

Appendix “A”



Date: 2022-03-18

From: Steven Dollmaier, Director of Operations

Subject: Biogas Feasibility Study

Report: OPS2022-09

Recommendation

That, the study report titled Source Separated Organics Availability, Digestion Technologies, and Beneficial Use of Biogas Study, attached to this report as Appendix “A”, be received; and

That the information contained within the appended study report be referenced for the review of requirements to support Option 1B of the report; and

That the information contained within the appended study form the basis of future planning purposes for the Biodigester; and

That the BioGRID Joint Board of Management direct staff to enter negotiations with Ontario Clean Water Agency (OCWA) to operate the Derby BioGRID facility for a five-year term, with an option to renew for an additional five-year term at the discretion of the Joint Board.

Background

The Province of Ontario is shifting toward a circular economy as described in its [Strategy for a Waste- Free Ontario: Building the Circular Economy \(2017\)](#), which aims to divert 100% of organic material from landfills. In the traditional waste management system, materials move through a linear “make-use-dispose” process where they are manufactured from raw resources, consumed, and ultimately sent to landfill. This model of consumption has resulted in an increase in absolute greenhouse gas emissions, as the amount of waste disposed in landfills has increased.

Within the next 2-3 years, it is anticipated the Province of Ontario will initiate a full ban on landfilling of organics.

A circular economy aims to eliminate waste, not just from recycling processes, but throughout the lifecycles of products and packaging. The intent is to maximize value and eliminate waste by improving the design of materials, products, and business/operating models.

This shift means municipalities need to look at infrastructure and operating programs that divert organic material from landfill.

A BioGRID Joint Board of Management governs the Derby BioGRID facility, for the processing of organic waste. The facility has potential to support the diversion of Food and Organic Waste (FOW) from landfill if the operating model was changed. The BioGRID facility has been a source of concern for several years, as costs have outpaced revenues. The facility needs some upgrades/modifications and is currently operating below maximum potential. If changes, as outlined in this report are implemented, the facility will provide an economically feasible waste solution for municipalities and businesses in the area. The Joint Board has been exploring options for this facility. This report outlines previous reports & studies, options for future operational models and recommendations for next steps in the process to determine the future of the BioGRID assets.

The fact that the Townships of Georgian Bluffs and Chatsworth already own/operate BioGRID assets, positions us well to meet our regulatory requirements and realize benefits from other municipalities/businesses who will be seeking and paying for the services of an Organic Processing facility, rather than building their own.

The Derby BioGRID facility is located 062111 Sideroad 3, Georgian Bluffs and is jointly owned by the Townships of Georgian Bluffs and Chatsworth. The BioGRID property is comprised of different assets:

- Wastewater lagoons constructed in 1975.
- the BioGRID facility constructed in 2011.

The BioGRID Facility also provides a distinct opportunity for the Townships to implement a future household separated organics and yard waste disposal program, as these materials would become feedstock.

While preparing the 2022 Annual Operating and Capital Budget for the Township of Georgian Bluffs, a budget survey was conducted, in which 42% of participants indicated that they would like to see the Township offer additional services related to green bin

collection and yard/compost waste disposal. Of the participants who indicated they would like this as a Township provided service, they provided the following comments:

- Start a green bin program to divert food waste
- Although some residents may already compost on their own land not every property has the space to do so
- There is too much weight going into landfills that should be collected as compost
- Some residents are dumping yard waste on vacant land or burning the waste which affects the air quality

Supporting Reports related to the BioGRID Asset:

1) Feed-In-Tariff (FIT) Contract

In October of 2012, the Cook Solar Project was constructed, and the Township entered a Feed-In Tariff (FIT) contract for electric power generation. To maximize the FIT contract, the facility is required to generate 1,074 m³ biogas per day, which is the key target in all stages of scenarios listed in the appended feasibility study (Appendix A). In the current operational model, the facility is estimated to produce 490m³ biogas per day, which is well below the requirement to maximize the FIT contract. The generated power contains an average of 58% methane content. This methane biogas is used as a fuel source the site boiler and to generate electricity of between 19,815 to 38,816 kWh per month from combined heat and power unit. This generation contributes to an annual FIT revenue of \$39,423 to \$79,217.

