

Nutrient Management General Regulation Amendment Proposal (Anaerobic Digestion)

Summary of Proposal

The province is committed to cutting red tape and reducing regulatory burden for all businesses, to lower business operating costs and improve Ontario's competitiveness while continuing to protect the environment. Reducing burden on farmers is a critical part of ensuring rural Ontario is economically vibrant and competitive. As part of this effort, the Ministry of Agriculture, Food and Rural Affairs (OMAFRA) and the Ministry of Environment, Conservation and Parks (MECP) are proposing changes to regulations under the [Nutrient Management Act, 2002](#) to reduce burden and ensure requirements are outcome-focused and evidence-based.

In this proposal, the province is considering changes to the General Regulation (O. Reg. 267/03 – General) to create more opportunities for agricultural producers to process manure and other agricultural source materials in on-farm Regulated Mixed Anaerobic Digestion Facilities (RMADFs) and enable the production of renewable natural gas. These changes have the benefits of:

- Increased opportunities for management of food and organic waste in the circular food economy;
- Increased production of renewable natural gas in Ontario; and
- Increased economic development opportunities for the agri-food sector.

The proposed changes maintain environmental protections and provide more opportunities to process manure and other agricultural materials in anaerobic digesters on farms (RMADFs) and return nutrients and organic matter from the anaerobic digestion output (digestate) to the soil.

These proposals have been developed in part based on feedback and requests from farmers, the biogas sector, and from companies that generate or collect food and organic material that could be suitable feedstocks for anaerobic digesters. They also align with environmental goals in the Made-in-Ontario Environmental Plan.

Specifically, the proposed changes would:

1. Clarify design and construction requirements to support renewable natural gas production while maintaining or enhancing environmental protections for neighbours and local communities.
2. Provide greater flexibility in the amount and type of on- and off-farm anaerobic digestion materials (feedstocks) permitted for use in RMADFs to make the generation of renewable natural gas more effective, efficient, and economical for farmers.
3. Simplify operational requirements regarding the sampling and analysis of received materials to reduce costs and enhance operational flexibility for farmers.

Background

Anaerobic Digestion and Renewable Natural Gas

Anaerobic digestion is a biological process in which microorganisms break down organic material in the absence of oxygen. The anaerobic digestion process produces digestate, which is a nutrient-rich material that can be applied to agricultural land to promote crop growth. The process also produces biogas (predominantly methane gas), which can be used to produce electricity and heat, burned as a fuel in a boiler or furnace or it can be upgraded and processed into renewable natural gas and transportation fuel. This process for producing renewable natural gas is outlined in Figure 1.

