ENERGY CONSERVATION
Powering Middlesex Centre

Presented by Michael Di Lullo, CAO, Municipality of Middlesex Centre

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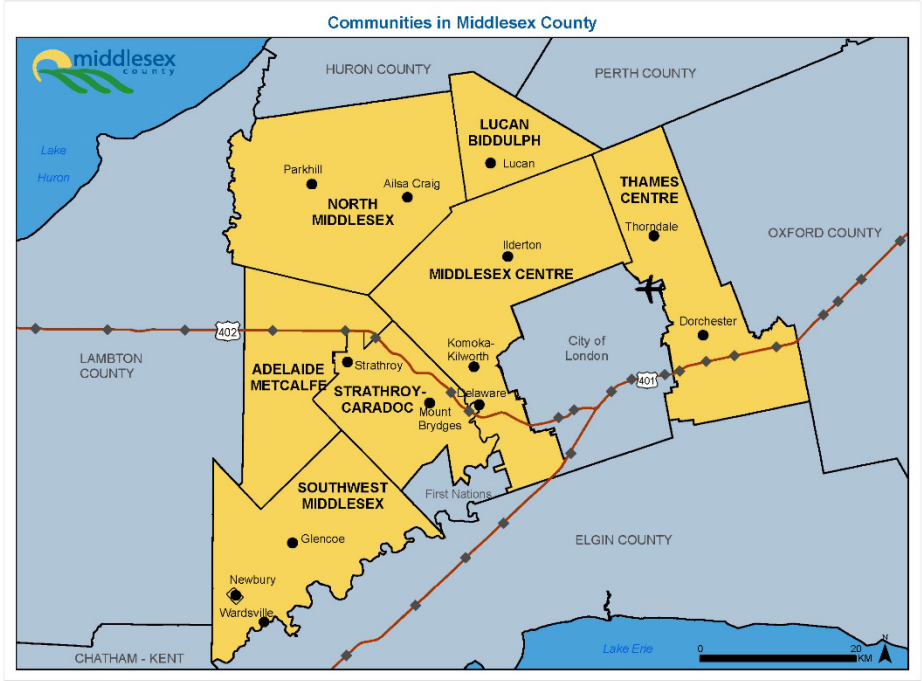
Agenda

- Background of Middlesex Centre
- Stanton Farms
- Municipal Green Initiatives
- Q/A

Municipality of Middlesex Centre

- Rapidly growing, mainly rural, municipality with a population of 20,000
- Located in Middlesex County surrounding the western and northern edges of the City of London, with an area of 588 km^2
- Total staffing complement is about 275 (including paid-on-call fire services)
- Municipal budget 2023 - $75 million
- Learn More: middlesexcentre.ca



