



**STAFF REPORT
ACTION REQUIRED**

**Associated Costs and Benefits Reported By Toronto
Water on the Deep Lake Water Cooling Project**

Date:	October 10, 2012
To:	Audit Committee
From:	General Manager, Toronto Water
Wards:	All
Reference Number:	P:\2012\Cluster B\TW\au12011

SUMMARY

This report responds to a February 6, 2012, City Council decision for the General Manager, Toronto Water to account for all operating and capital costs incurred by Toronto Water on the Deep Lake Water Cooling project along with the estimated benefits. The review provides a final and complete disclosure of all project related costs and benefits, particularly the associated energy transfer fees and additional operating costs that were not adequately included in previous reports.

In summary, the costs incurred by Toronto Water as a direct result of the Deep Lake Water Cooling project since the start of the project up to 2011 year-end is \$18.1 million. The total revenue generated from Enwave Energy Corporation during this time period has been \$15.2 million (\$3.5 million in net operating income and \$11.7 million in Energy Transfer Agreement fees). In addition, approximately \$61.5 million of new capital infrastructure has been transferred in title from Enwave to the City.

RECOMMENDATIONS

The General Manager of Toronto Water recommends that:

1. This report be forwarded to City Council for information.

Financial Impact

The recommendations in this report have no financial impact.

DECISION HISTORY

On November 23, 2011, the Audit Committee considered the Auditor General's review of the contract agreement between the City and Enwave Energy Corporation ("Enwave") in regard to Toronto Water's financial involvement in the Deep Lake Water Cooling Project ("DLWC"). The Auditor General's review concluded that certain project costs were in excess of estimates provided in the original staff report. Although these identified costs were reported to Council via the budget process, there had not been a final and complete report accounting for all Deep Lake Water Cooling Project costs. The Auditor General recommended that such a report would be useful information for Council to receive.

City Council on February 6, 2012, considered the Auditor General's recommendation and requested that the General Manager, Toronto Water report to Council on all of the Division's operating and capital costs for the DLWC project along with estimated benefits. A copy of the Decision Document can be found at:

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2011.AU5.6>

ISSUE BACKGROUND

In 2002, the City entered into a 50 year Energy Transfer Agreement ("ETA") with Enwave to provide cold water for Enwave's district cooling system which provides air conditioning to a number of downtown buildings. This initiative is known as the Deep Lake Water Cooling project. The ETA (with Amendments) defines the responsibilities, operational relationships, required infrastructure upgrades, and cost obligations as agreed upon between the parties.

This report summarizes the project's financial aspects and the environmental benefits.

COMMENTS

The Island Water Treatment Plant ("WTP") produces approximately 20% of the City's drinking water. Prior to signing the ETA with Enwave, this plant was only used seasonally to support the City's peak water demands. To facilitate year round pumping of deep lake water for Enwave's cooling system needs, numerous modifications were required at the Island WTP and at the John Street Pumping Station ("JSPS"). To implement the DLWC system, the ETA required that Enwave pay for the costs of upgrading the Island WTP (excluding Winterization project costs) and the costs for expanding JSPS. In addition, the Agreement also provided that incremental operating costs incurred by the City were to be reimbursed by Enwave.

The City has received annual operating revenues from Enwave since commissioning of the DLWC system in 2004. Also, incremental operating costs and appropriate utility costs have been recovered from Enwave. Due to ownership requirements, certain operational costs have been incurred by the City and are not recoverable from Enwave. Capital costs have been allocated to the City and Enwave according to the terms of the ETA.

Financial Review

Capital, operating, net income, cost recovery, and financial reconciliations of new asset values are made in four categories below. All financial costs and revenues are presented net of tax and summarized in Table 1.

Table 1: Summary of Financial Costs and Revenues (to 2011-end, net of tax)

Financial Item	(1) Net Operating Income to City <i>revenue (cost)</i>	(2) Operational Cost Recoveries from Enwave	(3) Capital Cost to City	(4) New Asset Values Transferred to City
Energy Transfer Fee	\$3,920,150			
Easement Fees to MNR	(\$404,596)			
Incremental Operating Cost		\$8,029,153		
Hydro Use Recovery		\$3,656,930		
Water Use Recovery		\$13,962		
Pre-design Study			\$400,000	
Winterization Costs			\$17,668,078	
Summerization Costs				\$2,473,120
New Intake Lines (3)				\$50,000,000 *
Raw Water Pump				\$1,500,000 *
John St PS Modifications				\$7,500,000 *
Net Benefit to the City	+ \$3,515,554	+ \$11,700,045	- \$18,068,078	+ \$61,473,120

* pre-construction estimated value

1) Net Operating Income/Costs

a) Energy Transfer Fee Revenue

The City collects an energy transfer fee from Enwave which is based on the monthly cooling energy transferred through the energy transfer loop, or the amount of heat Enwave is adding to the City's treated drinking water. From August 2004 to December 2011, the City has received a total of \$3,920,150.

b) Intake Line Easement Fees

The three new Deep Lake Water Cooling water intake lines were constructed and paid for by Enwave with title subsequently transferred to the City upon commissioning of the system. The owner is required to pay an annual easement fee to the Minister of Natural Resources. From 2003 to 2011, the City has made total easement payments of \$404,596. These costs are over and above what the City would have incurred had the DLWC project not been undertaken.

