



LEADERS IN MAXIMIZING THE VALUE OF ORGANIC WASTE



**National Nutrient Reuse and Recovery Forum
IISD with ECCC and MOECC
March 8th, 2018**

CONFIDENTIAL

Agenda

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- Ontario's Organic Waste Processing Facilities
- Circular Economy/Nutrient Recycling
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- Role of Anaerobic Digestion in Healthy Soils and Nutrient Reuse/Recovery
- Question/Answer



StormFisher owns/operates a 2.8MW biogas plant in London, Ontario offering organic waste disposal services

OVERVIEW

StormFisher offers a reliable, environmentally sustainable solution for organic waste from Ontario's food processors, food retailers, and waste haulers. StormFisher processes up to 100,000 tonnes of local organic waste streams per year and turns it into renewable energy and organic fertilizer.

Acceptable wastes:

- Food processor – vegetables, meat, grains, dairy
- Restaurant (grease trap, food scraps)
- Institutional waste (cafeterias, campuses, etc.)
- Food distribution center waste
- Grocery store waste
- Packaged food
- Liquid organic waste (DAF, sludges)
- Beverage waste



Located 3mins off the 401 in London, Ontario and are open 24hrs/day, 6 days/week with no seasonal variability

On-Farm Anaerobic Digestion Facilities – Manure and Co-Digestion



Off-Farm Anaerobic Digestion Facilities – Food Waste



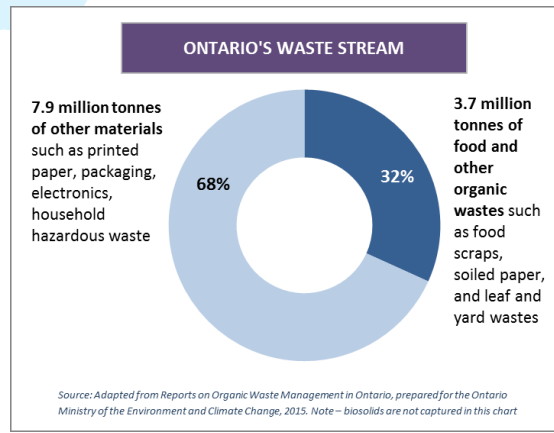
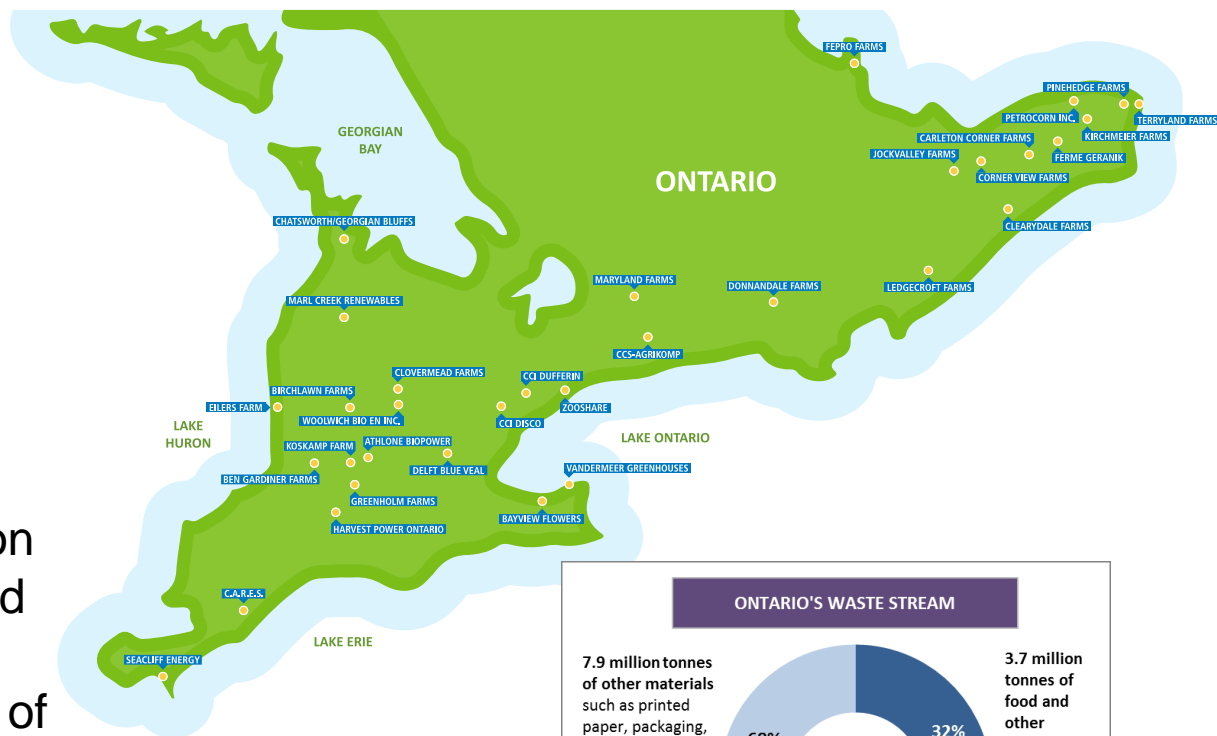
Ontario's Organic Waste Processing Facilities

