'general duty' clause of the Occupational Safety and Health Act. With little formal legislation regarding indoor air quality, Health Canada has

offered their guidance document "Indoor Air Quality in Office Buildings: A Technical Guide". This guidance document lists the following as factors influencing indoor air quality:

Factors and sources affecting indoor air quality and comfort (from "Indoor Air Quality in Office Buildings: A Technical Guide")

Factor	Source
Temperature and Humidity Extremes	Improper placement of thermostats, poor humidity extremes humidity control, inability of the building to compensate for climate extremes, tenant-added office equipment and processes
Carbon dioxide	People, combustion of fossil fuels (e.g., gas and oil furnaces and heaters)
Carbon monoxide	Automobile exhaust (garages, loading docks,air intakes), combustion, tobacco smoke
Formaldehyde	Unsealed plywood or particleboard, urea formaldehyde foam insulation, fabrics, glues, carpets, furnishings, carbonless copy paper
Particulates	Smoke, air inlets, paper, duct insulation, water residue, carpets, HVAC filters, housekeeping
Volatile organic compounds	Copying and printing machines, computers, compounds (VOCs) carpets, furnishings, cleaning materials, smoke,paints, adhesives, caulking, perfumes, hairsprays, solvents
Inadequate ventilation	Energy-saving and maintenance measures, (insufficient outside air, improper system design or operation, occupant insufficient airflow, tampering with HVAC system, poor office inadequate circulation) layout, system unbalanced
Microbial matter	Stagnant water in HVAC system, wet and damp materials, humidifiers, condensate drain pans, water towers

LEGISLATION

GENERAL AIR EMISSIONS

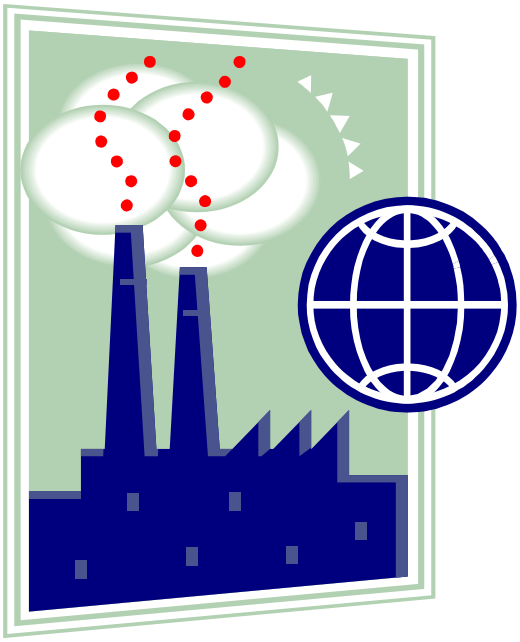
If you are going to build or expand on any process that is expected to generate contaminants (including heat, noise or vibrations) or you are altering any process so that air emissions will increase, you should apply for a new certificate of approval or amend your certificate of approval. Please review Section 9 of the Environmental Protection Act or contact the Ministry of the Environment for the specific conditions where you would need to obtain or amend such an approval.

Furthermore, under the Canadian Environmental Protection Act, organizations whose employees work more than 20 000 hours may be required to report to the National Pollutant Release Inventory, This inventory is a publically available national database of pollutant releases to air, land and water in Canada.

Most wineries will never have to report their emissions, since the reporting thresholds are designed for larger scale continuous operations. Please review the reporting requirements outlined in the Canadian Gazette (Volume I). The most pertinent chemicals are listed under Part IV and Part V substances.

GREENHOUSE GAS (CARBON)EMISSIONS

The Government of Ontario also laid the groundwork for reducing its impact on climate change by joining the Western Climate Initiative, which is a plan to implement a cap and trade system among many North American jurisdictions. It has also enacted the Environmental Protection Amendment Act(Green House Gas Emission Act) and Ontario Regulation 452/09 which details greenhouse gas (carbon) reporting requirements for affected facilities.



In a cap and trade system the government establishes a yearly cap on emissions. Companies are allotted a specific amount of contaminants they may emit, in this case greenhouse gases. These quantities are known as emission allowances, which are distributed to organizations covered under the system.

If one company's GHG emissions exceed their allowance they must purchase additional allowances from another company. Any company who produces fewer than their allotted emissions may sell or bank any allowances that are unused. The government ensures yearly emission reductions by consistently reducing the yearly cap on emissions.

OZONE DEPLETING SUBSTANCES

The Ontario Ministry of the Environment has amalgamated all of its regulations on ozone depleting substances into one regulation, O. Reg 463/10 Ozone Depleting Substances and Other Halocarbons. It bans the use or discharge of all chlorofluorocarbons (CFCs), which are the primary cause of ozone depletion. The

Montreal Protocol also plans to phase out the use of their primary replacement hydro chlorofluorocarbons (HCFCs) by 2030.

Practical Solutions

Combatting air pollution by reducing energy use

A significant portion of the air pollution emitted by the wine industry relates to energy generation. Fueling pumps, operating the heating ventilation and air conditioning system, running winery vehicles and general winery operations all influence the amount of energy used.

