
MEMORANDUM

WMPSC-C 26-2021

Subject: Alternative Waste Management Technologies Update

Date: Monday, August 30, 2021

To: Waste Management Planning Steering Committee

From: Brad Whitelaw, Program Manager, Waste Policy & Planning

As per PW 41-2015 and the May 30, 2016 Waste Management Planning Steering Committee (WMPSC) meeting, this memorandum is intended to provide Committee members with an update on alternative waste management technology projects and related initiatives (i.e. Energy-From-Waste (EFW), Mixed Waste Processing (MWP), Anaerobic Digestion (AD), etc.). Staff have been monitoring new and emerging alternative disposal technologies, along with existing projects, for future consideration, over the past several years. Staff provide updates on these alternative waste management technologies, at least annually, or whenever there are significant updates.

Background

- An RFP for the completion of Niagara Region's Long Term Waste Management Strategic Plan (LTWMSP) was released in early August 2021.
- Niagara Region continues to engage other neighbouring municipalities in discussions related to available capacity at their current/future alternative waste management technology facilities and/or future needs that could be addressed by collaborating on alternative technologies.
- Niagara Region continues to participate in the Municipal MWP Working Group, which has the objective to "identify collaboration opportunities and specific information needs, actions and timelines, in order to determine the feasibility of jointly implementing waste management policies, programs and/or facilities, which includes alternative technology facilities".

Overview

Provided below is an update on municipal and private alternative waste management technology facilities across Canada, and related Provincial waste reduction legislation, subsequent to what was previously reported in WMPSC-C 2-2021 – Alternative Waste Management Technologies Update, February 22, 2021.

Summary of Municipal and Privately-Owned Alternative Waste Technology Facilities Across Canada

Provided below is an update on municipal and privately-owned alternative waste technology facilities implemented across Canada.

Table 1 – Municipally-Owned Facilities (owned by a municipality and operated by a third party)

Municipality/ Facility	Type of Technology	Update
Durham-York Energy Centre (DYEC) and Covanta	EFW	<ul style="list-style-type: none">• In June 2019, the Regions of Durham and York began the Environmental Screening Process to increase the amount of waste processed at the DYEC by 20,000 tonnes per year (tpy), for a total of 160,000 tpy.• A streamlined Environmental Assessment to increase DYEC's permitted capacity from 140,000 to 160,000 tpy is targeted for submission in fall 2021, for Ministry approval.
Metro Vancouver Waste-to-Energy (WTEF) and Covanta	EFW	<ul style="list-style-type: none">• Since their organics ban was introduced in January 1, 2015, the Mixed Solid Waste (MSW) processed at the WTEF decreased from 280,000 tpy to approximately 244,500 tpy in 2020.• In 2020, the WTEF recovered and sold approximately 6,100 tonnes of ferrous and non-ferrous metals (i.e. aluminum, zinc, brass, stainless steel, and copper).

Municipality/ Facility	Type of Technology	Update
		<ul style="list-style-type: none"> • In 2020, the WTEF generated 150,625 MWh of electricity; enough to power approximately 16,000 homes per year. • In 2020, the total operating cost for the WTEF was approximately \$22.5 million, and disposal costs were \$3.3 million. • In 2020, Metro Vancouver earned approximately \$5.3 million in revenue from the sale of electricity, and \$0.2 million from the sale of recycled metals; the bulk of which was used to produce reinforcing steel. • In 2020, the net cost to operate the WTEF was \$69.84 per tonne.
Halifax Regional Municipality Otter Lake Waste Management Facility	Mechanical Biological Treatment (MBT)	<ul style="list-style-type: none"> • From April 2020 to March 2021, the Otter Lake Facility received a total of 51,511 tonnes of residential waste; of which 43,739 tonnes was landfilled (difference in tonnage includes metals, papers and pop bottles, which were recovered). • Total operating costs for the Otter Lake Facility during this period were \$6.9 million. • The status of the Otter Lake Facility was under review, relative to a motion from Halifax Regional Council in 2014. • Subsequently, a recommendation approved by Council on July 20, 2021 directs staff to work with the facility operator to submit an application to Nova Scotia Environment to deactivate the Front End Processor (FEP) and Waste Stabilization Facility (WSF) at the Otter Lake Waste Management Facility.