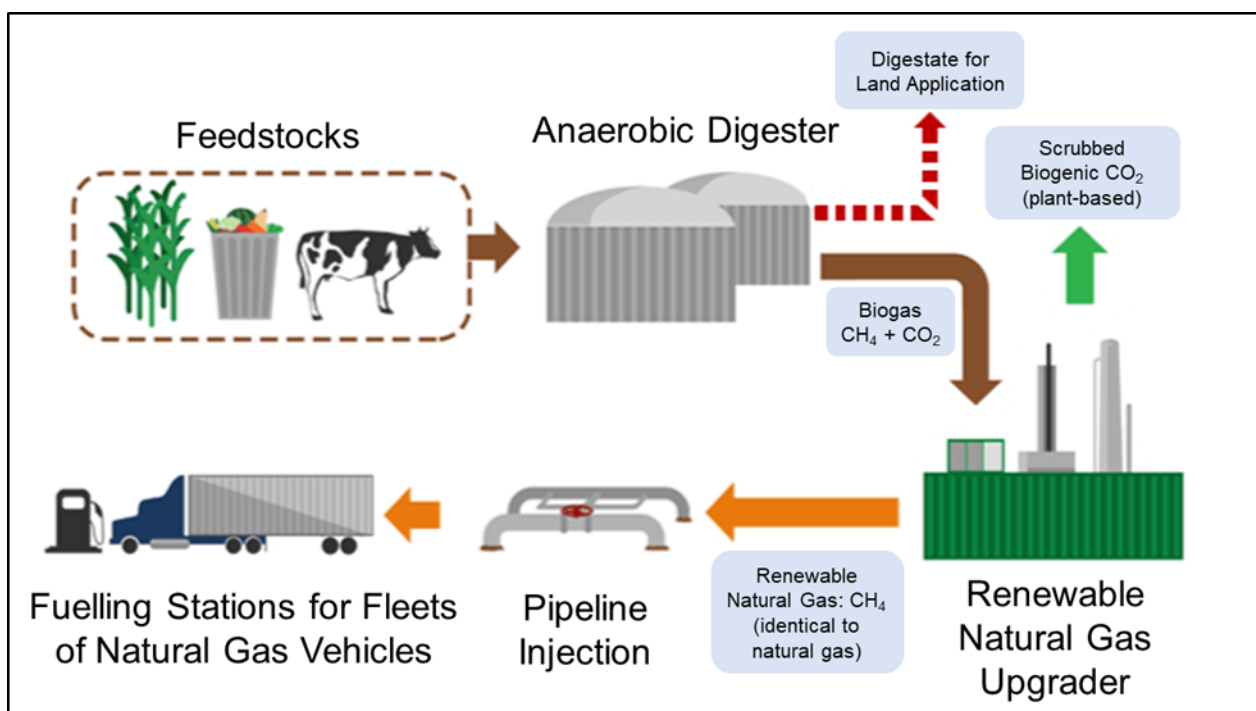


Figure 1. Schematic of renewable natural gas production at an anaerobic digester.

The Ministry of Environment, Conservation and Parks identified opportunities for renewable natural gas in the “Made-in-Ontario Environment Plan”. The plan also presents ways to cut regulatory red tape and modernize environmental approvals to support sustainable end-markets for organic material and food waste while returning nutrients to agricultural land. Promoting end-products like renewable natural gas and electricity can help replace carbon-intensive fossil fuels.

Ontario has the largest biogas industry in Canada. There are 38 on-farm and 8 commercial anaerobic digesters which rely on agricultural and food-based feedstocks, sometimes referred to as agri-food digesters. Most of these agri-food digester systems produce electricity. There is

one farm-based renewable natural gas system in British Columbia, and several in the United States. Comparatively, there are over 500 renewable natural gas anaerobic digestion systems in Europe, demonstrating that there is substantial potential for growth in the renewable natural gas biogas sector. Several new or expanding digester facilities in Ontario are planning to produce renewable natural gas to capitalize on new market opportunities. Revenue from renewable natural gas makes anaerobic digester systems an attractive method to turn both agricultural and off-farm¹ organic feedstocks² into digestate that fertilise our soils.

Renewable natural gas production through anaerobic digestion presents excellent opportunities for reducing greenhouse gas emissions while encouraging economic growth in the province. Pipeline natural gas is the main energy source used by Ontarians to heat our homes and water. However, natural gas consumption contributes to greenhouse gas emissions because natural gas is a fossil fuel. In contrast, renewable natural gas is a carbon-neutral energy source. By replacing some of the fossil fuel based natural gas we use with renewable natural gas, Ontario can reduce greenhouse gas emissions to address climate change and protect the environment. Even if Ontario were to replace 1% of our natural gas consumption, a very significant renewable natural gas capacity will be necessary. Anaerobic digestion facilities are one of the methods of creating renewable natural gas.

Renewable natural gas production requires costly innovative equipment to upgrade the biogas. The gas is compressed and must meet standards before it is injected into the natural gas grid. Therefore, biogas facilities that use this equipment need to be built to a larger scale than typical biogas systems that are generating electricity to make projects economically viable.

