



## STAFF REPORT ACTION REQUIRED

### Authority to Enter into Renewable Natural Gas Projects

<b>Date:</b>	April 29, 2016
<b>To:</b>	Public Works and Infrastructure Committee
<b>From:</b>	General Manager, Solid Waste Management Services
<b>Wards:</b>	All
<b>Reference Number:</b>	P:\2016\Cluster B\SWM\May\006PW (AFS#23137)

#### SUMMARY

---

The purpose of this staff report is to obtain City Council authority to explore and develop Renewable Natural Gas (RNG) Projects at various Solid Waste Management Services' facilities, including Green Lane Landfill, Keele Valley Landfill, the Disco Road Organics Processing Facility and the Dufferin Organics Processing Facility (the "sites"). Staff will report on the results of any RNG Projects that derive a strong environmental/business case. These projects represent a shift in typical biogas/landfill gas utilization projects, away from electricity generation, and instead towards the production of a more valuable renewable resource, namely RNG, thus providing increased economic benefits. In addition, environmental benefits realized from the avoidance of diesel/natural gas consumption are orders of magnitude larger than those realized from the displacement of electricity, given that Ontario's electricity mix is already quite clean (~90% clean).

A previous request for authority to enter into an agreement to produce RNG with Enbridge Distribution Inc. was previously granted by City Council on May 18, 2010; however, due to various circumstances at the time, an agreement with Enbridge was never concluded. Currently, more favourable market conditions, a renewed effort at all orders of government to reduce greenhouse gas emissions (GHGs) and more proven biogas/landfill gas upgrading technology have combined to once again drive interest in the production and utilization of RNG.

RNG is chemically identical to natural gas and can be transported via the current natural gas supply pipeline. It can also be compressed and used to fuel natural gas vehicles, which presents extremely favourable environmental, social, and economic outcomes. Essentially, we will be harnessing the biogas generated at our waste management facilities to fuel our solid waste collection fleet in the future.

## **RECOMMENDATIONS**

### **The General Manager, Solid Waste Management Services recommends that:**

1. City Council grant authority for the General Manager, Solid Waste Management Services, to enter into Renewable Natural Gas Projects and agreements on such terms that are satisfactory to the General Manager, Solid Waste Management Services, based on the environmental/business case presented in Attachment 1, and in a form satisfactory to the City Solicitor, and that the General Manager, Solid Waste Management Services be authorized to execute these projects up until December 31, 2021.
2. City Council authorize the General Manager, Solid Waste Management Services or his delegate, to administer and manage the Renewable Natural Gas Projects, including the provision of any consents, approvals, notices and notices of termination, provided that the General Manager, Solid Waste Management Services may, at any time, refer consideration of such matters (including their content) to City Council for its determination and direction.
3. City Council direct the General Manager, Solid Waste Management Services to report back to Public Works & Infrastructure Committee on the results of any Renewable Natural Gas Projects.
4. City Council direct the General Manager, Solid Waste Management Services, the Deputy City Manager and Chief Financial Officer to investigate options for funding the cost of the Renewable Natural Gas Projects through green energy funding opportunities.

### **Financial Impact**

Solid Waste Management Services is currently evaluating various projects for landfill gas and biogas utilization including the production of energy into the local distribution grid, and/or the production of RNG. The current approved capital investment plan totals \$30.8 million in project cost. Based on initial discussions with potential project partners the capital costs associated with the required renewable natural gas infrastructure at the Disco Road Organics Processing Facility could potentially be fully covered by a project partner. For 2016, Council has also approved \$0.5 million for an RNG project to utilize surplus biogas for fleet vehicles. This report seeks authority to further capitalize on RNG projects in light of current market conditions to provide a complete renewable source of fuel to power SWMS vehicles instead of utilizing diesel.

The financial impacts of RNG projects are project specific and will depend on a number of different parameters.

A high level, initial estimate was developed for the Disco Road Organics Processing Facility to demonstrate potential financial benefits over time and is included in Attachment 1. The simple payback for an RNG project at this site is estimated to be

between 2.1 and 2.9 years. A more detailed analysis will be determined at the time of report back to Public Works and Infrastructure Committee.

The Deputy City Manager & Chief Financial Officer has reviewed this report and agrees with the financial impact information.

## **DECISION HISTORY**

City Council on November 30, December 1, 2, 4 and 7, 2009, adopted the recommendations in Item PW28.14, authorizing and directing the General Manager, Solid Waste Management Services to enter into discussions with Enbridge Gas Distribution Inc. regarding the development of biogas refining systems at the City of Toronto's anaerobic digestion facilities and to report back on a recommended course of action for the procurement of a contract to design, build, own and operate biogas refining systems.

The City Council Decision document can be viewed at:

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2009.PW28.14>

City Council at its meeting on June 8 and 9, 2010, considered report PW33.13, "Authority to Enter into a Biogas Pilot Project Agreement with Enbridge Gas Distribution Inc. to Supply, Install, Own and Operate a Biomethane System at the Dufferin Waste Management Facility" directing the General Manager to enter into a Biogas Pilot Project Agreement with Enbridge Gas Distribution Inc. to supply, install, own and operate a biomethane system at the Dufferin Waste Management Facility to receive and refine biogas produced by the DOPF.