Municipality/ Facility	Type of Technology	Update
City of Toronto Dufferin Biogas Utilization Project	AD	<ul style="list-style-type: none"> • The City of Toronto, in collaboration with Enbridge Gas Inc. (Enbridge), is installing biogas-upgrading equipment at the Dufferin Solid Waste Management Facility. • The infrastructure will allow the City and Enbridge to convert the biogas that is produced from processing Toronto's Green Bin organic waste into renewable natural gas (RNG) and inject this gas into the natural gas distribution grid owned and operated by Enbridge. • Once in the grid, the City will be blending the RNG with Natural Gas to create a low-carbon fuel blend that will be used to power its waste collection trucks and other vehicles and heat City buildings and facilities. • This project is one of the first of its kind in North America and will allow the City to significantly reduce its greenhouse gas (GHG) emissions. • Current estimates suggest that the Dufferin RNG facility will process 55,000 tonnes of organics per year, and produce approximately 3.3 million cubic metres of RNG per year. • The first green molecule of RNG from the Dufferin facility is expected to start flowing in mid-August 2021. • The total project cost for the Dufferin Biogas Facility is estimated to be \$16.3 million. • The next facility to receive RNG infrastructure will be the Disco Road Organics Processing Facility, which is expected to process 75,000 tonnes of organics per year, and produce approximately 4.6 million cubic metres of RNG per year, by the end of 2023.

Municipality/ Facility	Type of Technology	Update
		<ul style="list-style-type: none"> The City has also identified other potential RNG production opportunities, for consideration, at two of its landfill sites (Green Lane and Keele Valley). A feasibility study is currently underway for the Green Lane Landfill to identify the best opportunity for landfill gas utilization with RNG being a top contender. At this time, a cost per tonne is not available. Through these four (4) sites, it is estimated that the City could produce approximately 65 million cubic metres of RNG per year – the equivalent in GHG emission reductions of taking 35,000 cars off the road for a year.

Table 2 – Summary of Current and Proposed P3 Facilities (owned and operated by a private company, but agreements with municipalities to supply waste)

a) Current P3 Facilities

Municipality/Facility	Type of Technology	Update
City of Edmonton and Enerkem Alberta's Waste-to- Biofuel and Chemical Facility	Gasification, Cleaning and Conditioning of Syngas, Catalytic Synthesis and Product Purification	<ul style="list-style-type: none"> There is nothing new to report on this facility since the previous update.

b) Proposed P3 Facilities

Municipality	Type of Technology	Update
Durham Region	MWP and AD	<ul style="list-style-type: none"> • Durham released an RFP on August 9, 2021 for the Design, Build, Operate and Maintenance (DBOM) of the Region's new Mixed Waste Pre-Sort and AD facility. • The facility is planned to begin operating in 2024. • The facility is anticipated to divert approximately 30,000 tonnes of organics from the DYEC, annually. • The facility is anticipated to generate approximately 4 million cubic metres of RNG by capturing methane that would otherwise be released into the environment. • The facility is estimated to have a capital cost of \$204M, and an annual operating cost of \$30M. • The estimated cost per tonne is \$150.

Table 3 – Summary of Privately-Owned Facilities

Facility	Type of Technology	Update
Escarpment Renewables Bio Digester, Grimsby	AD	<ul style="list-style-type: none"> • The facility is fully operational and is generating 1.0 MW of green electricity per day, using the biogas that is produced. • All equipment installed (i.e. pasteurization, contaminant removal, receiving tanks) has been commissioned and is fully operating. • The facility processes food waste and various liquid waste feedstocks, such as sugar waters, fats, oils and grease, and dissolved air flotation sludge.

Facility	Type of Technology	Update
		<ul style="list-style-type: none">• The digestate produced is a Canadian Food Inspection Agency-certified fertilizer, and Escarpment Renewables has commenced with hauling the digestate off site, for land application.
Southern Alberta Energy from Waste Association (SAEWA)	EFW	<ul style="list-style-type: none">• In June 2021, SAEWA authorized its project engineer, HDR, to issue an REOI for an EFW project development partner.• SAEWA's objective is to find a partner to move forward with development of an EFW facility at the preferred site location at the County of Newell Landfill.• SAEWA is in the final planning stages of developing an EFW facility that will handle the conversion of municipal and other sources of solid waste into energy.

Municipal MWP Working Group

The Municipal MWP Working Group, which Niagara Region is currently a member of, meets to discuss and share information on various municipal MWP initiatives. The Municipal MWP Working Group previously met, as a group, in December 2017. The next meeting has been tentatively scheduled in Q4 2021.

Provided below is an update from the Municipal MWP Working Group members on their current initiatives:

i) **London:**

- As part of London's 60% Waste Diversion Action Plan, Council approved the direction to proceed with a pilot project for MWP for waste collected from a portion of London's multi-residential buildings. City staff are currently working on current opportunities and alternative plans for Council's consideration.
- Research at London's Waste to Resources Innovation Centre (WRIC), including the Natural Sciences and Engineering Research Council of Canada's (NSERC)

Industrial Research Chair Thermochemical Conversion of Biomass and Waste to Bio-industrial Resources administered by Western University (2019) has been under way since 2015. Academic research, laboratory and bench scale testing, and field work ranges from feedstock handling to material quality through to technologies and end market products (e.g., mechanical recycling, chemical recycling, material conversion, alternative low carbon fuel, solid recover fuel, etc.).