To maximize the power generation and associated revenue a new combined heat and power unit is required

- 2) [BioGRID System Decommissioning and Recommissioning Plan](#): Because the costs to operate and maintain the BioGRID has outpaced the revenues, the Townships commissioned GHD, to conduct an BioGRID System Decommissioning and Recommissioning Plan (found in Appendix C of the appended study). As this study was underway, potential partners/suppliers of feedstock emerged and there was an indication that the assets may provide economically feasible and required waste diversion solutions. The Township of Georgian Bluffs commissioned a feasibility study, to outline potential options for future scenarios for the assets.
- 3) [Source Separated Organics \(SSO\), Digester Technology and Biogas utilization Feasibility Study \(Appendix A\)](#): OCWA was commissioned to review the BioGRID

assets and outline options for the future of the assets for consideration by the Joint Board. The report Source Separated Organics (SSO), Digester Technology and Biogas utilization Feasibility Study is attached as Appendix A and the potential scenarios are outlined in the analysis section of the report. The appended study was funded by the Federation of Canadian Municipalities Green Municipal program.

Analysis

[The Source Separated Organics \(SSO\), Digester Technology and Biogas utilization Feasibility Study](#) considered the report [BioGRID System Decommissioning and Recommissioning Plan](#) (found in Appendix C of the appended study), results from stakeholder outreach and engagement, relevant organics and biogas market information, operations and anaerobic digester co-digestion project knowledge.

Revenue:

- 1) Hours of operation: Hours should be expanded to ensure the expectations of the FIT contract are realized and the assets are operating at maximum potential. Previous operating hours have been restricted by the hours a qualified internal resource could be on site/monitor the facility. With a contracted operator, the assets full functional potential can be maximized.
- 2) Feed Stock: In order to expand operating hours, additional feed stock is required to “fuel” the Biodigester. During the review to consider temporary de-commissioning of the asset, several municipalities/businesses approached the Townships expressing interest in participating and taking advantage of the waste diversion opportunity. Further information on potential feedstock providers is outlined below.
- 3) Infrastructure investment: In order to expand hours of operation and process additional feedstock, the undersized heat/power unit needs to be replaced.
- 4) Site Improvements: There have been three bottlenecks identified for organic waste feedstock reception:
 - a. Site access roads: The access roads limit the size of waste supply vehicles that can deliver to the facility, which excludes potential high volume waste suppliers or increases costs for multiple trips with smaller vehicles.

- b. Storage Area and Loading/Unloading Equipment. With space re-configured on site and ease of loading/unload, the BioGRID operation can provide more planning certainty for feedstock suppliers and more efficient processes on-site.
- c. Biogas flare: The installation of this new equipment will allow for better management of feedstock and associated biogas production (i.e., excess biogas can be burned off safely). The lack of this equipment limits the volume of feedstock that can be accepted and processed on site.

To implement the changes to optimize the facility operations, the Environmental Compliance Approval (ECA) will need to be updated.

The feasibility study attached to this staff report lists current site and operational limitations in detail with proposed solutions to address these limitations to increase operational flexibility of BioGRID facility.

Potential Feedstock Providers

The consultant held many outreach meetings through 2019-2021 to canvas potential organic waste sources and providers. Over thirty potential stakeholders were contacted formally, including neighboring municipalities, Industrial Commercial & Institutional (IC&I) producing organic wastes, waste haulers, technology providers, gas utility and potential product (energy and digestate) consumers. The stakeholder list was developed in consultation with staff. Stakeholder engagement was conducted with the aim of sharing information on the project objectives and encouraging each to consider the potential role they can play to support this project. Follow up meetings were arranged with many of the stakeholders based on their response.

[The Source Separated Organics \(SSO\), Digester Technology and Biogas utilization Feasibility Study Scenarios](#)

The project scenarios developed for this study are outlined below and detailed in Appendix A.

Terminology:

ICI: Industrial Commercial & Institutional

SSO: Source Separated Organics

FIT: Feed-in-Tariff

AD: Anaerobic Digester

MSW: Mixed Solid Waste

The project scenarios developed range from do nothing (0.1) to an ambitious full potential scenario (3B).

Below is the list of the project scenarios:

- Scenario 0.1: Baseline Status quo- do nothing
- Scenario 0.2: Mothballing the facility- under separate study
- Scenario 1 A and 1 B: Increase ICI and SSO to maximize FIT contract
- Scenario 2 A and 2B: Increase ICI and SSO to maximize AD capacity
- Scenario 3 A and 3B: Significantly increased ICI and SSO with additional AD

The scenarios are grouped based on type of organics being proposed.

Scenario A primarily considers receipt of organic waste in a pulp form, with approximately 20-23% total solids concentration.