Over 30 anaerobic digestion facilities are operating in Ontario with more planned

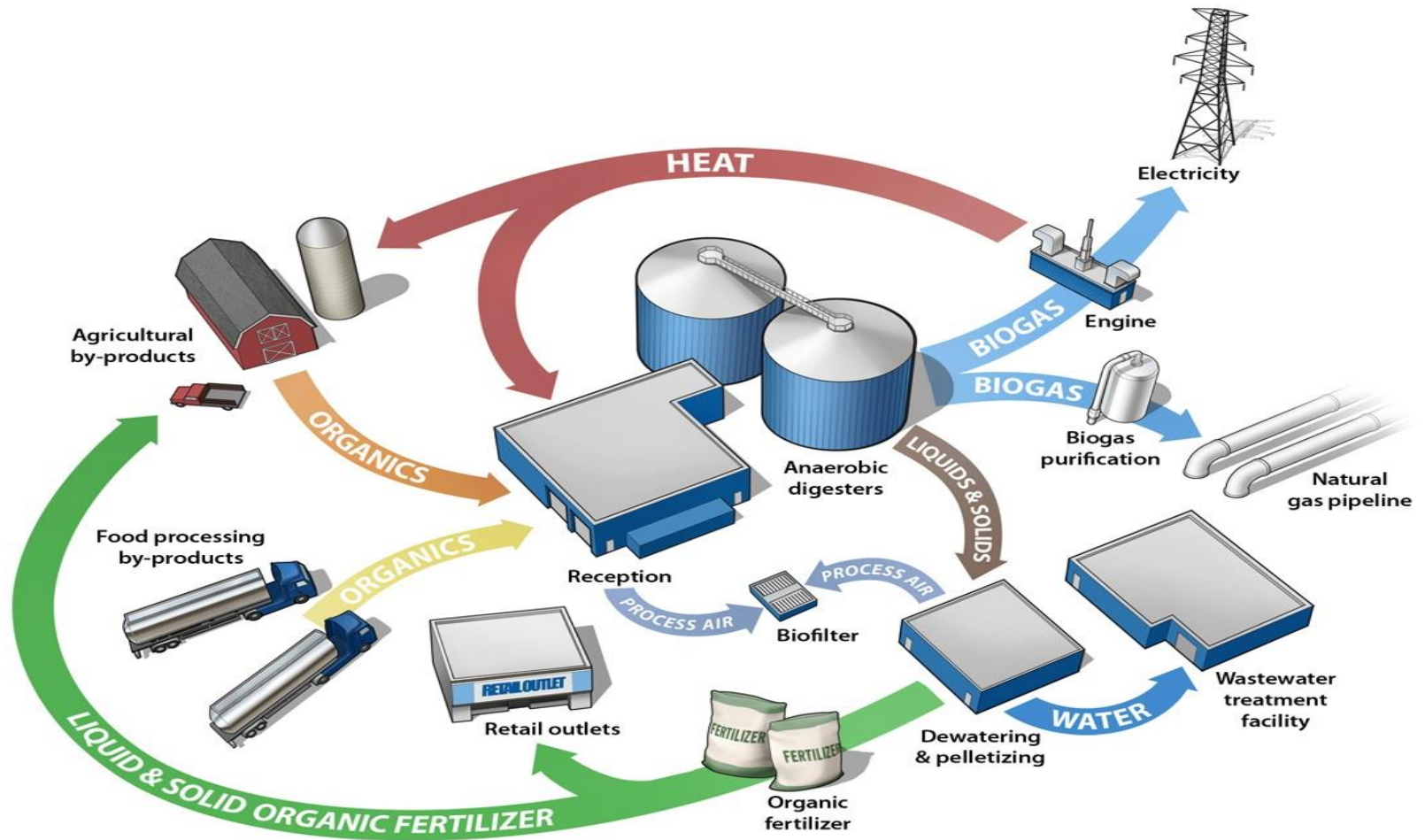
These facilities include farms that co-digest food waste and food processing residuals

