Five-Year Energy Plan for the Lambton Area Water Supply System (2012 - 2017)

July 1, 2014

The Lambton Area Water Supply System (LAWSS) includes a direct filtration water treatment plant (WTP) with a maximum rated capacity of 181,844 m^3/d. The WTP uses chemically assisted filtration with disinfection and supplies water to approximately 100,000 users in Lambton County. LAWSS has about 250 km of watermain of various sizes and materials, three standpipes, one elevated tower and two booster stations. The East and West Lambton Booster Stations (ELBS and WLBS) have 9,000 m^3 and 90,000 m^3 of water storage, respectively and both have the ability to re-chlorinate the water prior to being re-pumped into the distribution system. LAWSS' sites have a combined peak energy usage of 2 MW.

Attachment 1 shows the monthly energy use for all the sites at LAWSS that use energy. Note that in 2013 LAWSS used a total of 13,703 MWh. Attachment 2 shows a presentation completed by LAWSS staff on current and estimated Energy Consumption patterns at the WTP, ELBS and WLBS. LAWSS has been working with the Ontario Power Authority since 2012 to implement projects to reduce the energy consumption at LAWSS. Lighting, HVAC, and variable frequency drive studies have been undertaken at LAWSS.

Table 1 presents the completed and proposed energy saving projects for LAWSS until 2017. Table 2 summarizes the estimated energy saved by the project (those where analysis has occurred to date). Based on the results LAWSS is expected to save 3,140 MWh or energy yearly and reduce its peak demand by 0.41 MW yearly. In 2013, LAWSS used 13,703 MWh and had a peak demand of 2 MW. Therefore by the end of 2015 it is expected that LAWSS will reduce its energy usage by 23% and reduce its peak demand by about 21%.

Table 1: Completed Energy Savings Tasks in 2012, Ongoing Energy Saving Tasks in 2013 and Goals for LAWSS 2014-2017

DATE	TASKS
2012	- completed lighting audit - completed administrative HVAC Energy audit
2013	- lighting retrofit for WTP and ELBS - complete power monitoring integration of high and low lift pumps - complete Preliminary Engineering study for plant HVAC system - complete retro-commissioning of plant HVAC system - complete preliminary design for VFDs at WTP - prepare and present presentation for OCWA on energy usage and initial opportunities for saving energy and money based on variable energy costs
2014	- install new HVAC system for administrative area - investigate options for solar at the WTP - detailed design for VFDs for WTP - retrofit plant HVAC system - complete pumping optimization study following the installation of VFDs at WTP and WLBS - look into replacing or improving inefficient pumps or motors through retrofit, repair or right sizing - investigate use of energy storage battery to reduce the peak demand at the WTP by about 15%
2015	- install VFD at WTP or purchase a new right sized pump - investigate options for enrolling in a peak shaving program such as EMBALA
2016	- replace inefficient louver system in generator room at WLBS to reduce heat loss during the winter months
2017	- replace the WTP's 4, 1 MW generators and switchgear - complete environmental assessment for 1.5 million gallon water tower (allows LAWSS to be off the grid for 3 hours per day) - investigate demand response opportunities with new generator

Table 2: Summary of Estimated Energy Savings and Cost for Completed and Planned Projects at LAWSS (completed projects are italicized)

Project	Estimated Yearly Energy Savings (MWh)	Estimated Demand Savings (MW)	Estimated Capital Cost ($)	Estimated Simple Payback Period assuming $0.12/kWh and not including any OPA incentives (years)	Project Forecasted completion date
Lighting Retrofit-Water Treatment Plant	*64*	*0.018*	*$27,000*	*6*	*April, 2013 (Completed)*
Lighting Retrofit-East Lambton Booster Station	*1.2*	*0.0023*	*$5,000*	*35*	*April, 2013 (Completed)*
Operating Changes for Main Plant HVAC Fans	*307*	*0.07*	*$0*	*(save $36,840 per year)*	*June, 2013 (Completed)*
Administration HVAC Replacement	40	0.025	$180,000	38	August, 2014
VFD at West Lambton Booster Station	492	0.08	$450,000	8	June, 2014
Main Plant HVAC Replacement (this will be offset by operating changes already implemented)	1200	0.13	$500,000	3.5	March, 2015
VFD at WTP	1000	0.08	$1,000,000	8	December, 2015
Total	**3140**	**0.41**	**$2,162,000**	**na**	**na**