
For Information

REPORT TITLE: **Peel Renewable Natural Gas Centre (Anaerobic Digestion Facility) – Decision Making History**

FROM: Kealy Dedman, Commissioner of Public Works

OBJECTIVE

To provide Regional Council with an overview of the decision-making history of the Peel Renewable Natural Gas Centre (Anaerobic Digestion Facility) project.

REPORT HIGHLIGHTS

- Currently, one half of Peel's organics is processed through the existing composting system owned and operated by the Region and the remaining half is processed through contracts with private processing facilities.
- The existing composting system cannot be expanded, is aging and increasingly in need of maintenance while the private contracts are small tonnage and short-term which increases both financial and capacity risk for the Region. This system does not satisfy Peel's future organics processing needs and therefore new, reliable, long-term capacity is required.
- In 2014, Regional Council endorsed the Waste Management Infrastructure Development Plan which included a new Anaerobic Digestion (AD) Facility to process Peel's organics material stream (Resolution 2014-626).
- The preparation of the Infrastructure Development Plan included a review of the Region's future waste management infrastructure requirements, a review of processing capacity in Ontario, an assessment of organics processing options, a review of available technology and a review of facility ownership options.
- In 2015, Regional Council approved a plan to develop a Region-owned AD Facility to be located at a new site in either the City of Brampton or the City of Mississauga to enable organics to be delivered directly to the facility (Resolution 2015-742).
- In 2017, Regional Council approved the development of a 90,000 tonnes per year AD Facility as part of the Region's long-term waste management strategy (Resolution 2017-972). Regional Council also approved the Strategic Terms for the AD Facility Project including the procurement plan and the use of a design, build, operate and maintain (DBOM) contract for the facility (Resolution 2017-975).
- Other large municipalities with similar tonnage to Peel, such as the City of Toronto, Durham Region and York Region, have investigated and proceeded with AD to meet their organics processing needs.
- In 2017, the results of the Region's Mixed Waste Processing (MWP) Feasibility Study were also reported. The report suggested that MWP had the potential to increase Peel's diversion rate by 20 percent but also highlighted key risks that should be resolved before proceeding to procure processing capacity. Further, it was determined that organics recovered through MWP would still need to be processed by composting or AD to

Peel Renewable Natural Gas Centre (Anaerobic Digestion Facility) – Decision Making History

remove most of the contamination such as plastic and glass under the current regulatory framework in Ontario.

- In 2020, Regional Council asked staff to investigate and report back on the potential to implement a mixed waste processing pilot to achieve additional diversion by recovering recyclables and organics from Peel's garbage stream (Resolution 2020-845). Staff is in the process of conducting its investigation and will report back to a future meeting of the Waste Management Strategic Advisory Committee with the results of its investigation.

DISCUSSION

1. Background

In 2014, Regional Council endorsed the Waste Management Infrastructure Development Plan which included a new Anaerobic Digestion (AD) Facility to process Peel's organics material stream (Resolution 2014-626).

In 2015, Regional Council approved a plan to develop a Region-owned AD Facility to be located at a new site in either the City of Brampton or the City of Mississauga to enable organics to be delivered directly to the facility (Resolution 2015-742).

In 2017, Regional Council approved the development of a 90,000 tonnes per year AD Facility as part of the Region's long-term waste management strategy (Resolution 2017-972). Regional Council also approved the Strategic Terms for the AD Facility Project including the procurement plan and the use of a design, build, operate and maintain (DBOM) contract for the facility (Resolution 2017-975).

In 2018, the Region purchased 125 Orenda Road in the City of Brampton and Regional Council approved it as the facility location (Resolution 2018-740).

In 2019, Regional Council approved the recommendation to build the AD facility at 125 Orenda Rd. and issue the Request for Proposal (Resolution 2019 -199).

On May 20, 2021 staff provided an update on the AD project outlining that the procurement process follows Regional Council direction and is ongoing. The next steps included staff completing the evaluation of the Request for Proposal submissions and recommending a preferred proponent to Council at its July 8, 2021 meeting (Resolution 2021-560).

There was a total of 14 reports to Council pertaining to the AD facility.

2. Recommending a Peel-owned Anaerobic Digestion Facility

The Infrastructure Development Plan identified Peel's long-term organics management requirements and compared feasible alternatives.

Peel needs reliable, long-term capacity with sufficient tonnage and capabilities to divert more organics, including diapers and pet waste, and to support the 75 percent 3Rs target.