- As part of London's WRIC, the City has a non-binding Memorandum of Understanding (MoU) with Green Shields Energy (GSE) until December 31, 2022. The MoU sets out the short-term objective of collaboration between the City and GSE to undertake testing and develop data/information on the viability of Hydrogen Reduction technology to manage various non-hazardous waste streams including household garbage. This research has the potential to move to constructing and operating a demonstration scale facility containing a Hydrogen Reduction unit designed for demonstrating the effectiveness of the process on the conversion of various non-hazardous wastes.
- In late October 2019, London launched their two-year Hefty EnergyBag Pilot Project at 13,000 homes, in nine (9) areas of the City. The purpose of the project was to:
 - 1) Divert more plastics from landfill (i.e. juice & food pouches, chip & snack bags, meat & cheese bags, pet food bags, fruit/vegetable bags, etc.)
 - 2) Reduce the amount of plastic being mismanaged
 - 3) Advance towards a more circular plastics economy and more sustainable future
- London's Hefty EnergyBag Pilot Project (for hard-to-recycle plastic items that are currently placed in the garbage) proceeded as planned until March 2020. A number of adjustments were made to address operating through the pandemic, including delaying measurement studies and postponing expansion until a clearer picture was available. Revisions were launched in July 2021. The Pilot Project will carry on into 2022.
- This project includes working with a number end markets and advanced resource recovery technologies.
- On April 20, 2021, staff submitted an *Update on Resource Recovery Strategy, Including Mixed Waste Processing* to their Civics Works Committee. The following recommendations of this report were approved:
 1. this report **BE RECEIVED** for information;

2. the Civic Administration **BE DIRECTED** to take no further action on the Unsolicited Proposal dealing with mixed waste processing; and
3. the Civic Administration **BE DIRECTED** to develop details and a background business engagement document to initiate a two-step public procurement process (Request for Qualifications followed by a Request for Proposals) for a resource recovery facility or facilities (including mixed waste processing, mechanical biological treatment and waste conversion technologies), pilot project or commercial scale, and report back to Civic Works Committee by December 2021 with details on how the process will occur; it being noted that Civic Administration already have direction to examine the potential for small scale, demonstration facilities for resource recovery facilities as part of the London Waste to Resources Innovation Centre, subject to Municipal Council approval.

ii) **Oxford County:**

- In 2021, Oxford County will be starting high level planning for organics diversion (i.e. Source-Separated Organics vs. Facility-Separated Organics) in order to meet the 2025 targets established in the Provincial organics policy statement.

iii) **Peel Region:**

- An RFP for the DBOM of an AD facility (Peel Renewable Natural Gas Centre) to process Peel Region's Green Bin organics was completed in the spring of 2021.
- It will provide 90,000 tonnes per year of organics processing capacity, which considers Peel Region's Green Bin program expansion and population growth.
- The results of the RFP were presented to Council at its July 8, 2021 meeting. Council directed staff to cancel the procurement without award. As a result, Peel Region staff will need to develop a new plan for organics processing.
- On June 18, 2020, Peel Region's Waste Management Strategic Advisory Committee (WMSAC) directed staff to report back with information on how a MWP Pilot fits into the Region's long-term waste management strategy, including timing, scope, costs, risks, outcomes, and options for procurement.
- Peel Region prepared a REOI for a MWP Pilot Project, which was released on December 24, 2020, and closed on February 8, 2021.
- Peel Region staff reached out to other municipalities to discuss potential partnering opportunities for the MWP Pilot Project.

- Niagara Region expressed an interest in participating in this MWP Pilot, including potentially contributing tonnages.
- Peel Region staff will be reporting back to WMSAC with their findings and recommended next steps pertaining to project timing, scope, costs, risks, outcomes, and options for procurement of a MWP Pilot Project.

iv) **Simcoe County:**

- Simcoe County has no plans, at this point, to pursue MWP technology. Instead, the County will be keeping abreast of developments in the MWP field.
- Simcoe County is pursuing the development of its waste management facility (ERRC - Environmental Resource Recovery Centre), which has two (2) major components: an Organics Processing Facility, and a Materials Management Facility or waste transfer facility for garbage and recycling.
- Simcoe County has selected a site and is currently pursuing the necessary Official Plan and zoning designations.
- Simcoe County is in the midst of updating their Solid Waste Strategy.