Most agri-food anaerobic digesters are located on farms. Feedstocks for digesters located on farms include manure and other agricultural products and byproducts like fruit and vegetable wastes. Most digesters also accept off-farm feedstocks such as residues from the food processing industry. The food processing feedstocks are more energy rich and boost biogas production. Digestate is generally spread on agricultural fields to fertilize crops in the same way that manure is spread as a nutrient source. However, digestate has the added benefit of pathogen and odour reduction when processed in the digester.

Anaerobic digestion can also reduce the amount of food and organic waste that goes to landfill. Presently, approximately 60% of Ontario's food and organic waste is sent to landfills, where the

¹ "Off-farm anaerobic digestion materials" are defined in the Regulation as anaerobic digestion materials that are not generated at an agricultural operation and that are received at an agricultural operation from an outside source. They are listed in Schedules 1 (e.g. organic waste matter derived from food processing at bakeries) and Schedule 2 (e.g. paunch manure) and include agri-food processing wastes and byproducts.

² Food and agricultural wastes and byproducts are often referred to as "feedstocks" because anaerobic digesters require input materials to produce renewable natural gas which is a product.

material breaks down and creates methane, a potent greenhouse gas that contributes to climate change. While some landfills have gas collection systems to capture methane, harvesting biogas in an anaerobic digester is a more efficient way of collecting methane and using it as an energy source. Diverting organic waste from landfills also extends the life of landfills, leaving space for wastes that cannot be reduced, reused or recycled.

Ontario has over 10 years of experience of successful biogas production on farms. With advances in renewable natural gas production, the biogas sector is seeking opportunities to utilise organic wastes to produce renewable fuel and reduce greenhouse gas emissions. Ontario's experience working with on-farm biodigesters ensures potential risks are understood and mitigated.

Current Regulatory Environment

The Nutrient Management Act, 2002 (NMA) and its General Regulation (O. Reg. 267/03 – General) regulate some on-farm anaerobic digestion facilities that mix on-farm anaerobic digestion materials (e.g., manure, corn silage) and off-farm anaerobic digestion materials (e.g. food processing products and byproducts). Other anaerobic digestion facilities are regulated by an Environmental Compliance Approval (ECA) or a Renewable Energy Approval issued under the Environmental Protection Act (EPA). This proposal focusses on the on-farm systems regulated under O. Reg. 267/03.

OMAFRA and MECP jointly administer the NMA and its associated regulations. OMAFRA is responsible for approvals, training and certification. MECP is responsible for enforcement to ensure compliance. This structure supports the implementation of an integrated framework governing nutrient management and other related farm practices in Ontario.

The purpose of the NMA is to provide for the management of materials containing nutrients in ways that will enhance protection of the natural environment and provide a sustainable future for agricultural operations and rural development. O. Reg. 267/03 under the NMA came into force in 2003. and has evolved to regulate the management of a variety of prescribed materials (e.g. on-farm and off-farm materials) including their storage, use within an anaerobic digestion facility on an agricultural operation and land application.

Digesters regulated under the Regulation are called Regulated Mixed Anaerobic Digestion Facilities (RMADF). The Regulation has design and processing requirements that facilities must meet to operate as an RMADF.

For example, at least 50% by volume of all materials in the digester must be on-farm³ materials. Of the 50% on-farm materials, at least 50% must be manure. Therefore, manure currently makes up at least 25% of all material processed in an RMADF.

The Regulation has three schedules of off-farm materials: Schedule 2 materials have additional requirements for heat treatment that do not apply to Schedule 1 materials; and, Schedule 3 materials are not allowed to be received for use in a RMADF.

A Nutrient Management Strategy that outlines how nutrients are generated, stored, and managed is required for agricultural operations with a RMADF. The Nutrient Management Strategy is required to be prepared by a certified individual and must be approved by the relevant OMAFRA Director.