Original driver was Ontario's Feed-in Tariff program and RNG production/cost of carbon will be the driver going forward

This is in addition to a variety of composting operations throughout the Province



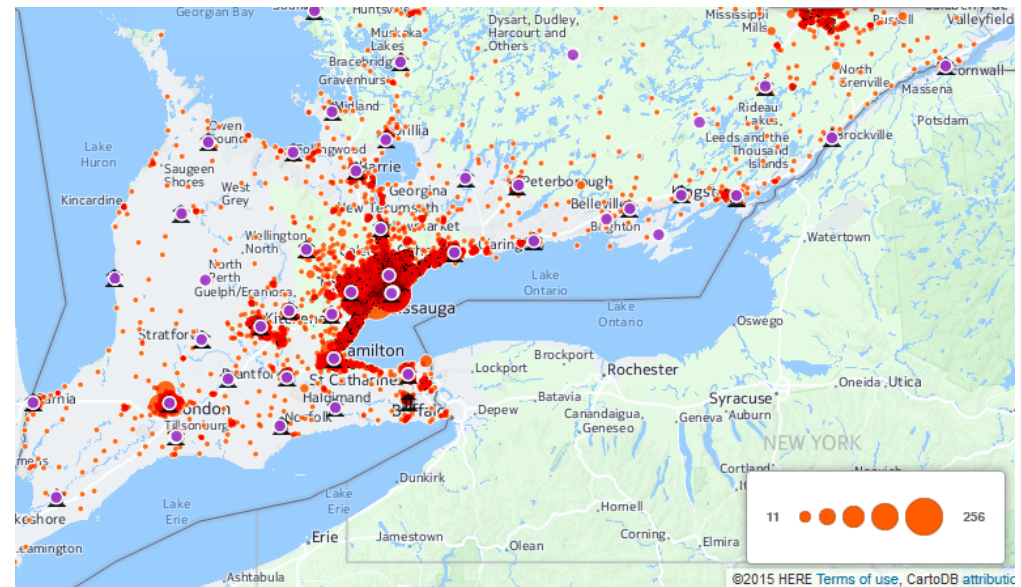
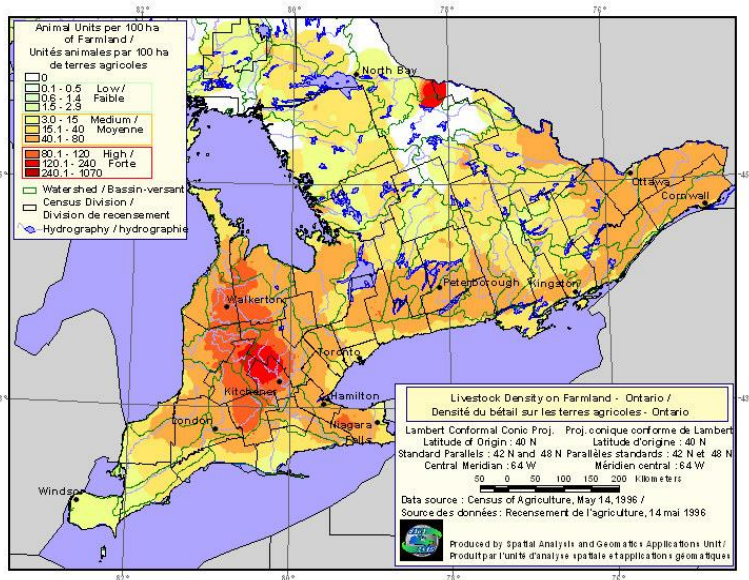
Circular Economy/Nutrient Recycling