v) **Toronto:**

- In March 2020, Solid Waste Management Services staff took the *MWP Study Update* report to the Infrastructure and Environment Committee, which was referred to Toronto City Council, for consideration.
- The report indicated that the \$310 million initially anticipated as the cost for a MWP facility in the City of Toronto's Long Term Waste Management Strategy is sufficient for a facility with a capacity of 270,000 tonnes per year. This assessment was derived from a rough order-of-magnitude costing exercise for a facility that includes a front-end sorting component for separation and capture of recycling and organic fractions, followed by organics contaminant removal and an anaerobic digester to process the organic fraction.
- The operating cost was estimated at \$16.9 million per year or about \$63 per tonne. This does not include revenues from the sale of materials or renewable natural gas (RNG). These costing estimates were derived using industry-standard costs. Further analysis will be necessary to determine specific technology costs and to refine the estimate for effective planning.
- In September 2020, Toronto City Council adopted the following motions for this report:

1. City Council direct the General Manager, Solid Waste Management Services to consider future work on the development of a mixed waste processing facility, with or without a thermal treatment process, where the overarching goals are maximizing resource recovery through reduce, reuse, recycle, energy recovery then residual disposal, minimizing the dependence on long term landfill use all while ensuring the financial sustainability of the Solid Waste Management Services program.
 2. City Council direct the General Manager, Solid Waste Management Services to report back to the Infrastructure and Environment Committee no later than the end of 2023 with a business case, including a triple bottom line analysis (environment, social and financial) and a utility rate impact assessment on the mixed waste processing of waste with and without thermal processing compared to increased reduction and diversion and traditional landfilling.
 3. City Council direct the General Manager, Solid Waste Management Services to pursue potentially applicable Federal Government, Provincial Government, and non-profit organization funding opportunities to assist in implementing Parts 1 and 2 above and to negotiate and enter into all necessary agreements to receive any available funding in a form satisfactory to the City Solicitor.
- Solid Waste Management Services staff will continue to research the topic and have committed to reporting back to City Council with updated findings by the end of 2023.

vi) **Waterloo Region:**

- Waterloo Region is continuing to monitor the activities of larger municipalities with respect to alternative technology initiatives.

vii) **York Region:**

- York Region issued an RFP to procure contracted AD processing services at a privately-owned facility on June 7, 2021, which closes on September 30, 2021.

Provincial Waste Reduction Legislation

Provincial waste reduction legislation may impact the amount of tonnage to be directed to alternative technology facilities, and will require additional consideration by Niagara Regional Committees/Council, in terms of services and facilities that Niagara will continue to operate under a producer responsibility framework.

Provincial “Made-in-Ontario Environment Plan” Update

- On June 3, 2021, the Minister of the Environment, Conservation and Parks (MECP) announced the finalization of the new Blue Box Regulations.
- Details of the final Blue Box Regulations (O. Reg. 391/21) were provided at the June 28, 2021 WMPSC meeting, and included in PWC-C 24-2021, July 13, 2021.

Provincial “Food and Organic Waste Policy Statement” Update

- The Food and Organic Waste Policy Statement, which was issued by the MECP on April 30, 2018, establishes the following targets and timelines for residential organics management in Ontario:
 1. Larger municipalities, including Niagara Region, need to implement an organics management program that will achieve at least a 70 per cent waste reduction and resource recovery of food and organic waste generated by single-family dwellings in urban settlement areas by 2025.
 2. Multi-residential buildings need to implement an organics management program that will achieve at least a 50 per cent waste reduction and resource recovery of food and organic waste by 2025.
- Additional guidance will be provided by the Province to municipalities in the coming months regarding implementation of the Food and Organic Waste Policy Statement.

Staff will continue to provide reports to Committee with further updates on any Provincial legislative changes.

Summary/Conclusions

Based on a review of the Municipal MWP Working Group members, the majority of these municipalities are not considering EFW at this time, for various reasons, including:

- The decision was made to monitor EFW, but not to implement at this time (Waterloo, Simcoe);
- The decision was made to focus on organics (AD) diversion (Durham, Oxford, Simcoe, Peel and York);
- EFW technology was not included, as part of London’s long-term waste strategy. However, City staff will be developing a background business engagement document to initiate a two-step public procurement process (RFQ followed by a

RFP) for a resource recovery facility or facilities (including MWP, MBT and waste conversion technologies) pilot project or commercial scale, and report back to Civic Works Committee by December 2021 with details on how the process will occur;

- Toronto will be considering MWP, with or without thermal processing, as part of their MWP Study, which is expected to be completed by the end of 2023.

Niagara Region will be assessing EFW, as part of its upcoming LTWMSP.

Respectfully submitted and signed by

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