TOWN OF LAKE COWICHAN

Economic and Sustainable Committee

Tuesday, November 8th, 2016 at 6:00 p.m. – Council Chambers

AGENDA

1. CALL TO ORDER — **Page #**

INTRODUCTION OF LATE ITEMS (if applicable)

2. APPROVAL OF AGENDA

3. BUSINESS ARISING AND UNFINISHED BUSINESS

(a) Bridget Horel, ICET- presentation at Sunfest Study Report Meeting on November 30, 2016.

(b) Ongoing Items Still Being Addressed:

(i) Parking Solutions.

(ii) Sustainable Waste – Use of Biovators, etc. (See article re: 'From Waste to Resource') — **3**

4. DELEGATIONS AND REPRESENTATIONS

None.

5. CORRESPONDENCE

None.

6. STAFF REPORTS

None.

7. NEW BUSINESS

(a) Access to Natural Assets- Water and Mountains.

(b) Looking to the Future over 50 years to make Lake Cowichan vibrant and sustainable.

(c) Article by Dianne Saxe, Re: The Energy Footprint of Water. — **5**

(d) Event Calendar (see contract with Chamber of Commerce).

8. NOTICES OF MOTION

9. PUBLIC RELATIONS ITEMS

10. MEDIA/PUBLIC QUESTION PERIOD

11. ADJOURNMENT

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by Karla Zubrycki

From Waste to Resource

Using drain and land maintenance waste for bioenergy and compost

With the development of Canada-wide carbon pricing, we can expect an increased demand for low-carbon energy sources. At the same time, there is a public expectation to keep our waterways clean, including preventing algal blooms from nutrients such as phosphorus and nitrogen – a problem common not only in many of Canada's lakes, but also in stormwater and wastewater retention ponds.

The City of Winnipeg is using an approach that addresses both of these concerns. By turning unused materials from land maintenance activities into biomass fuel pellets and compost, it is creating bioenergy for space heating, reducing nutrients released into waterways, and improving urban habitat. These actions reflect a growing trend in Manitoba, where smaller communities and rural municipalities (RMs) are also looking at land maintenance in a new light.

Pellets of Power

Rodney Penner, city naturalist with Winnipeg's public works department, began to see the potential for bioenergy from local plant materials when the city's new developments started to include naturalized areas around stormwater retention ponds. The areas were planted with native prairie grasses that historically would have been naturally maintained by wildfires, which controlled dead plant materials, released nutrients into the soil, and stimulated prairie renewal. Similarly, numerous brownfield areas in the city, such as decommissioned landfills, were turned back into prairie. Penner says that since starting even controlled fires near urban developments can be unwelcome, other management methods had to be considered, particularly mowing.

"Mowing opened up the opportunity for bioenergy. We realized we could turn a waste product into something worthwhile," says Penner. The pilot site for this idea became the city-owned Living Prairie Museum, where a pellet stove was installed to heat the building.

To make pellets, the city partnered with the Winnipeg-based International Institute for Sustainable Development (IISD), which for 10 years has been researching ways to turn locally-harvested plant materials into value-added products, including bioenergy. Dr. Richard Grosshans, senior research scientist at IISD, says perennial plants – such as grasses and the abundant wetland plant, cattail – provide advantages over traditional bioenergy fuels, such as wood. "Their energy value is comparable to or better than wood pellets, and you get additional benefits such as capturing nutrients in harvested materials and providing habitat for species that need prairie or wetlands."

A five-hectare restored prairie in Winnipeg was harvested; and, in order to produce an ideal mix, the grasses were blended with cattail harvested from RMs outside of the city and wood residues from local manufacturing to produce what Grosshans calls "premium pellets." Last winter, these pellets were able to heat the entire museum, even on the coldest of Winnipeg days.

Part of the "premium" built into these pellets is their ability to displace coal as a fuel source. While the Living Prairie Museum does not burn coal, and Winnipeg buildings are generally heated by hydro-electricity or natural gas, pellets are being used to replace coal in several rural locations, including three Hutterite colonies. Biomass can directly replace coal in some heating systems – no major modifications required. Grosshans says that while some biomass users were at first skeptical of pellets that were not 100 percent wood, the mixed-source pellets won them over. "They all loved it and wanted more."