Digestate Management Technical Facts

- AD facilities produce a large amount of high-strength liquid that requires wastewater treatment before discharge or must be stored and land applied
- This material poses nutrient loading concerns to wastewater plants who may be limited on the amount of nutrients (typically nitrogen and phosphorous) they are allowed to discharge. They may require large fees to treat liquids
- In the case of land application, need to address the costs for transport, storage as well as focus on the nutrients and salts that are going to need to be addressed
- We can deploy technologies to remove phosphorous and nitrogen from our wastewater to lessen our impact on wastewater plants or land application however it requires additional costs
- Post-digestion material can be processed in various ways to create marketable end product (typically solid/liquid separation). There are two basic options:
 - Compost
 - Fertilizer
- Fertilizer can be produced more easily on an urban site but requires large amount of heat (exhaust heat from engines)
- Compost requires larger footprint and amendment with green waste to ensure proper C:N ratios
- Both products have a use in the agricultural and consumer markets; however contamination on the inbound material needs to be addressed and the impact of OMRI requirements for some customers causes concerns

Concentration of Livestock Farms and Human Population in Ontario



- **Livestock Farms**

- Animal Units means nutrients (N/P) which are focused in certain areas in Ontario and could be redistributed to areas that are seeking improvements in soil carbon and nutrient sources
- Anaerobic digestion leads to energy production and an ability to make nutrients more available. Through solid/liquid separation, redistribution of P is possible

- **Food Waste**

- Generated in population centers and can be digested to produce energy
- Aggregation and processing of food waste to produce energy allows for solid/liquid separation for further composting or organic based fertilizer production and redistribution of nutrients

Role of Anaerobic Digestion in Healthy Soils and Nutrient Reuse/Recovery

- BMPs improve soil health and lower GHG emissions, reduce P loss from fields to surface water and improve resilience to drought and excessively wet conditions
- Building and maintaining levels of organic matter offers many benefits including improving soils physical properties including water retention, permeability, water infiltration, drainage, aeration, and structure
- Addition of organic amendments in lieu of or in conjunction with synthetic fertilizers is beneficial
- Organic amendment sources include:
 - Manure
 - Biosolids
 - Compost
 - Digestate (liquid, wet cake or dried solids)
 - Crop Residues
 - Forage/pastures
 - Cover Crops



Role of Anaerobic Digestion in Healthy Soils and Nutrient Reuse/Recovery

- Redistribution of nutrients is crucial however, hindrance is water as the density of this material means that trucking for redistribution is cost prohibitive. Therefore, need to separate the fractions and focus on phosphorus reallocation as it stays primarily with the solid fraction
- Pathogens and metals are not an issue for these materials as they are source separated and are processed to ensure high product quality. However, as diversion requirements increase, likely to see more mixed waste facilities and end products require further testing/analysis on constituents
- Physical contamination is an area that requires further focus as industry is seeing challenges to handle diapers, pet waste, sanitary products and compostable products and packaging. This leads to more contaminated end products that require further processing to ensure high product quality
- 4R Nutrient Stewardship in conjunction with Ontario Healthy Soils Framework provides a framework to achieve cropping system goals, such as increased production, increased farmer profitability, enhanced environmental protection and improved sustainability. To achieve those goals, the 4R concept incorporates the: right fertilizer source at the; right rate, at the; right time and in the right place
- Properly managed fertilizers support cropping systems that provide economic, social and environmental benefits. On the other hand, poorly managed nutrient applications can decrease profitability and increase nutrient losses, potentially degrading water and air.





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