2) Operational Cost Recoveries

a) Incremental Operating Costs

Enwave reimburses the City for Incremental Operating Costs, defined as the net additional operating and maintenance costs directly incurred that are required to enable Toronto to fulfil its obligations over and above those costs that the City would have incurred had the Deep Lake Cooling Water project not been undertaken. For the period from July 2004 to December 31, 2011, the City has received a total of \$8,029,153.

b) Utility Cost Recoveries

The City has received operational hydro recoveries dating from May 2004 to December 2011. Over this period, Enwave has paid the City a total of \$3,656,930 for power used within their facility at John Street Pumping Station. Similarly, for Enwave's water consumption, from January 2005 to December 2011, the City has invoiced Enwave and received a total of \$13,962.

3) Capital Costs

a) Pre-Design Study

In 2000, a project pre-design study and environmental assessment was approved by the City. The study cost \$800,000 to complete and the City and Enwave split the cost of this report equally.

b) Winterization

Extensive capital project modifications (including building insulation upgrades, heating, ventilation, air conditioning improvements, and electrical enhancements), collectively referred to as the Winterization project, were undertaken at the Island WTP in order to convert the facility to year-round operation able to meet the increased demand for cool water. The total Winterization cost, borne entirely by the City, was \$17,668,078.

4) Value of Assets Transferred to the City

As specified in the ETA, Enwave constructed – at its expense - most of the project's infrastructure. After commissioning, ownership of the following assets (valued using pre-construction estimates, or as otherwise noted) was transferred irrevocably from Enwave to the City:

- three new intake lines, located approximately 5 kilometers off-shore, for drawing deep cold lake water into the Island WTP (\$50 million).
- improvements to the Island WTP, including a fifth raw water pump and associated modifications to the raw water pumping station, all necessary to pump higher flows of cold water (\$1.5 million).

- modifications to John Street Pumping Station to permit the diversion of water flowing to the energy transfer loop and the project's heat exchangers (\$7.5 million).
- facility improvements, under the capital project called Summerization, were required to minimize heat gain in the water treatment process at the Island WTP and protect the facility from condensation. Enwave reimbursed the City for its percentage share of costs and expenses, a total of \$2,473,120, recognized as increased asset value at the Island WTP.
- expansion of the John Street Pumping Station including the energy transfer loop and associated mechanical and electrical equipment upgrades (approximate \$15 million value), as well as the project's heat exchangers (approximate \$5 million value). As per the ETA, these expansion items have unique ownership lines (Enwave and/or City), yet moreover, while necessary for Deep Lake Water Cooling, they add little value to the City's drinking water infrastructure. As such they are not included in the summary of new City asset values.

Therefore, in total, \$61.5 million of new infrastructure value was transferred to the City from Enwave and is a direct net benefit to the City.

Environmental Benefits

The Deep Lake Water Cooling partnership has resulted in other less quantifiable benefits to the City's drinking water system and for Toronto's environment as a whole, including:

- Carbon reduction – By using the coldness from the lake water, an alternative to conventional air-conditioning is achieved in the downtown commercial district. The net result on Toronto's environment is:
 - an electrical reduction by 90% (over in-house chillers)
 - electricity demand reduced by 61MW
 - CO₂ emissions reduced by 79,000 tonnes/year
 - elimination of 1391 kg of CFC's per year
 - annual SO_x reduction of 145 tonnes and NO_x reduction of 318 tonnes
- Superior water quality, as achieved with the new deep raw water intake lines at the Island WTP, resulting in fewer water quality events in treatment process, including the elimination of taste and odour events, as well as reduced chemical treatment costs. Additionally, no zebra mussel control is required because of the depth of these intake lines.
- The year-round operation of Island WTP, providing additional security of the water treatment and supply system, particularly operational flexibility, thus enabling upgrades at other sites and the ability to react to system challenges.
- Emergency back-up power supply at John Street Pumping Station provided by Enwave through its steam turbine generation facility.

- Green roof installation at John Street Pumping Station.

CONCLUSION

The Deep Lake Water Cooling Project has yielded income of \$3.5 million and has recovered \$11.7 million in supplementary costs in accordance with the ETA. While the city has invested \$18.1 million in capital infrastructure improvements, a net gain of \$61.5 million in new assets has been transferred to the City.

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