



Committee of the Whole Report

Report Number:	WM2023-006
Meeting Date:	March 7, 2023
Title:	2022 Lindsay Ops Landfill Gas Generator Summary
Description:	An operational review of the Lindsay Ops landfill gas generator for the year of 2022
Author and Title:	David Kerr, Manager of Environmental Services

Recommendation(s):

That Report WM2023-006, **2022 Lindsay Ops Landfill Gas Generator Summary**, be received;

That Staff continue to review the efficiency of the generator annually and budget accordingly;

That annual reporting cease and Staff be directed to report to Council for significant variations in operational and capital plan only; and

That these recommendations be brought forward to Council for consideration at the next Regular Council Meeting.

Department Head:_____

Financial/Legal/HR/Other:_____

Chief Administrative Officer:_____

Background:

At the Council Meeting of October 20, 2020, Council adopted the following resolution:

CR2020-333

That Report ENG2020-018, Lindsay-Ops Landfill Electricity Generation System Optimization Study, be received;

That staff proceed with continued operation of the generator and implement recommendations in the study to optimize the operation where feasible; and

That staff present an annual report to Council on the Lindsay-Ops Landfill Electricity Generation System.

This report follows that direction.

To put this report into context, we have provided a summary overview of the generator and its operational performance over the 2022 calendar year. This is the third annual report provided to council on the operation of the generator. The first report was provided to council on February 9, 2021.

Overview:

It is a provincial requirement for a landfill the size of Lindsay Ops, to have a methane collection system. There is not only a flare installed at the Lindsay Ops landfill to manage methane onsite, but since 2015, the City has also owned and operated a landfill gas generator. The generator converts methane gas from the Lindsay Ops landfill into electrical power. This power is in turn used to supply electricity to the Lindsay Ops landfill and adjacent Lindsay Water Pollution Control Plant (WPCP). In addition to offsetting electrical costs the generator is an initiative that reduces green house gases and supports the City's Healthy Environment Plan.

The benefits of having both a flare and generator onsite is that if for any reason the generator is down for maintenance or other, methane is routed to the flare where it is burned, thus meeting the regulatory requirement.

The gas facility (including collection system, generator, and flare) is located on the Lindsay Ops landfill property, west of the current fill area. The operation of this facility, including maintenance and monitoring, is currently contracted to Comcor Environmental Limited (Comcor), and is administered by Waste Management Operations. Comcor is

the successful contractor retained through a public procurement process for a 5-year term starting in 2023 and expiring on December 31, 2028. The contract also includes optional renewals of 2 additional 1-year periods subject to performance and mutual agreement.

As per Council's direction, the User Rate (Water and Wastewater) covers the bulk percentage of the costs associated with the operation of the landfill gas generator, while the Waste Management Division assumes the remainder of the costs, and those of the flare and collection system. The percentage paid by the user rate is dependent on the amount of energy the Lindsay Water Pollution Control Plant (WPCP) consumes from the generator's production, and is reviewed annually.

Performance in 2022:

In 2022, the generator was out of service for approximately 122 days. These downtimes are a combination of pre-scheduled maintenance, alarms and other issues that arose.

A major cause of the generator's downtime in 2022 were power issues related to the capital construction work at the WPCP. As a result of the new electrical configuration at the WPCP facility the generator has been tripping due to high voltage issues. This is due to a protection relay located on the electrical panel at the WPCP. The generator could only run for a short period of time before being shut down due to an alarm on the system. Issues started in mid September and as of November the generator had been turned off completely until a solution of fixing the voltage output and alarm. The contractor doing the construction work at the WPCP was able to diagnose the source of the power issues and provide a solution which is currently being implemented. The expectation is that the generator will be back online in Q1 2023. The flare has been operating in place of the generator.

Rationale:

When waste is first deposited in a landfill, it undergoes aerobic (oxygen) decomposition and during this stage little methane is produced. Typically, within one-year anaerobic (lack of oxygen) conditions are met and methane-producing bacteria begin to decompose the waste and generate methane. The expectation is that with time, as the Lindsay Ops landfill increases in age and size, there will be many future years of optimal

methane production. Any future expansion of the wellfield will also work in bettering the operation of the generation facility.

The landfill gas generator provides a sustainable green alternative energy source that is greatly utilized onsite, due to the considerable energy demands of the WPCP and landfill buildings. The generator also provides redundancy onsite, so if either the flare or generator are unable to run, the other can operate. This is very important in ensuring the site remains in compliance with the landfill site's Environmental Compliance Approval (ECA), which requires methane to either be flared or converted to energy through the generator.

In 2022, approximately 754,900 kilowatt hours (kWh) of electricity were produced from the methane gas to service the onsite needs of City operations. This accounted for approximately 24% of the electrical demands of the Lindsay Ops landfill and Lindsay WPCP.