For Peel's organics processing needs, staff considered several options that were compared against maintaining the status quo. The assessment included an evaluation of available

Peel Renewable Natural Gas Centre (Anaerobic Digestion Facility) – Decision Making History

technology (composting vs. AD), facility ownership (Peel-owned vs. Private-ownership) and a review of available processing capacity in Ontario.

3. Maintaining the Status Quo

Peel requires more reliable organics processing capacity and capabilities over a long-term to meet current and future organics processing needs as the Region continues to grow.

Currently, almost one half (approximately 35,000 tonnes annually) of Peel's green bin organic material is processed through Peel's in-house composting system and the remaining half (37,000 tonnes annually) is processed through small tonnage short-term contracts with private processing facilities. These contracts are short-term and close to expiry.

Peel's existing organics composting system is nearing the end of its service life, is unable to separate contamination effectively and is not sized to manage Peel's future organics processing needs. Staff evaluated the potential for expansion of the existing system, but this approach was limited due to area constraints. As such, additional investment to replace equipment and upgrade processing capabilities was not recommended.

Peel's existing composting system does not and cannot satisfy the Region's future organics processing needs.

4. Alternative Options Considered

A number of options for organics processing capacity were considered including technology and facility ownership through the Infrastructure Development Plan.

Technology

Staff considered two ways to manage green bin organics: composting and AD.

An AD facility was determined to have advantages over composting for processing residential organics because it:

- Enables better odour control
 - Since the AD process does not require oxygen, AD facilities need to contain and treat significantly less air than do composting facilities.
 - Composting facilities require significant separation distance from residents and other uses to prevent odour impacts. The Ontario Composting Guideline recommends that a composting facility of the size needed to process Peel's organics would require a separation distance of up to a kilometer from land zoned for residential uses and other sensitive receptors.
- Has a significantly smaller footprint
 - A composting facility sized to process the Region's organics plus amendment material would require approximately 22 hectares compared to the 3 – 4 hectares required for an AD facility. A composting facility would also retain the material on-site for a longer period than would AD.
- Because it requires a smaller site and enables better odour control, an AD facility can be located in built-up areas close to the source of green bin organics

Peel Renewable Natural Gas Centre (Anaerobic Digestion Facility) – Decision Making History

- Has better ability to separate higher amounts of contamination
- Produces biogas which is a source of renewable energy
- Reduces greenhouse gas emissions thereby addressing the Region's Climate Change Strategy

At the scale needed to process the Region's organics, the total costs (siting, capital, operating and maintenance, transfer, and haulage) of both methods were considered to be similar. AD facilities have higher capital costs per tonne of processing capacity however composting facilities require additional capacity to process amendment materials, require more land and would be located further away increasing haulage costs.

AD can also allow for the expansion of Peel's green bin program to include additional materials such as diapers, pet waste and use of plastic bags instead of compostable liners. These additions will contribute to Peel reaching its 75 percent 3Rs diversion target. The AD technologies prequalified for the project have demonstrated the ability to successfully separate contaminants from very heavily contaminated organics material streams and also to separate and process the contents of diapers and similar products from the non-processible plastic shells.

Processing an organics stream containing pet waste, diapers and sanitary products while minimizing residue are requirements of the AD Facility.

Other AD facilities, including the City of Toronto's Disco Road Organics Processing Facility have successfully processed organics containing pet waste, diapers, and sanitary products.

Facility Ownership Model

The Infrastructure Development Plan included a review of available organics processing capacity in Ontario. There was no single large processor that had enough capacity available to process all of Peel's green bin material. A tender for a single processor would likely have required the construction of a new facility or the significant expansion of an existing facility.

A recent report by the Canadian Biogas Association containing a 2019 analysis of organics processing capacity reported that most compost and AD facilities are operating close to capacity. Meeting the provincial requirements outlined in the Food and Organic Waste Policy Statement (2018) will increase the supply of organics from the commercial and residential sectors, which will create a need for new processing capacity.¹

Market intelligence suggests that several new private organics processing facility projects, and expansions of existing facilities, are in early stages of development to address some of the increased capacity needs across the province. However, there is significant uncertainty regarding capacity availability or timing, as well as the unknown future tipping fees for use.

Both Private-ownership and Peel-owned options were considered for the AD facility. Consideration of private capacity included a single dedicated facility or multiple contracts using existing capacity.