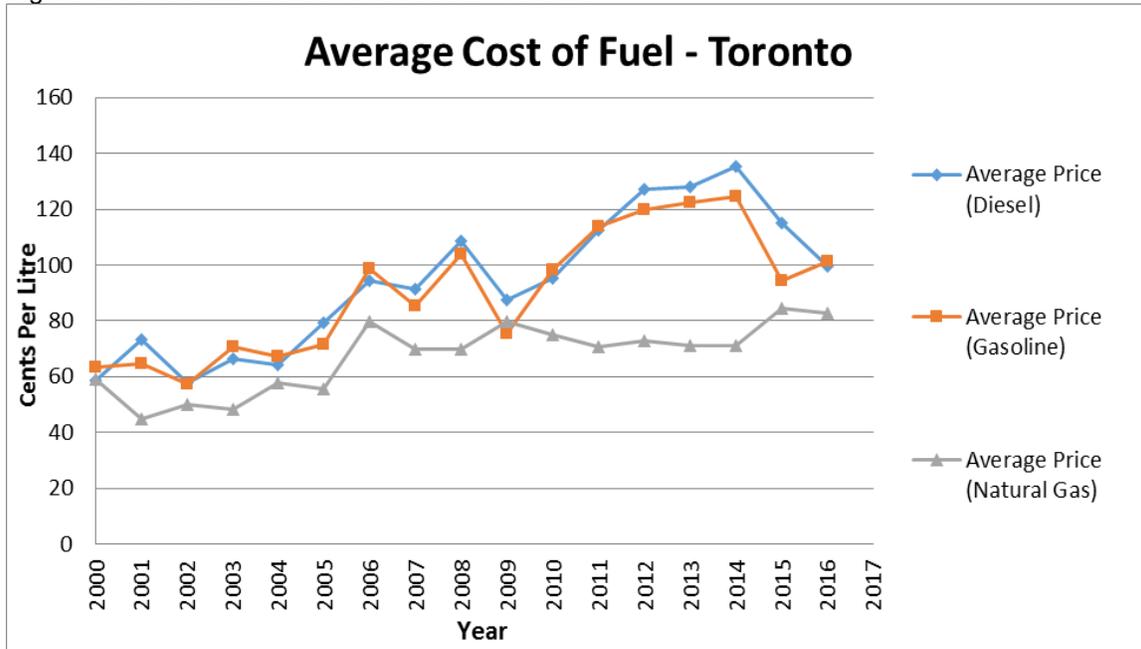
The City Council Decision document can be viewed at:

<http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2010.PW33.13>

## **ISSUE BACKGROUND**

In previous RNG project negotiations it became apparent that there were a number of barriers to overcome in regards to the implementation of RNG projects. One of the main barriers at the time was the cost of natural gas, which was very inexpensive compared to producing and using RNG. With the introduction of compressed natural gas vehicles in the Solid Waste Management sector and the common practice of flaring biogas/landfill gas, the business case to produce RNG, thus off-setting diesel consumption, has become significantly more favourable. While the overall cost of natural gas has not changed much and stayed relatively static (Figure 1), a number of other factors have significantly reduced the costs associated with RNG. These include: considerably cheaper biogas/landfill gas upgrading technology and the increasing cost of diesel. In addition, there exists the potential to generate revenue from the upcoming Ontario Cap and Trade Program, as well as secure funding opportunities for capital costs from other orders of government.

Figure 1: Petroleum Sourced Fuel Costs - Toronto



The environmental benefits of replacing diesel with RNG are quite significant and are consistent with the City’s goal of reducing GHGs by 30% and 80% below 1990 levels in 2020, and 2050, respectively. Estimated emissions reductions from utilizing RNG produced from the Disco Road Organics Processing Facility within our Solid Waste Management Collection Fleet are about 13,635 tonnes of carbon (CO<sub>2</sub>) annually (see Attachment 1).

## COMMENTS

Based on internal research, Solid Waste Management Services has estimated the amount of energy measured in gigajoules that can be extracted each year from our biogas/landfill gas sites. Using these numbers, the approximate amount of diesel litre equivalents that could be produced were also estimated. These numbers are presented in Table 1.

Table 1: Potential Energy and Fuel Production:

Location	Gigajoules (GJ) Annually	Diesel Litre Equivalents (DLE) Annually
Green Lane Landfill	511,181 – 872,015	14.1 – 24.1M
Keele Valley Landfill	300,000	8 – 10M
Disco Road Organics Processing Facility	131,000	4.0M
(Expanded) Dufferin Organics Processing Facility	94,000	2.8M

\*These numbers are for illustration purposes only and will change based on a number of different factors including technology selected, gas pre-treatment, organics composition etc.

This means that given a best-case scenario, the Solid Waste Management Services Division could produce approximately 40 million diesel litre equivalents each year. This amount is far in excess of what our Division uses to fuel our fleet and external markets would need to be explored.

## CONTACTS

Carlyle Khan, Director, Infrastructure Development & Asset Management, Solid Waste Management Services, Telephone: 416-392-5488, Fax: 416-392-4754, E-mail: [ckhan@toronto.ca](mailto:ckhan@toronto.ca)

Kris Hornburg, Project Lead, Solid Waste Management Services, Telephone: 416-392-3752, Fax: 416-392-4754, E-mail: [khornbu@toronto.ca](mailto:khornbu@toronto.ca)

## SIGNATURE

---

Jim McKay  
 General Manager  
 Solid Waste Management Services

## ATTACHMENTS

Attachment 1 – Environmental/Business Case for Renewable Natural Gas