Scenario B primarily considers receipt of organic waste in a slurry form, with approximately 7% total solids concentration.

It is envisioned that in all scenarios the facility will continue to receive hauled sewage and septage.

Scenario 0.1:

Status Quo: provides baseline condition for comparison with other project scenarios. This scenario continues operation, while under utilizing the BioGRID asset. Costs would continue to outpace revenues.

Scenario 0.2:

Temporarily Decommission the biodigester, while keeping the lagoons operational. This scenario was reviewed in a separate study by GHD and was presented to the BioGRID board on June 28th, 2021. The information can be found in Appendix C of the appended study in Appendix A. De-commissioning and re-commissioning of the BioGRID, are not a quick processes. When the province implements a full ban on organic disposal to landfill, or even tighten restrictions significantly, the Townships will scramble to meet the new legislated requirements. It is anticipated the Province of Ontario will initiate a full ban on landfilling of organics within the next 2-3 years.

Scenario 1A:

Enhances the status quo scenario by managing the acceptance and storage of additional pre-processed materials. This additional feedstock would be added to the current septage/sewage and organic waste feedstock accepted. The biogas produced will continue to be used as a renewable fuel with the new combined power and heat unit to maximize the FIT contract.

Scenario 2A

Enhances Scenario 1A by maximizing use of existing BioGRID capacity through management of an additional pre-processed ICI waste (incremental increase of Scenario 1A) from an industrial composting facility at the site and processing it in the BioGRID with the current septage/sewage and organic waste feedstock accepted. The biogas produced, more than the combined power and heat unit and the FIT Contract, is conveyed for potential industrial use.

Scenario 3A:

Enhances Scenario 2A by building a new pre-processing facility and new digester system to manage additional raw SSO waste from MSW with the current organic waste feedstock accepted at the site. The biogas more than the combined power and heat unit and the FIT Contract, is conveyed for potential industrial use. In this scenario additional pre-processing infrastructure will be required.

Scenario 1B

Enhances the status quo scenario by managing additional pre-processed SSO waste from ICI and MSW processing facilities at the site and processing it in the BioGRID with the current organic waste feedstock accepted. The biogas produced will continue to be used as a renewable fuel with the new combined power and heat unit to maximize the FIT contract. The current septage and sewage will be bypassed directly into the lagoons.

Scenario 2B:

Enhances Scenario 1B by maximizing use of existing BioGRID capacity to manage additional material of pre-processed SSO waste from MSW with the current organic waste feedstock accepted at the site. The biogas more

than the combined power and heat unit and the FIT Contract, is conveyed for potential industrial use.

Scenario 3B:

Enhances Scenario 2B by building a new digester system to additional raw SSO waste from MSW with the current organic waste feedstock accepted. The biogas more than the combine power and heat unit and the FIT Contract, is conveyed for potential industrial use. In this scenario additional pre-processing infrastructure will be required.

Each of the 1, 2, 3 scenarios are intended to build out the BioGRID potential incrementally. At each stage, the Joint BioGRID Management Board and respective Councils will consider opportunities and risks as part of endorsing investment.

Staff is recommending proceeding with Scenario 1B, as it allows for a “testing” of the future potential with a reasonable level of initial infrastructure investment.

Summary of the infrastructure needs are illustrated below. The infrastructure requirement is presented in an incremental phased approach with aim of minimal initial capital investment while allowing progressive increase in organics supply. As the Townships proceed with Scenarios 1 and 2, the facility will be positioned to achieve benefits of the rapidly evolving organics market requirements and associated financial opportunities, through strong collaboration with other municipalities and private stakeholders. Scenario 3 is the most ambitious, with much higher volume of organics and potential new Anaerobic Digester infrastructure and aimed for future consideration

Infrastructure Requirements

2022 through 2041

Scenario 1A (Enhance Scenario 0.1)

Road upgrades	BioGRID enhancements	Biogas flare	Odour control system	Feedstock receiving building
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Scenario 1B (Enhance Scenario 0.1)

Road upgrades	BioGRID enhancements	Biogas flare	Odour control system
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2023 through 2041

Scenario 2A (Enhance Scenario 1A)

<i>Scenario 1A requirements</i>	Digestate storage tank	Biogas pipeline to adjacent property	Buffer/storage tank	Pre-processing system
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Scenario 2B (Enhance Scenario 1B)

<i>Scenario 1B requirements</i>	Digestate storage tank	Biogas pipeline to adjacent property
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2031 through 2041

