

# EXTRACTIONS



a newsletter from **O'CONNOR ASSOCIATES**

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## PLANTS IN THE NEWS

Vine-covered façades and lush rooftop gardens offer more than a green oasis in the concrete jungle. European experience shows that they can also help urban areas adapt to climate change and decrease greenhouse gas emissions by reducing the energy spent on heating and cooling.

To see if similar results could be obtained in Canada, Environment Canada and several private sector partners recently completed a report on the benefits of rooftop and vertical gardens for the Canada Mortgage and Housing Corporation entitled *Greenbacks from Green Roofs: Forging a New Industry in Canada*.

According to the report, one of the chief benefits of planting vines on buildings and trees around them is to reduce energy usage and therefore reduce greenhouse gas emissions. By protecting buildings from wind, plants can reduce heating in winter by 25% and, by direct shading and evaporative cooling, they can reduce air conditioning in summer by 50 to 75%. A 16-centimetre thick blanket of plants can increase the R-value of a wall by as much as 30%.

The US Department of Energy estimates that the proper placement of trees can save the average household between US\$100 and US\$250 a year in energy costs.

A recent NASA study shows that common houseplants can also improve indoor air quality by absorbing harmful toxins such as trichloroethylene, benzene, and formaldehyde. All three carcinogens are often present in home and work environments as well as in the atmosphere. Only 15 to 18 well-placed plants are needed to significantly improve the air quality of an average home.

However, plants may not always improve air quality. After decades of study, an Oregon professor, Dr. Reinold Rasmussen, has confirmed that trees give off isoprenes, terpenes, and other hydrocarbons — major contributors to the chemical conditions that cause smog. In some cases, these emissions are high enough to produce the blue hazes which give rise to the names of the Blue Ridge Mountains of Virginia and the Blue Valleys of Uganda.

[from <[http://www.ec.gc.ca/science/sandejuly99/article2\\_e.html](http://www.ec.gc.ca/science/sandejuly99/article2_e.html)>, *Plants for Life!*, The Garden Club of Toronto, and *Env. Sci. & Engineering*, June 1999]

## LANDFILL GAS

The decomposition of waste in landfills produces a gas composed primarily of methane and carbon dioxide (CO<sub>2</sub>), both of which are greenhouse gases (GHG) contributing to climate change. Landfill sites in Canada generate 1.2 million tonnes of methane annually (26% of the man-made methane emissions). Because the global warming effect of methane is 21 times greater than that of CO<sub>2</sub>, this is equivalent to the GHG emissions from more than 40% of Canadian passenger cars. If it were all used productively, this amount of methane could heat 600 000 homes.

Innovative technologies have been developed to use landfill gas (LFG) to produce electricity, heat, or steam for industrial use. Local governments are finding out that LFG can supply energy, generate significant revenues, and reduce demand on local electrical utilities, delaying the need for new power plants. As well, these projects consume gases that, if not collected, pose serious odour, safety, and environmental hazards. For example, the Clover Bar Generating Station in Edmonton, Alberta has been operating with LFG additions since 1992. LFG piped from a 12 million-tonne landfill site to the nearby generating station produces enough power annually for 4200 homes. Capturing this LFG gives a GHG reduction equivalent to 182 000 tonnes of CO<sub>2</sub>.

As an alternative to burning LFG to produce electricity, a phosphoric acid fuel cell, operating on LFG, is installed at the landfill in Groton, Connecticut. Still in trial mode, the cell continuously feeds 145 kW into the local utility grid, enough to supply over 100 homes. The fuel cell emissions are primarily water vapour and CO<sub>2</sub>. Emissions of nitrogen oxides and sulphur dioxide from the combustion of LFG are virtually eliminated.

Environment Canada is preparing a report to be released later this year exploring ways to make LFG a more viable energy source. It is also supporting research on new technologies such as a cryogenic purification process that can separate LFG into liquefied natural gas and high-purity CO<sub>2</sub>.