Existing regulatory requirements under the Regulation were designed when the biogas industry was new in Ontario, and the rules have been updated over time. These requirements were designed for anaerobic digestion systems within the context of generating electricity and do not easily accommodate systems developing the capacity to produce renewable natural gas. As the renewable natural gas marketplace develops, the province is proposing several regulatory changes to address the increasing demand for renewable natural gas.

Normal agricultural operations have the potential to generate odour, noise and traffic. Provisions have been included in the Regulation to minimize the potential for these types of impacts. In this proposal further protections are proposed to strengthen environmental protection while enabling RMADFs to develop renewable natural gas production.

³ The Regulation defines “on-farm anaerobic digestion materials” as anaerobic digestion materials that are generated at an agricultural operation. The agricultural operation may or may not be the farm where the RMADF is located.

Proposed Regulatory Amendments

1. Design and Construction Requirements

Changes are proposed so that O. Reg 267/03 can accommodate anaerobic digestion systems that generate renewable natural gas on farms. Changes are also proposed to clarify design requirements that strengthen environmental protections. The changes could include:

A. Clarified design requirements to enable biogas upgrading to renewable natural gas on an agricultural operation under the Nutrient Management Act;

- i. The regulation would be updated so that renewable natural gas can be exported off the farm, while maintaining the obligation to have a properly- sized secondary combustion unit such as a flare.⁴

B. Clearly define what components fall under the definition of an RMADF and therefore are required to meet certain rules within the regulation, for example setback requirements, and systems required to reduce potential for noise and odour;

- i. Requirements for odour containment and odour control systems would be updated and risk-based to protect neighbours and local communities from noise and odour, particularly where farms receive higher volumes of off-farm feedstocks than currently allowed.

C. Clarified digester tank design to bring liner and containment requirements into conformity with other permanent storage systems on the farm.

- i. Requirements for feedstock storage, pasteurization and digester tank facilities would be updated to ensure a consistent approach.

Enabling the generation of renewable natural gas would encourage the processing of manure and other organic materials and byproducts prior to land application to agricultural fields, while making RMADFs more economically effective for Ontario's farmers.

Clear rules will make it easier for farmers to have RMADFs designed, operated, and maintained while protecting local communities and the environment.

⁴ Flares combust excess biogas or combust biogas during periods when the primary gas use device is undergoing maintenance or repair.

2. Permitted Feedstocks

Farmers have told the government that they need a greater quantity and variety of feedstocks to make renewable natural gas generation effective, efficient, and economical. Additionally, as the biogas sector has developed, new organic and food byproduct materials have been identified that could safely and economically be processed through anaerobic digestion. Facilitating the digestion of these materials could create new processing and disposal solutions and allow the digested materials to be land applied as a nutrient, while ensuring the materials are processed safely and effectively at the farm agricultural operation.

Changes are proposed to provide greater flexibility in quantity and type of permitted feedstock for RMADFs (for materials from both on-farm and off-farm sources) under the Nutrient Management Act, including:

A. Changes to quantity limits of off-farm materials (materials that do not come from an agricultural operation) with plans to avoid possible noise and odour impacts:

- i. Increase maximum allowable limits (daily and annually) of off-farm materials, accompanied by new requirements for odour control and odour management plans.**
 - We have heard from stakeholders that in order to be economically viable, renewable natural gas digesters need to process a greater volume of materials than electricity digesters (a minimum of 30,000m³/year).
 - Additional quantities of certain feedstock types (dilute organic materials that require higher volumes to generate biogas, such as food processing washwaters) may be permitted to ensure financially sustainable RMADFs (total maximum of 60,000 m³/year).
 - A tiered approach is contemplated, whereby larger facilities would require additional safeguards to reduce the potential for environmental impacts (this could include appropriate site design, facility setbacks, or other approaches).