While the Living Prairie Museum only uses about two tonnes of pellets each year, larger biomass burners can heat entire building complexes, requiring many more tonnes. One of the larger biomass users in Manitoba is Providence University College, in the community of Otterburne, which can use about 300 tonnes of biomass per year to heat the campus. In greenhouse gas (GHG) reduction terms, amounts like this add up. Burning 300 tonnes of biomass represents a CO_2 reduction of roughly 618 tonnes compared to the equivalent amount of heat from lignite coal. That's equivalent to taking 135 cars off the road for a year. The Hutterite colonies burn more than 1,000 tonnes per year, representing the equivalent of each taking 460 cars off the road.

KARLA ZUBRYCKI is a Project and Communications Manager with the water program at the International Institute for Sustainable Development (IISD). She can be reached via email at <kzubrycki@iisd.ca> and via phone at 204-958-7700 ext. 733.

Composting Cattail

When he learned about the bioenergy initiative, Travis Stephenson, a technologist with Winnipeg's water and waste department, remarked that waste plant materials could also be composted. Stephenson oversees the removal of vegetation from 25 kilometres of city drains every year in order to improve water flow. This activity produces large amounts of plant materials, mostly cattail, which for years were sent to the city's landfill.

The construction of the city's nine-hectare composting facility in 2013 presented the opportunity to divert these materials to better use. "We thought we could improve our environmental footprint by looking at ways to compost," he says.

To test the idea, the city composted 59 tonnes of cattail last year, only a small portion of what was actually removed. Becky Raddatz, environmental planner with the city, calls the experiment a success. Laboratory test results of the composted cattail showed that the finished compost was similar to that from composted leaf and yard waste. It appeared fit for unrestricted use according to compost quality guidelines from the Canadian Council of Ministers of the Environment.

The composted cattail is now being put to use as part of the cap for the finished landfill, a move that also saves the city money, as they don't have to buy as much soil from landscaping companies – meaning that compost has both environmental and economic value. "When you're throwing your organics away, you're throwing away value. When you compost, you're producing something that has value," says Raddatz.

Another benefit of harvesting the cattail is that the nutrients are not released into waterways. Had the cattail been left in the drains, it would have released nutrients from its leaves when it decomposed. Grosshans says cattail "are like sponges" for nutrients and contain up to two kilograms of phosphorus and 10 kilograms of nitrogen per tonne.

Stephenson points out that capturing these nutrients will not only benefit the city's waterways, but also those downstream, such as Lake Winnipeg. "By cutting and removing vegetation from the drains, we're capturing and removing excess nutrients from the system before they reach the receiving bodies of water. I assume that this will gradually reduce the nutrients available in the watershed, which should improve water quality over time and help reduce problem vegetation such as algae," he says. Indeed, estimates show that the 2015 experiment captured 60 kilograms of phosphorus and 300 kilograms of nitrogen.

As an additional environmental bonus, diverting cattail from landfill also reduces the city's GHG emissions. Cattail that goes to landfill might decompose without oxygen, a process that releases the potent GHG, methane. The city turns its compost rows, thereby allowing oxygen in. The 2015 compost test resulted in a GHG reduction of almost 14 tonnes. Stephenson says those amounts are likely to grow in future years, as the city is planning to compost much more of its harvested cattail in 2016.

He also suggests that other cities can quite easily adopt a similar method, particularly if they're already removing vegetation. "If you're already doing drain maintenance, it's fairly easy to slightly modify your approach," he says.

A Rural Revolution in Ditch Management

Outside of Winnipeg, RMs are also looking at ways to add value to their ditch management. Rick Wilson, a councillor for the RM of Springfield, located east of Winnipeg, says controlling cattail growth in the RM's more than 1,600 kilometres of roadside drains is not optional. Without management, significant flooding happens.

WASTE, cont'd on p. 40

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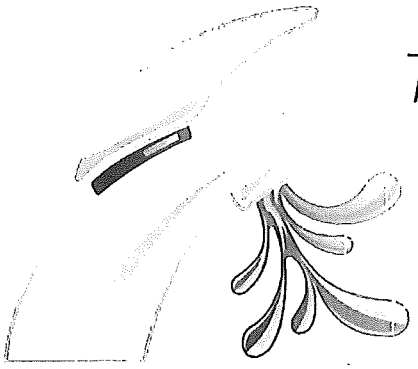
by Dianne Saxe



The Energy Footprint of Water

Municipal water and wastewater has a huge energy and financial footprint. For most Canadian municipalities, water and sewage infrastructure is their largest single energy cost. Water and sewage operators work hard to keep that cost down. Now, they have a new tool: a treasure trove of data that allows them to benchmark their water and wastewater energy use against their Ontario colleagues.