¹ Canadian Biogas Association. (2019). Biogas and Renewable Natural Gas in Ontario: 2019 Market Overview and Outlook. <https://www.biogasassociation.ca/images/uploads/documents/2019/2019-Market-Overview.pdf>

Peel Renewable Natural Gas Centre (Anaerobic Digestion Facility) – Decision Making History

Private capacity creates the possibility of several undesirable outcomes including:

- The cost of the new facility would be passed on to Peel through tipping fees, causing the Region to bear the costs of developing the facility without the control and security of owning the asset.
- The Region may not be able to use or retain the same carbon reduction and other environmental benefits associated with organics diversion if the organics are managed at a private facility.
- A long-term processing contract would expose the Region to the risk of service disruptions if the private facility is unable to control odours or otherwise maintain the technical or financial conditions needed for successful operation.

As previously stated, there is no single private facility that currently has the processing capacity Peel requires to manage its existing and future needs (90,000 tonnes per year). Use of multiple contracts would be required and would be limited to low tonnages and short terms. In short-term processing contracts, there are no obligations on the processor to accept material, no performance guarantees or compensation for failure to perform, and the contractor retains all environmental attributes. For private capacity to be reliable there is a need for a capable facility to process large tonnages in the long-term.

A Peel-owned facility was preferred as it gives Peel the ability to:

- Set performance and reliability requirements
- Control and minimize risks of service interruption and future pricing
- Invest more to address issues of community concern such as housekeeping and odour
- Claim greenhouse gas emission reductions and other environmental benefits

Regardless of the option chosen, the long-term management of Peel's green bin organics requires significant cost and new capacity.

5. Other Municipalities

Other large municipalities with similar tonnage to Peel, such as the City of Toronto, Durham Region and York Region, have also investigated AD for organics processing capacity. After conducting thorough review and analysis, these municipalities proceeded with AD to meet their organics processing needs.

- **The City of Toronto** owns and operates two AD facilities processing residential source separated organic waste and is planning on building a third AD facility.
- **Durham Region** is planning to build AD capacity to process its green bin material. The new AD capacity will be co-located with new Mixed Waste Processing (MWP) capacity to process its garbage streams. The green bin organics and MWP organics will be processed separately.
- **York Region** recently issued a Request for Proposals for private AD capacity to ensure source separated organic waste services continue to be provided to residents. York Region compared public versus private ownership options on the basis of overall lifecycle cost, capital cost (expressed as the debt requirement), GHG emissions, traffic, odour and location. The top-ranked public and private ownership options had similar

Peel Renewable Natural Gas Centre (Anaerobic Digestion Facility) – Decision Making History

scores with the exception of the capital cost (i.e. debt) criterion which strongly favoured the private ownership option and contributed to the choice of private ownership. It should be noted that having a criterion for overall lifecycle cost and a second criterion for capital cost (i.e. debt requirement) is important for municipalities with constrained debt capacity. At this point in time, Peel has not reached its debt limit and still has capacity to utilize debt financing as an option.

6. The Role of Mixed Waste Processing in the Region's Waste Management Long-Term Strategic Plan

In 2016, staff began investigating the feasibility of using Mixed Waste Processing (MWP) to achieve additional diversion by recovering recyclables and organics from Peel's garbage stream to meet Peel's 75 percent 3Rs diversion target. Staff also investigated the potential for MWP to produce fuel products from the materials not diverted which would increase total diversion from landfill (Resolution 2016-987).

In June 2017, staff presented findings from MWP facility site visits in Europe and North America. While MWP is an approach that could be used to recover organics and recyclables from garbage, it was clear that source separation is needed to achieve better quality and marketable products. Organics recovered through MWP would need to be processed by composting or AD to remove most of the contamination such as plastic and glass (Resolution 2017-629).

In November 2017, the results of the Region's MWP Feasibility Study were reported as part of the Long-Term Waste Management Plan, "Roadmap to a Circular Economy in the Region of Peel". The Report stated that MWP had the potential to increase Peel's diversion rate by 20 percent but recommended that key risks should be resolved before proceeding to procure processing capacity (Resolution 2017-792). Key risks of MWP included:

- May not be able to successfully divert organics if the quality does not meet applicable provincial standards or market requirements.
- May not be able to produce a marketable fuel product.
- May not be able to achieve or sustain the expected diversion if, in the future, the garbage contains less recoverable material than is currently projected.

In June 2020, staff was directed to report 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 (Resolution 2020-474). In October 2020, staff provided an update on a potential MWP pilot project outlining interest amongst other municipalities, siting considerations, desired outcomes, key terms, and next steps (Resolution 2020-845). Staff will provide a report on the results of its investigations to Waste Management Strategic Advisory Committee and Regional Council at a future date.

Both AD and MWP provide organic diversion and both are needed to reliably meet Peel's diversion and climate change objectives. A solution for Green Bin organics is needed now so a recommendation on AD will be brought to the July 8 Regional Council meeting.

There was a total of 11 reports to Council pertaining to MWP.