B. Remove restrictions on the quantity of on-farm materials (materials from agricultural operations):

- i. Remove the restriction on materials that can be received from other farms, provided the RMADF is located on an agricultural operation that generates manure;**

- Currently, on-farm materials can be received from other farm units⁵ if the total number of nutrient units generated on the farm units is less than 2000⁶. Removing this limit would promote and expand manure processing for farms, may help encourage the storage and spreading of manure nutrients at the right time, and would support economic development such as a renewable natural gas network in rural communities.
 - The requirement for the farm to generate its own manure, along with other requirements such as construction and siting standards, setback distances, limits to timing of truck traffic would continue to provide environmental protection.
- ii. Increase allowable proportion of non-manure based agricultural materials for digestion with manure;**
- O. Reg. 267/03 requires that at all times at least 50%, by volume, of the total amount of on-farm anaerobic digestion materials that are being treated in the RMADF must consist of manure.
 - Changing this requirement to ensure that manure continues to be treated, but does not limit the addition of other on-farm anaerobic digestion material, would allow farms to process more bioenergy crops (e.g. corn silage), fruit and vegetable waste material (e.g. grape pomace), and/or farm-based culled fruit and vegetable feedstock.
 - Reducing barriers to using on-farm feedstocks would allow the use of other agricultural materials when manure may not be easily available or when there is an opportunity to capture additional energy value from agricultural byproducts. Digested materials then can be returned to agricultural land as a nutrient and organic matter source.
 - Allowing more on-farm materials may also open opportunities for farmers to use purpose-grown crops in the RMADF, meaning the farmer isn't solely subject to the year-to-year uncertainty that may come from selling crops into the conventional market.

This approach ensures that off-farm materials will make up no more than 50% of all feedstocks while allowing farmers flexibility to accept on-farm materials in any quantity.

C. Provide greater flexibility for the types of off-farm materials that can be used in the digester.

Permitted feedstocks are currently listed in Schedules 1 and 2 in the regulation and prohibited materials are listed in Schedule 3. The lists of approved and prohibited materials have not been updated in six years. New types and sources of materials continue to emerge as potential feedstock. Expanding the scope of permitted materials could support the circular food economy through recovery of energy from agri-food materials as feedstocks for the generation of renewable natural gas, while providing

⁵ Farm unit means land consisting of, or designated as, a farm unit under section 5 of O. Reg. 267/03.

⁶ Using the Nutrient Units (NU) concept helps ensure a comparison between sizes and types of farm units. A Nutrient Unit is a measure of how much nutrient is in a material like manure. So in simple terms, a limit on nutrients units is a limit based on the quantity of manure at a farm.

destinations for food and organic waste materials as processed nutrients applied to agricultural land rather than going to landfill.

- i. Propose that manure from non-farm herbivorous animals including associated runoff and washwater could be added to Schedule 1;**
 - In July 2019, a regulatory change came into effect to include manure from non-farm herbivorous animals as a Category 1 NASM in the Nutrient Management Regulation.
 - Allowing this material into the RMADF as a Schedule 1 off-farm anaerobic digestion material provides consistency with some other materials which are found in Schedule 1, allowing them to be fed to the RMADF without the need for pre-processing.

- ii. Propose that certain de-packaged and screened source separated organics could be added to the list of Schedule 2 off-farm anaerobic digestion materials;**
 - Source separated organics acceptable for Schedule 2 (when heat processed) could include post-consumer food and organic wastes collected under a program operated by municipalities, provided that these materials do not contain other materials listed in Schedule 3 (prohibited as feedstock) or materials otherwise ineligible for creating digestate that is an agricultural source material.
 - The de-packaging and screening of the source separated organics would occur at a waste processing facility regulated under the Environmental Protection Act. One on-farm digester in Ontario already successfully accepts this type of feedstock, being regulated under an ECA which requires source separated organics to meet quality criteria.
 - Existing requirements for processing and excluded materials would continue to apply. Consistent with existing Schedule 2 requirements, source separated organics would require pre-processing prior to being used as a feedstock. Certain quality criteria would apply, for example:
 - The material shall not contain any items found in Schedule 3.
 - The materials shall not include feedstock materials that would prevent the digestate from being considered an agricultural source material after processing in the RMADF.
 - The material would be screened to a pre-determined screen size prior to arrival at the farm.
 - The material must meet standards for metals, pathogens, plastics, and foreign matter to ensure farmers receive high-quality feedstock.