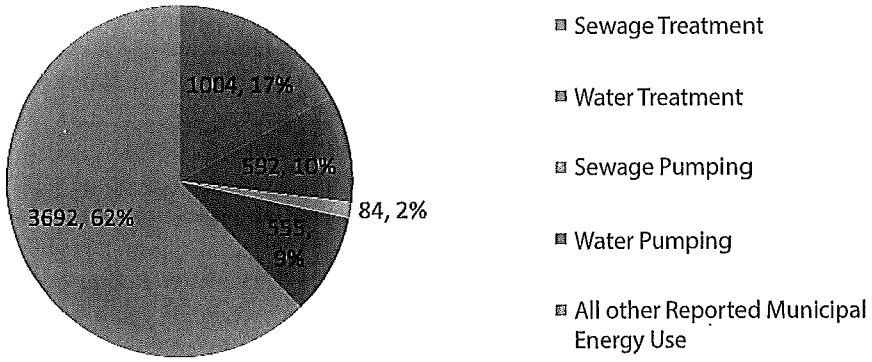
Ontario has required the broader public sector to disclose its energy use since 2011. The first three years of data collected under O. Reg. 397/11 can now be seen on the website of the Environmental Commissioner of Ontario, in map view, as part of the report "Conservation: Let's Get Serious."[1] This map reflects energy use data from 15,000 facilities, including water and sewage treatment facilities.

Among other topics, the report explores: energy benchmarking as a spur to efficiency improvements; and end-use efficiency standards for water fixtures and appliances.

Energy Benchmarking of Water and Sewage Infrastructure

In 2011, Ontario's water and sewage treatment facilities and pumping facilities used about 2,000 gigawatt hours (GWh) of electricity and 40 million cubic metres of natural gas, accounting for 0.3 megatonnes of greenhouse gas emissions. This cost Ontario municipalities roughly $260 million dollars in energy costs at current prices (as of August 2016). Water and sewage treatment and pumping accounted for about 40 percent of all reported municipal energy consumption.

Figure 1
Ontario Municipal Energy Consumption by Facility Type (GWh), 2011



This figure is based on data collected under O. Reg. 397/11 in 2011. Of note, there were concerns raised over the accuracy of reported energy consumption and water flow rates for sewage and water pumps. The regulation has subsequently been amended to remove reporting requirements for pumping.

There is great variability in the energy intensity (energy used per megalitre of water or sewage treated or pumped) of sewage and water treatment and pumping facilities. The least efficient facilities use five to 10 times as much energy per unit of water as the most efficient facilities do. This suggests a large potential for energy savings, if less efficient facilities adopt best practices and best available technologies.

Improving the Energy Efficiency of Water Facilities

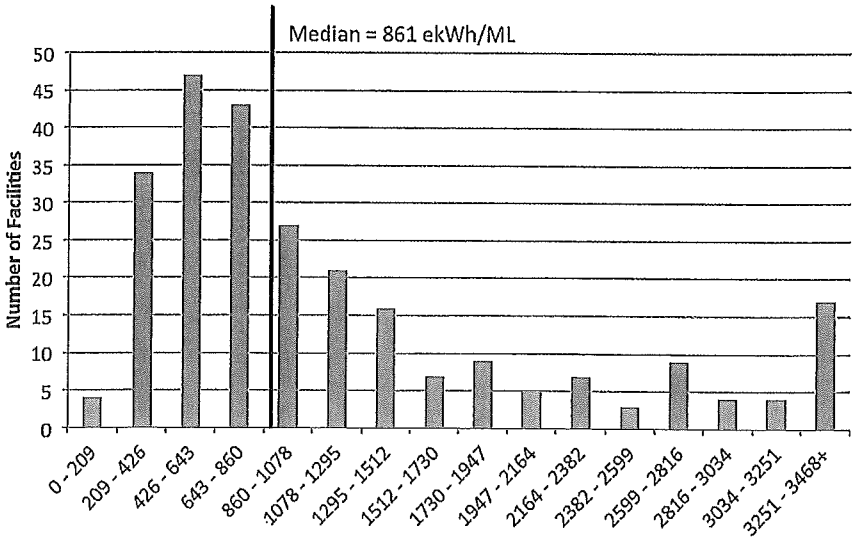
Once benchmarking identifies less efficient facilities, many opportunities exist to improve their energy intensity. Electric and gas utility energy efficiency programs may help provide

DIANNE SAXE is the Environmental Commissioner of Ontario <http://eco.on.ca>.