[From <[http://www.ec.gc.ca/science/sandemay99/artilce1\\_e.html](http://www.ec.gc.ca/science/sandemay99/artilce1_e.html)>, <<http://www.ec.gc.ca/nopp/lfg/bulletin/indexe.htm>>, <<http://www.nu.com/energy/fuelcell.htm>>]

## OUR TOXIC WORLD

Several recent studies have shown that products previously thought benign are actually harmful to human health:

- Health Care Without Harm (HCWH) commissioned a report that evaluated more than 100 studies of diethylhexyl phthalates, a softener used to add flexibility to polyvinyl chloride (PVC) products such as IV and blood storage bags. The toxic effects on laboratory animals spurred HCWH to ask the US Food and Drug Administration to warn patients and healthcare providers about the potential health risks and to require warning labels on all PVC-based medical products.

[<<http://news.medicaldesignonline.com/feature-articles/19990621-6022.html>>]

- After a four-year review of hormone-altering chemicals in the environment, a panel of prominent scientists has concluded that pesticides and other pollutants which mimic estrogen do seem to be feminizing fish, birds, and other animals. However, they failed to agree on the effect on humans, saying that it may require a generation-long study to produce definitive answers.

[*Calgary Herald*, August 10, 1999]

- Researchers at Toronto's Hospital for Sick Children reported that pregnant photo developers, hair dressers, medical lab technicians, and graphic artists exposed to organic solvents in their workplace are four times more likely to have babies with major birth defects.

[*Environmental Science and Engineering*, June 1999]

- Researchers from Stockholm's Institute of Environmental Medicine have found that men who live in areas with heavy traffic pollution have a higher risk of lung cancer, up to 40% higher if they've lived near traffic fumes for 30 years.

[*Calgary Herald*, August 1, 1999]

- A study of 20 000 twins found that an identical twin of a person with Parkinson's disease did not get the disease any more often than do two unrelated individuals, suggesting that a defective gene is unlikely to be the cause. When the medical community began to look at chemical exposure as a possible cause, the resulting studies began to show a pattern — many people who developed Parkinson's disease have had a history of exposure to pesticides, especially insecticides and herbicides.

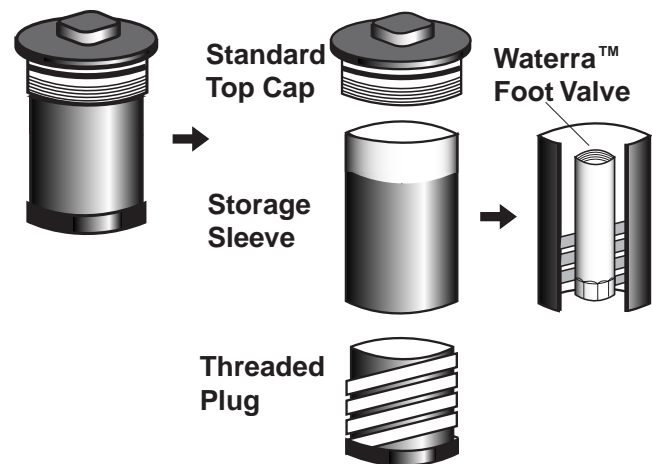
[from *EnCompass Magazine*, Vol. 3, No. 5, June/July 1999]

## UNEXPECTED PESTICIDE EFFECT

Red-winged blackbirds avoided eating all mealworms after trying only one mealworm exposed to a very low dose of organophosphate insecticide. These startling results are from a study by Lowell Nicolaus and others from Northern Illinois University in DeKalb. Avoiding toxic prey is an important adaptation that helps birds avoid poisoning. However, if birds begin avoiding unexposed, crop-damaging insects, the birds could lose an important food source, and farmers could lose a natural crop protection.

[from <<http://ens.lycos.com/ens/sep99/199L-09-02-09.html>>]

## THE P-STORAGE CAP



Staff at O'Connor Associates and OAK Environmental Equipment Supply Ltd. have developed a specialized device (the p-storage cap) to store a foot valve in a modified monitoring well top cap. At sites where groundwater sampling is conducted routinely, the foot valve can be dedicated to a particular monitoring well. The p-storage caps are made at OAK and fit easily within a 2-inch monitoring well. For more information, contact Terry McNeill at (403) 250-9810.

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