As further discussed in the financial operation impact section of this report, there is a strong business case to continue operating the generator based on regulatory needs, reduction of greenhouse gases, operational redundancy and offsetting electrical costs. It is expected that through additional operation in 2023 and beyond, that the cost savings will be able to be more accurately predicted. For these reasons, we continue to recommend operation of the generator.

Staff also continue to review the efficiency of the generator on a regular basis as part of the overall delivery of operations and budget accordingly on an annual basis. Therefore, the ongoing need to provide a separate annual Council report on the performance of the generator is likely unnecessary and redundant. Any discussion on the generator performance will be discussed through the annual budgetary process and will be brought to Council as direction is needed. This would help streamline and focus staff resources.

Other Alternatives Considered:

There are no other alternatives being considered at this time.

Alignment to Strategic Priorities:

The Lindsay Ops landfill gas generator is a component of the Healthy Environment Plan and overall Strategic Priority of a Healthy Environment. This is because it produces renewable energy and reduces the corporate carbon footprint and the City's greenhouse gases. It also contributes to environmentally efficient municipal infrastructure as it offsets a large portion of the electricity required by Lindsay's Water Pollution Control Plant (WPCP), therefore reducing the energy consumption required for municipal operations.

Financial/Operation Impacts:

The City budgeted \$250,000 in 2022 for the operation and maintenance of the landfill gas generator, flare and wellfield.

Electricity demands for the Lindsay WPCP and Lindsay Ops landfill are significant and for the period of December 8, 2021 to December 15, 2022, Hydro One costs came to a total of \$422,188 (approximately \$69,000 more than the previous reporting year). The total amount of kilowatt hours (kWh) consumed during this time was approximately 3.2 million kWh. Of this, 754,900 kWh were delivered from the generator, while the remainder were sourced from the Hydro One grid. With the power issues, the generator was not utilized fully in the last quarter of the year. Due to these issues, the output from the generator had dropped by 37% in comparison to the previous yearly reporting period.

The kWh contributed by the generator provided the City with an approximate savings of \$135,100 in Hydro One billing costs for the year of 2022. This is an estimation using the approximate \$/kWh for each billing period. The \$135,100 that was saved in Hydro One billing costs, was used to off set the annual cost for the operation and maintenance of the generator.

Although the generator has provided a reduced output in 2022, it did continue to offset 24% of the total power consumption of the WPCP and Lindsay Ops landfill. The expectation is that once the electrical issues are resolved in Q1 2023 the total power output from the generator will improve allowing further offset of total electrical costs and more in line with past years' performance. The generator serves an important service to the City to provide redundancy with the flare to ensure effective management of landfill gas and compliance with regulatory requirements.

Supporting information for the reduction in Hydro One billing costs is outlined in the following chart:

Billing Period	Hydro One Bill Total (A)	Hydro One Bill Total kWh (B)	Total kWh Generator Produced (C)	Total Amount of kWh Consumed (B+C)	Estimated \$/kWh (D)	Estimated Cost Savings* (C x D)
Dec 08 - Jan 10	\$31,669.54	218,314.65	107,193	325,507.65	0.15	\$15,549.82
Jan 11 - Feb 08	\$32,840.64	192,477.75	87,591	280,068.75	0.17	\$14,944.82
Feb 09 - Mar 10	\$35,415.80	227,630.11	55,368	282,998.11	0.16	\$8,614.42
Mar 11 - Apr 07	\$22,709.66	108,658.21	127,755	236,413.21	0.21	\$26,700.91
Apr 08 - May 09	\$26,248.34	173,313.59	96,988	270,301.59	0.15	\$14,688.83
May 07 - Jun 09	\$24,940.64	128,305.41	127,793	256,098.41	0.19	\$24,841.04
Jun 9 - Jul 11	\$34,717.24	174,191.35	82,500	256,691.35	0.20	\$16,442.68
Jul 11 - Aug 10	\$52,235.05	230,429.63	29,860	260,289.63	0.23	\$6,768.83
Aug 10 - Sept 9	\$64,393.25	321,861.74	-	321,861.74	0.20	-
Sept 10 - Oct 07	\$37,306.19	228,159.72	39,853	268,012.72	0.16	\$6,516.33
Oct 08 - Nov 09	\$29,351.07	222,967.04	-	222,967.04	0.13	-
Nov 10 - Dec 15	\$30,361.18	199,944.61	-	199,944.61	0.15	-

*It is important to note that these costs are estimated based on variable billing costs.

Consultations:

Manager, Water and Wastewater
Waste Technician 2

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Department Head: Bryan Robinson, Director of Public Works