1 Conservation: Let's Get Serious, 2015/16 <http://eco.on.ca/reports/2016-lets-get-serious>.

Figure 2

Water Treatment Facilities



Energy Consumption in Equivalent Kilowatt Hours/Megalitre (ekWh/ML)

funding. Two technologies with relatively wide application are improving water pumping efficiency, and capturing biogas from wastewater for energy production.

Water pumping efficiency – The energy performance of water pumps degrades over time. A 2013 study of 152 pumps in eight Ontario municipal water utilities found that, on average, pumps were operating at 12 percent lower efficiency than in their initial design, and that pump refurbishment and changes to operating practices could recover much of this loss.[2] Where water pumping rates are not constant, additional energy savings can often be captured by installing variable frequency drives (VFDs) to control pumps.

Biogas capture – Mid-sized and large wastewater treatment plants using anaerobic digestion can use energy from the wastewater sludge, possibly enriched by other organic wastes. Methane gas produced through anaerobic digestion can be: burned onsite to provide heat; used to provide combined heat and power (CHP); or sold as renewable natural gas. A U.S. study found that CHP systems were in place in 104 wastewater treatment plants, but were economically feasible (a seven-year payback or less) at 200-600 additional facilities.[3] A similar potential likely exists in Canada, and the economics of energy capture could become more attractive as most provinces – and the federal government – move more agressively toward some form of carbon pricing.

The Green Municipal Fund (operated by the Federation of Canadian Municipalities) has funded many feasibility studies and pilot projects for water infrastructure efficiency, including CHP projects at wastewater plants in Grande Prairie, Alberta; Red Deer, Alberta; and Nanaimo, British Columbia. It is not yet clear whether

2 HydraTek, *Toward Municipal Sector Conservation: A Pump Efficiency Assessment and Awareness Pilot Study*, 2013 <http://hydratek.com/opa>.

3 U.S. Environmental Protection Agency, Combined Heat and Power Partnership, *Opportunities for Combined Heat and Power at Wastewater Treatment Facilities: Market Analysis and Lessons from the Field*, 2011 <www.epa.gov/sites/production/files/2015-07/documents/opportunities_for_combined_heat_and_power_at_wastewater_treatment_facilities_market_analysis_and_lessons_from_the_field.pdf>.

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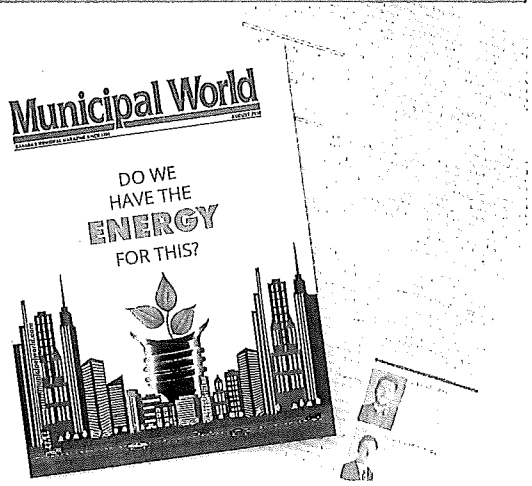


the $2 billion Clean Water and Wastewater Fund announced in the 2016 federal budget will help fund energy-related investments at water and sewage plants, as the focus appears to be on projects that will improve drinking water quality or reduce water pollution.

Reducing Water Demand

The municipal energy bill can also be reduced by reducing the water and sewer use of municipal consumers. Behaviour modification is one approach (e.g., through full-cost water pricing and area charging for stormwater management). But, expanding the use of water-efficient fixtures and products can also go a long way.