Using this energy more efficiently will both reduce your emissions and reduce operating costs at your winery. One of the most cost effective approaches to reducing energy use is through employee level initiatives to change behavior.

Green teams can be a great way to promote these changes and create a culture of sustainability at your organization. They will help save costs, retain premium talent and strengthen the public image of your winery. These teams can promote sustainability and engage other staff by:

Improvements in energy efficiency do not always have to be high-tech. The Malivoire Wine Co.'s unique positioning on the Niagara Escarpment has allowed them to use gravity to its advantage. Energy use is reduced by the use of gravity-flow, rather than pumps, to feed their bottling operations. They also handpick their grapes to avoid the fuel use and soil compaction associated with heavy harvesting equipment.

For more information on Malivoire's commitment to sustainability please visit their website at www.malivoirewineco.com.

BUILDING GREEN TEAMS

Niagara Sustainability Initiative held an event on engaging staff in reducing energy use at your business. Representatives from Niagara College, Walker Industries and goingforthegreen.net spoke about building green teams to foster environmental improvement.

The event was held on November 24th. For more information on future events that will help reduce your carbon footprint please visit:

http://niagarasustainability.org/events/

- Celebrating success
- Contests and friendly competitions
- Education and training
- Internal newsletters
- Web tools
- Developing sustainability programs or campaigns

Purchasing and using energy efficient technology can also significantly improve your environmental footprint. The newsletter on energy efficiency outlined several energy efficiency incentive programs. The Ontario Power Authority has recently updated several of their conservation & demand management programs.

Conservation & Demand Management Programs from the Ontario Power Authority

Program	Description
Demand Response	Companies can enter a contract to either voluntarily or contractually reduce their energy use during high demand periods
Small Business Lighting	$1000 worth of energy efficient lighting and equipment upgrades for companies that demand less than 50 kW
Audit funding	Up to $25,000 incentives for companies to complete an energy audit conducted by a qualified auditor
High Performance New Construction	Incentives and design assistance for projects that exceed the electricity efficiency standard in the Ontario Building Code
Process & Systems: Energy Efficiency Upgrades	Up to 70% funding for engineering studies and capital investments
Process and Systems: Energy Management and Monitoring	Financial tools and incentives to help monitor energy use and establish reduction targets
Training Opportunities	Program to help fund an embedded (internal) energy manager or a roving energy manager (for a short period of time) to help develop an energy management plan.

Assessing energy efficiency and energy use in your facility is a key component to using energy more efficiently. These audits will also ensure that all equipment is operating properly, reducing the contaminants entering the air from the incomplete combustion of fuels. The following firms offer energy audits from a qualified auditor, which includes professional engineers, certified engineering technologist, certified energy managers, or a certified verification and management professional:

Consulting firms who offer energy audits

Company	Website	Electronic
CEM Engineering	www.cemeng.ca	Natalie@cemeng.ca
Synchro Engineering	www.powerundercontrol.com	info@powerundercontrol.com
Virta Energy Consultants Inc.	www.virtagroup.com	info@virtagroup.com
Epsylon Energy Management Corp	www.energyefficientlighting-epsylon.com	Epsyloncorp.1@cogeco.ca
EnerQuest Service Inc.	www.enerquestservices.com	Darryl.ireland@enerquestservices.com
Audit Engineering	www.auditeng.ca	Robert@auditeng.ca
Direct Energy	www.directenergy.com	N/A
AET Group	www.aetconsultants.com	info@aet-group.com
Golder Associates	www.golder.ca	
Pinchin Environmental	www.pinchin.com	http://www.pinchin.com/contact

HVAC System audits

HVAC systems draw a lot of energy. Bringing in a professional to audit or auditing your HVAC system yourself will ensure it is not wasting energy by operating inefficiently. A properly operating HVAC system will also avoid the wasted stagnant water and poor ventilation that can cause deterioration in indoor air quality by dust, microorganisms and other contaminants.

Refrigerants

When looking at the air emissions from HVAC, companies should consider the impact of their refrigerants along with reducing energy use. The U.S. Building Council has reviewed several refrigeration options in their study "The Treatment by LEED® of the Environmental Impact of HVAC Refrigerants".

With CFCs banned and HCFCs being phased out by 2030, companies have been shifting to a variety of alternatives. So, what are the options for 'greener' refrigerants?

The most common alternatives to these substances are **hydro fluorocarbons (HFCs)** which are very efficient as refrigerants and have a negligible ability to deplete the ozone layer. However they do contribute significantly to climate change if they escape into the

natural environment, which may make certain HFCs less environmentally friendly than the HCFCs they replace.