7. Mixed Waste Processing in the European Union

The European Union's (EU) approach to waste management is based on the waste hierarchy which prioritizes prevention followed by reuse, recycling, other recovery, and disposal as the least desirable option. In the EU, diversion is achieved through source separation and reducing the impacts of landfilling waste is achieved by Mixed Waste Processing (MWP) and incineration.

The MWP market in the EU began to develop shortly after the introduction of the Landfill Directive in 1999 prohibiting the disposal of unprocessed waste and requiring member states to reduce the amount of biodegradable waste sent to landfill.² It was not meant to increase 3Rs diversion. At the time, all activities to avoid landfill disposal were supported including energy from waste.

The rise in the use of MWP was supported by the following:

Landfill Tax

Landfill taxes were introduced by member states in response to the Landfill Directive to recover the full cost of waste management and support investment in waste processing infrastructure.

Almost all EU member states currently have landfill taxes that range from 5€ to 107€ per tonne (approximately \$7 to \$157). While the United Kingdom is no longer part of the EU, the landfill tax was a significant driver in the United Kingdom and is currently at £96.70 per tonne (approximately \$166). See Appendix I for a listing of landfill taxes across the EU.

Access to Energy Markets

There was also an established market for energy products such as electricity, solid recovered fuel or refuse derived fuel, and renewable natural gas. Combined with government regulation and policy, this was a significant driver of investment into the MWP sector.

Different Product Quality and Permitted Uses

EU regulations do not permit the use of compost derived from the separation of the organic fraction from mixed municipal household waste to be used in organic and waste-based fertilizers in the EU market.

However, individual EU member states can set their own rules for application of organic products derived from mixed waste within their own borders. For example, France and Italy allow the use of MWP derived organic products for limited agricultural applications. However, Germany, Netherlands and Belgium do not permit MWP derived organic products for agricultural use and restrict its use to specific low-grade applications. Similarly, the UK also does not permit the use of MWP derived organic products for agriculture use.

² Council of the European Union. (1999). Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste. <http://data.europa.eu/eli/dir/1999/31/oj>

Peel Renewable Natural Gas Centre (Anaerobic Digestion Facility) – Decision Making History

Recent Regulatory Changes

Despite the growth of the MWP market, source separation is still the predominant way of managing organics across the EU. Source separation is supported by the following recent changes to EU government regulations:

- In 2018, the EU amended the Waste Framework Directive (2008) to require separate collection of biowaste or recycling at source by the end of 2023. As of January 1, 2027, only separately collected and processed organics will be counted as diversion.³
- In 2019, the EU amended the Fertilizer Regulation (2003) stating that an EU fertilizer product cannot contain compost or digestate derived from ‘the organic fraction of mixed municipal household waste separated through mechanical, physiochemical, biological and/or manual treatment’.⁴ Therefore, it does not permit MWP compost to be marketed as fertilizer.

It’s therefore important to note that the European experience does not translate directly to Ontario or Canada because the regulatory framework and financial conditions in the EU incentivize MWP to a greater extent than does Canada’s regulatory framework.

FINANCIAL IMPLICATIONS

There are no immediate financial implications resulting from this report.

CONCLUSION

The decisions made by Regional Council continue to be appropriate today as conditions that previous decisions were based on have not changed. Peel’s organics infrastructure is at capacity and needs to be expanded or replaced to meet the needs of Peel’s growing population and regulatory requirements.

Anaerobic Digestion is a proven and widely used technology that is compatible with a diverse organic waste stream and will allow the Region to expand its organics diversion program and processing capability while reducing waste for disposal.

Further, owning such strategic assets significantly reduces the risk of service interruptions.

³ Council of the European Union. (2018). Directive (EU) 2018/851 of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC on waste. <http://data.europa.eu/eli/dir/2018/851/oj>

⁴ Council of the European Union. (2019). Regulation (EU) 2019/1009 of the European Parliament and of the Council of 5 June 2019 laying down rules on the making available on the market of EU fertilising products and amending Regulations (EC) No 1069/2009 and (EC) No 1107/2009 and repealing Regulation (EC) No 2003/2003. <http://data.europa.eu/eli/reg/2019/1009/oj>

Peel Renewable Natural Gas Centre (Anaerobic Digestion Facility) – Decision Making History

APPENDICES

Appendix I - List of Landfill Taxes across the European Union

For further information regarding this report, please contact Norman Lee, Director Waste Management, Ext. 4703, norman.lee@peelregion.ca.

Reviewed and/or approved in workflow by:

Department Commissioner, Division Director, Financial Support Unit and Legal Services.