The federal and provincial governments have generally done little to mandate water-efficient products. Water efficiency standards were introduced in the *National Plumbing Code of Canada, 2015* for water fixtures (toilets, urinals, showerheads, and bathroom and kitchen faucets). As these requirements are adopted by provincial building codes, they should gradually reduce water use in new buildings. However, building codes do nothing to reduce water use in existing buildings. Provinces could, but generally haven't, set water efficiency standards for fixtures at point of sale.[4]

Municipalities can encourage their residents to purchase water-efficient products. In the U.S., the WaterSense label set out by the Environmental Protection Agency identifies products that are 20 percent more water efficient than standard products, with an even larger advantage over older models. Among household water fixtures, high-efficiency toilets offer the most potential for water savings, but they could use a popularity boost. (While WaterSense-rated showerheads and faucets now account for the majority of product sales, only 30 percent of toilet sales are for WaterSense-rated toilets.[5])

Better Data, Better Decisions

Municipalities are good at helping each other and learning from each other, for the public good and their own. Making water use more efficient, and making water and wastewater infrastructure more energy efficient, is good for the budget and for our shared water resources. And, by reducing fossil fuel use, it is also good for helping fight climate change and for local air quality.

Better data allows better decisions. And now, there is better data. *MW*

Guelph: Water Efficiency Leader

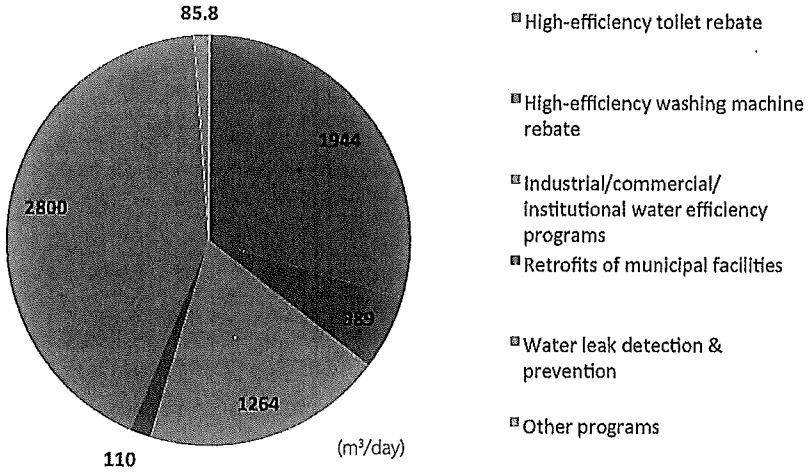
Promoting water-efficient products has helped Guelph, Ontario become a leader in water efficiency. Guelph is a rapidly-growing municipality that relies almost entirely on groundwater. It reduced per capita water consumption by more than 20 percent between 2006 and 2014, leading to an absolute reduction in water use despite population growth.

Its program (currently being updated) includes:

- rebates for water-efficient toilets and front-loading washing machines;
- incentives for commercial, industrial, and institutional customers, based on pre- and post-retrofit monitoring;
- incentives for greywater reuse and rainwater harvesting;
- a "Blue Built home" certification and rebate for water-efficient new homes;
- a comprehensive water leak detection program; and
- water-efficient retrofits of municipal facilities.

Guelph estimates that this has saved about $27 million by deferring new investments in water and wastewater infrastructure.

Daily Water Savings, 2006-2014
City of Guelph Water Efficiency Programs



Adapted from: City of Guelph, 2016 Water Efficiency Strategy Update (draft), <http://guelph.ca/wp-content/uploads/WESU_Draft_Final_Report.pdf>.

4 For example, Ontario could do so under the *Water Opportunities and Water Conservation Act, 2010*. Ontario has recently proposed to match the U.S. Department of Energy's (DOE) water efficiency standards for clothes washers and dishwashers, in addition to the existing requirement that they meet DOE energy standards. However, the DOE water standards don't have as much impact as they could, because top-loading models are allowed to be less efficient than front-loading units.

5 GMP Research, *US Market Penetration Of WaterSense Shower Heads, Lavatory Faucets And Toilets*, 2015 <www.safeplumbing.org/files/safeplumbing.org/documents/press_release_downloads/9-15-15-WaterSense-market-penetration-study.pdf>.

In next year's energy report, the Environmental Commissioner of Ontario plans to take a closer look at the water-energy nexus. Municipal staff and councillors in Ontario are invited to contact <conservation.report@eco.on.ca> to provide perspectives on barriers that inhibit municipal efforts to improve efficiency at all stages in the water cycle, and suggestions for improvement.