Summary of the Environmental Properties and Effectiveness of Refrigerants

Refrigerant	Global Warming Potential	Effect on Ozone Depletion	Effectiveness	Other Concerns
CFCs	High	High	High	Volatile toxic liquids
HCFCs	Low to Moderate	Low to Moderate	High	Volatile toxic liquids
HFCs	Moderate to High	Negligible	High	Low toxicity
Ammonia	Negligible	Negligible	High	Toxicity if released
Hydrocarbons	Moderate	Negligible	High	Explosion risk
Other refrigerants	Negligible	Negligible	Low	None

Ammonia has been widely used for chilling due to its high efficiency as a refrigerant. It also has a low global warming potential and a negligible effect on the ozone layer. It is considered a hazardous substance, which is a strong irritant when used in higher concentrations. Consequently, refrigeration systems must be designed with strong precautions to prevent its release.

Hydrocarbons (such as propane) were commonly used as a refrigerant before CFCs were developed. However, they do have a significant global warming potential and are very flammable. So, they are not typically used in larger buildings and only with very strong safety precautions.

The use of carbon dioxide, water and air for HVAC systems is currently being studied. However, their use in industrial applications is limited. Each has its own inherent inefficiencies as a refrigerant.

California winery uses alternative HVAC System

Somerston Wine Co. in Napa Valley California has begun using an integrated CO_2 refrigerant heating and cooling system. It operates with zero emissions of hazardous refrigerant while, they claim, operating with greater efficiency than traditional propane based hot water boiler systems. They also use an adiabatic fluid cooler instead of cooling towers to reduce water and energy use.

For more information please review the September –October 2011 issue of Vineyard and Winery Management Magazine.

Odour

Septic conditions are often the most common cause of odours at a winery. Ensuring that you maintain aerobic conditions in your wastewater systems and your compost pile will avoid unpleasant odours from your winery. Aerobic conditions can be promoted by improved oxygen supply for wastewater treatment systems, treating your wastewater (if you currently have a septic system), or turning your compost piles and maintaining a proper nutrient balance in the compost pile (ensuring there is not too much green, or high nitrogen, material). The newsletter on water quality provides several options for upgrading a wastewater treatment system.

Noise

Noise is a more difficult issue to address. Often, repelling birds using bird bangers can be one source of noise that can annoy neighbours. The Ontario Ministry of Agricultural and Rural Affair provides guidance in "Bird Control on Grape and Tender Fruit Farms" which lists options such as electronic sound devices or birds of prey to replace bird bangers in dissuading pest birds.

Additionally, while night time operations can at times be unavoidable. Wineries may still reduce vibrational noise by maintaining all equipment in good working order. Noise may be further reducing by installing barriers around equipment to prevent noise from leaving the premises.

The effectiveness of these barriers improves the closer they are to the source of the noise, which is much more difficult for mobile equipment. However, conversation buffers can act to significantly reduce nuisance to neighbours by increasing the physical distance from the winery's activities and dampening the noise. To find out more about programs to help you implement habitat strips on your property, please visit your local conservation authority's homepage.

USING LESS TOXIC SUBSTANCES

Careful choice of the chemicals you use for building materials, cleaning products and paints will greatly affect the quality of air in your building. Look for products with a GreenSeal or EcoLogo to indicate that they are healthier for people and the environment. When building a new winery, renovating or expanding an existing winery reference the materials and resources section of the Canadian Green Building Council resources and the LEED standard for guidance on more sustainable and safer building materials.

Employee practices can also play a strong role in air quality. Turning your office into a scent-free environment will often reduce the amount of chemicals being emitted into the air and create a hypo-allergenic environment for employees. Also, enforcing the legal ban on smoking in public places will further reduce the amount of indoor air contaminants.

OFFSETTING

Often, to reduce their greenhouse gas emissions to zero a company may purchase 'offsets'. Typically, purchasing offsets should only be considered after you have done everything that is economically feasible to improve energy efficiency, switch to renewable energy and use new technology to reduce emissions.

Offsets are defined as greenhouse gas emission reductions through various means. Some inexpensive offsets can be questionable, particularly those priced under $30 per tonne of carbon dioxide equivalents. It is important that ensure that your offset is from a certified emission reduction or verified emission reduction. A quality reduction, such as a CER or VER, should be:

- Additional to and not be the result of normal operations
- Measured accurately
- Verified by a third party
- Unique to the company who purchased the reduction
- Permanent and lasting
- Not cause an increase in emissions in another region
- Minimal negative social or environmental impacts, if any

The David Suzuki Foundation has written an excellent guidance document for purchasing carbon offsets.

STAY TUNED FOR THE NEXT SUSTAINABILITY NEWSLETTER ON MANAGEMENT SYSTEMS IN FEBRUARY 2012.

IF YOU LIKED THE INFORMATION ON INDOOR AIR QUALITY OR TOXICS REDUCTIONS AND WANTED A NEWSLETTER ON EITHER TOPIC, PLEASE CONTACT US AT REGINA.FOISEY@WINESOFONTARIO.ORG

WINERIES SUPPORT LOCAL CLIMATE CHANGE PROJECT

Recognizing the importance of sustainability and the potential environmental footprint of the 2010 Taste the Season Touring pass the Wineries of Niagara-on-the-Lake have purchased carbon offsets from Carbon Zero.

The purchase of these offsets supported a local landfill gas utilization project that helps reduce air emissions in the region.

http://www.carbonzero.ca/news