

GREENHOUSE GAS AND ENERGY CO-BENEFITS OF WATER CONSERVATION

A Summary Report

Water and Energy in Ontario

Meeting Ontario’s commitment to fight climate change will take more than changing out light-bulbs. It will require all sectors to diligently look for opportunities to reduce waste and increase efficiency. The long-term energy and cost saving benefits that stem from greater efficiency will benefit municipalities, businesses, industry and agriculture and help to build a strong economy and a resilient Ontario.

Municipalities have been reported to consume more electricity than any industrial sector outside Pulp and Paper. As much as half of this electricity is used to power water and wastewater treatment plants and pumps. The potential for energy savings associated with reduced water use has been recognized by water conservation practitioners in the field for years. However, in Ontario the quantification of energy savings has typically been limited to site specific estimates, and a rigorous examination of the opportunities for water conservation to offer energy and greenhouse gas (GHG) emission reductions in Canada has been lacking to date.

A New Study, a New Tool

The report summarized herein, entitled “**The Greenhouse Gas and Energy Co-benefits of Water Conservation**”, marks the first Canadian study of its kind to quantify the energy and GHG savings achievable through water conservation measures¹. Perhaps more importantly, a methodology has been presented to enable municipalities across Canada to estimate the energy and GHG savings associated with reduced water use. The methodology has been incorporated into a novel, WaterSmart Scenario Builder, an excel-based tool that enables communities to consider the impact of water use, and water conservation and efficiency measures, on the energy and GHG emissions associated with pumping, treating and heating water. The full report, and the WaterSmart Scenario Builder, are available free of charge at www.polisproject.org/nexus/.

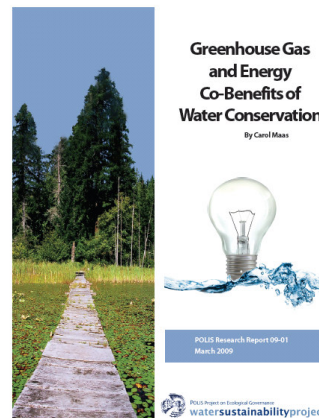
The key findings of the study are highlighted below, in the form of illustrative examples, a summary of conclusions of the report, and a number of identified opportunities for action.

WaterSmart Scenario Builder^{BETA}

A Water Soft Path Analysis Tool



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Case Study Results

A Municipal Example – A case study on the City of Guelph, a medium sized city, with a current population of 115,000, was examined. The city is served primarily by groundwater sources and is predicted to experience significant population growth. The City of Guelph’s Water Conservation and Efficiency Strategy is targeting a total water use reduction of 20% in 2025. The study suggested that a 20% reduction in future water use could power half of the City’s existing wells and, at today’s electricity prices, save more than \$2700/week in water and wastewater electricity expenditures. The greenhouse gas emissions saved through reduced energy use, were found to be on par with other GHG mitigation measures currently being pursued in Guelph, such as powering the Woods Pumping station with green energy.

A Provincial Example – A coarse-scale estimate of the potential for energy savings through water conservation in Ontario was completed to provide perspective on the relevance of water efficiency to energy reduction programs. The calculations were a simple “back of the envelope” estimation to demonstrate what could be. Increasing province-wide water efficiency by 20% in 20 years was predicted to save 1.6 billion litres of municipal water every day, and is roughly equivalent to Ontario using “no new water” to accommodate its growth². To achieve this increase in efficiency, in the residential customer sector for example, average per capita water demands would need to decrease from 260 LCD to 208 LCD – an achievable goal given that new, water efficient homes can achieve 120-150 LCD indoor water use today.

A study by the Power Applications Group Inc. (PAGI) identified the current opportunities to reduce Ontario’s municipal electricity use at 792 million kWh, or 12% of the total use, using a variety of measures. This estimate excluded the savings water conservation could offer. The provincial water conservation case study suggested that pumping 20% less water in 2029 could provide a whopping 34% of the total municipal energy reduction potential reported by PAGI. Furthermore, the projected greenhouse gas emission savings, from reduced hot and cold water use in Ontario, would be equivalent to providing electricity for 87% of homes in the City of Toronto using wind energy, an estimated 1,200 windmills.

An Example for Citizens - Showering for just 2 minutes less could save the energy equivalent of a 60 W light-bulb running for 12 hours. In energy efficiency terms, a 20% reduction in either shower time or the flow rate of showerhead fixtures, for example from 9.5 Lpm to 7.6 Lpm, could achieve the equivalent energy savings of changing 5 incandescent light-bulbs to compact fluorescent.

Conclusions

To slow the progression of climate change, significant mitigation efforts will be required in all sectors. Unfortunately, there will be fewer and fewer opportunities for achieving direct energy savings from rapid payback initiatives such as compact fluorescent light bulb change-out programs. Energy savings stemming from water efficient technologies were found to be on par with typical energy efficiency and green energy solutions in practice today, highlighting the largely untapped opportunity of water conservation to help meet energy reduction and climate change targets in Ontario.

Ensuring every community, business, and most importantly every new home, is equipped with water efficient fixtures and technologies simultaneously addresses the intersecting challenges of climate change, energy security and water scarcity. The technologies and programs required to affect measurable water savings are already available “off-the-shelf”, and will be complemented by Canadian companies offering emerging clean technology and services related to water conservation and efficiency.

² assumes a linear increase in gross municipal water-demand with population

Opportunities for Action

There are a number of key opportunities for Ontario to transform this research into positive action. The following water-energy related policy and program opportunities were identified:

THE GREEN ENERGY ACT

- **Water Efficiency Standards** – Provisions exist in the proposed Green Energy Act for minimum water efficiency standards for appliances and products. The Act should mandate standards for water efficiency that meet or exceed international standards. For example, minimum standards for 6L toilets should be included to effectively ban 13 L toilets, a measure the U.S. has adopted since 1992.
- **Ontario Building Code** – The code will be reviewed, within 6 months of the Act, for energy efficiency. Water efficiency standards should be included in this review, given water efficiency measures are, in fact, energy reduction measures. For example, new homes and buildings should be made as water efficient as possible by requiring specifications in line with “WaterSense Labelled New Homes” in the Ontario Building Code today.
- **Adopt Voluntary WaterSense Labelling** – Provisions exist in the proposed Green Energy Act for labelling of water efficiency ratings. Make water conservation a simple choice for Ontario consumers by partnering with WaterSense, the water efficiency equivalent of the successful EnergyStar consumer labelling program. Most major suppliers of toilets have several WaterSense approved models and many are offered at an equivalent, and in some cases a lower, price than inefficient models. Major US retailers, such as Lowe’s, have already partnered with WaterSense along with a vast number of state environmental agencies and individual utilities.

ECOENERGY / HOME ENERGY SAVINGS PROGRAM

- A review of the EcoENERGY / Home Energy Savings Program could identify additional opportunities for water and energy savings. For example, the Home Retrofits Program currently offers rebates for 6 L toilets, but should be updated to offer rebates for only WaterSense approved toilets (4.8L).

PROVINCIAL WATER CONSERVATION & EFFICIENCY STRATEGY

- A Water Conservation and Efficiency Strategy is being developed in Ontario. Strong support should be provided for implementing a progressive Strategy, such as that proposed by POLIS “H2Ontario: a Blueprint for a Comprehensive Water Conservation & Efficiency Strategy” (draft report pending mid-April)