- iii. Propose new regulatory process to make it easier to approve new feedstocks in the future;**
 - Currently, any changes to off-farm anaerobic digestion materials (Schedules 1 to 3) require regulatory amendments which must be approved by Cabinet,

reducing the flexibility of the government to respond to new science or operational developments in the anaerobic digestion sector.

- Under the proposed approach, Schedules 1 to 3 would be moved into a new protocol document that could be adopted by reference. This would increase agility to ensure new materials can be added or removed from the lists in a timely manner with an appropriate level of government oversight.
- This approach is already used under the NMA in the [Nutrient Management Protocol tables](#) which allow for a more responsive approach while providing a similar level of evaluation and consultation compared to a regulatory update.

RMADFs receiving proposed new higher quantities of permitted off-farm materials or permitted source separated organic materials would have enhanced requirements for odour containment and odour control systems. These facilities would also be required to have an Odour Management Plan.⁷ These measures would help support broad development of the sector while reducing the risk of noise and odour issues for the local community and neighbours.

⁷ An odour management plan outlines sources of potential odour emissions at a facility, the location of sensitive receptors like neighbours, the implemented odour reduction systems and approaches for a facility, and plans or solutions for dealing with unexpected, new, or problematic odour impacts that might arise. An odour management plan is both a proactive plan developed during project start-up, and a living document that should be referred to and updated regularly.

3. Operational Requirements

Simplifying operational requirements regarding the sampling and analysis of received anaerobic digestion materials would help reduce costs and enhance operational flexibility for farmers while maintaining risk-based performance requirements and environmental standards. Changes could include:

A. Reduce requirements for accepting a load of off-farm anaerobic digestion materials that is to be diverted to another RMADF if it is already known to be acceptable under the NMA.

- i. Propose that if a material is currently being sent to a RMADF, and if a valid lab analysis is currently in place for the first RMADF, that a single new load of material could be sent to a second RMADF prior to completion of a fresh lab analysis.**
 - Currently, before a person receives a first load of off-farm anaerobic digestion materials from a generator, the material must be analyzed for heavy metals and the person must obtain the results of that analysis.
 - There have been instances where for operational reasons the original RMADF was not able to receive the material even if it met the metal testing requirements in O. Reg. 267/03. If that same material is to be sent to a new RMADF destination, currently the materials need to be retested before the second RMADF can receive them.

This proposal would reduce costs and create logistical flexibility for generators of off-farm materials such as food processing companies, allowing them to shift materials to another digester if needed.

Conclusion

Anaerobic digestion is an important part of Ontario's approach to managing on-farm organic materials and off-farm food and organic byproducts, so they do not end up in a landfill. This approach supports a circular food economy by returning nutrients and organic matter to our soils while recovering energy value and returning it to the rural economy. These proposed changes would also establish a regulatory environment for farms to help fulfill Ontario's waste diversion goals and increasing the production capacity of renewable natural gas.

The province is seeking your feedback on the proposed amendments as outlined in this paper. Your feedback will be considered during the development of possible amendments that support the development of anaerobic digester systems under O. Reg. 267/03 of the Nutrient Management Act, 2002.

Questions for Consultation

- i. *Are there environmental risks associated with operation of anaerobic digesters on farms that have not been considered in this proposal?*
- ii. *Are there other requirements that could be simplified or streamlined to reduce burden and improve efficiency?*

The province is committed to ongoing review of the NMA and associated regulations. If there are additional opportunities for reducing burden in current requirements while continuing to protect the public interest, that are not addressed in this paper, please let us know so that they may be considered as part of future regulatory proposals.

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