Scenario 3A (Enhance Scenario 2A)

<i>Scenario 1A and 2A requirements plus additional Feedstock receiving</i>	Digester system
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Scenario 3B (Enhance Scenario 3B)

<i>Scenario 1B and 2B requirements plus additional Feedstock receiving</i>	Buffer/storage tank	Pre-processing system	Digester system
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Figure 1: Infrastructure Requirements (Source: Source Separated Organics Availability, Digestion Technologies, and Beneficial Use of Biogas Study, 2021)

The figure above presents an illustration of infrastructure needs for each project scenarios. The Townships can use the information to develop long term strategic plan or invite interested stakeholder to explore project scenarios and secure various public and private funding to implement these project scenarios with matching project delivery model as defined in sections below.

Financial Impact

There are no financial implications, at this time.

Costs:

Results of negotiation with the potential service provider will be presented to the BioGRID Joint Board of Management and subsequently the Township Councils, at future meetings.

Costs to support Option 1 B of the report will be refined through detailed design and presented at future meeting(s). The infrastructure investments are intended to be incremental and will be approved at future BioGRID Joint Board and Council meetings. The order of magnitude projected costs (+/- 50%) to implement the changes outlined in Option 1B is \$700,000 (2021 dollars).

Costs to amend the Environmental Compliance Approval (ECA) will be refined and presented at a future meeting. Overall ECA costs will be determined by the requirements and based on the operational and infrastructure changes.

Potential offsetting revenues:

Revenue opportunities with feedstock stakeholders will be pursued and details presented at future meetings

Funding opportunities for capital improvements will be pursued and details presented at future meetings.

Strategic Priorities

Demonstrate and Enhance Environmental Stewardship

The Township of Georgian Bluffs strives to become a leader in Environmental Stewardship by reducing energy consumption, reducing solid waste, increasing diversion rates of recyclable materials, and lessening the environmental impact of existing and future infrastructure through innovation and upgrading.

- 3.1 Continually strive to reduce environmental footprint by reducing energy consumption and greenhouse gas emissions to minimize climate change.
 - (a) Investigate and pursue opportunities to improve the Biodigester to ensure long term sustainability including the acceptance of source separated organics and a reduction in operating costs to attract septage waste.

Conclusion

The Province of Ontario is creating legislation to shift toward a circular economy which aims to divert 100% of organic material from landfills. This shift means municipalities need to look at infrastructure and operating programs that divert organic material from landfill.

The fact that the Townships of Georgian Bluffs and Chatsworth already own/operate BioGRID assets, positions us well to meet our regulatory requirements and realize

benefits from other municipalities/businesses who will be seeking and paying for the services of an Organic Processing facility, rather than building their own.

The facility has potential to support the diversion of Food and Organic Waste (FOW) from landfill if the operating model was changed. The facility needs some upgrades/modifications and is currently operating below maximum potential.

The Joint Board has been exploring options for the assets. The Source Separated Organics (SSO), Digester Technology and Biogas utilization Feasibility Study shows the Townships can explore further steps to optimize its BioGRID facility and reduce revenue loss with the implementation of project Scenario 1B.

There is great potential for partnerships with organics suppliers, project developers, technology-providers, gas utility and local municipalities to further develop and assess other project scenarios and refine the business model.

Next Steps:

- Apply for funding from federal, provincial funding programs for next stages of project development including conceptual/ detailed design, engineering, and construction.
- Explore partnerships with potential project financiers and developers for long term financing options and project development.
- Explore partnerships with potential organics suppliers and gas utilities.
- Engage and consult with regulatory agencies for necessary approvals.
- Enter negotiations with OCWA to operate the Derby BioGRID facility for a five-year term, with an option to renew for an additional five-year term at the discretion of the Joint BioGRID Board
- Report back to the Joint BioGRID Board and respective Councils as required

Supporting Documentation

Appendix A - [The Source Separated Organics \(SSO\), Digester Technology and Biogas utilization Feasibility Study](#)

Appendix B – [RES2019-264](#)

Respectfully Submitted: Steven Dollmaier, Director of Operations

Report Approval Details

Document Title:	OPS2022-09 Biogas Fesibility Study.docx
Attachments:	
Final Approval Date:	Mar 8, 2022

This report and all of its attachments were approved and signed as outlined below:

Steven Dollmaier, Director of Operations

Samantha Buchanan, Treasurer

Brittany Drury, Director of Corporate Services/Clerk

Cynthia Fletcher, Chief Administrative Officer