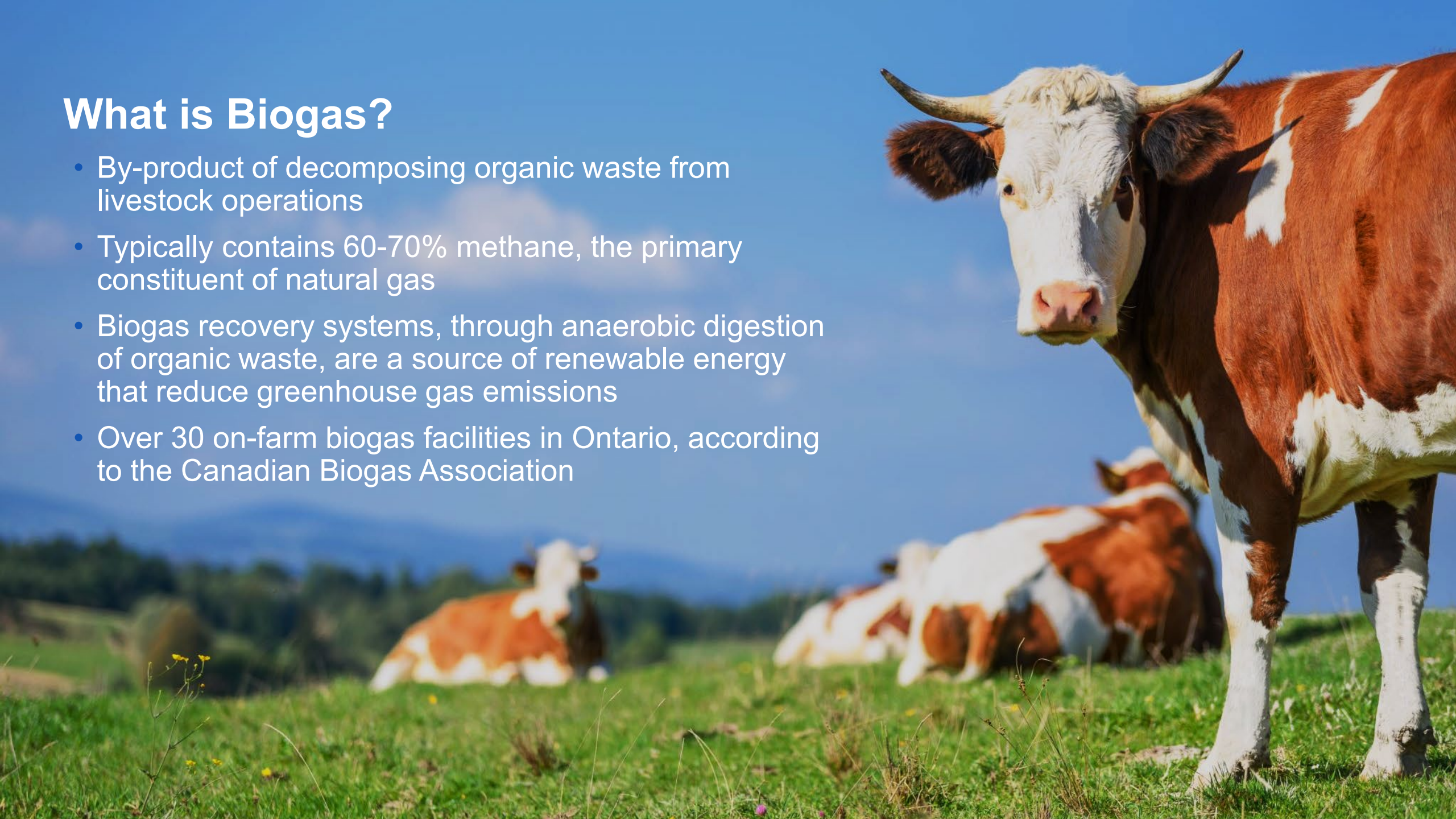
Background – Stanton Farms

- About Stanton Farms
  - 3,000 dairy-cow farm
  - state-of-the-art farming practices and sustainable family farming
  - global-leader in Holstein dairy genetics and high genetic-merit dairy cows and bulls
- Relocated in 2006 to its current location in Ilderton because of urban sprawl encroaching on the old farm

- Installed one of Canada's first on-farm anaerobic digestion systems for biogas production from community-based and on-farm organic waste
- Provides electricity to the community of Ilderton –upwards of 750 kW of renewable electricity

What is Biogas?

- By-product of decomposing organic waste from livestock operations
- Typically contains 60-70% methane, the primary constituent of natural gas
- Biogas recovery systems, through anaerobic digestion of organic waste, are a source of renewable energy that reduce greenhouse gas emissions
- Over 30 on-farm biogas facilities in Ontario, according to the Canadian Biogas Association



Innovation in Ilderton – Stanton Farms

- Stanton Farms expanded its operation in 2021 to produce renewable natural gas and became Ontario's first agriculture-based RNG supplier
- On October 14, 2022, they commenced operation of a new $12 million biogas facility to produce RNG from community-based and on-farm organic waste
- Stanton Farms has a 20-year purchase agreement with FortisBC for its RNG, and engaged Enbridge on the project for RNG injection into the Ontario natural gas grid, helping decarbonize Canada's natural gas supply
- Over 30 on-farm biogas facilities dot the Ontario landscape, according to the Canadian Biogas Association

A dairy industry first!

The milk Stanton Farms produces comes from a 100% renewable energy dairy farm.

Pioneer in Anaerobic Digester Technology

- Stanton Farms incorporated one of Canada's first anaerobic digestive systems
  - process on-farm organic waste to create biogas as a renewable fuel that would power the farm with renewable electricity
  - more environmentally responsible way to deal with nutrient management, eliminating odour causing compounds from the traditional land application of manure on farm fields
- A few years later, Ontario decided to close coal generating power plants and looked for renewable energy as an alternative.
- This gave Stanton Farms an opportunity to expand its biogas production by taking community-based organic waste and diverting it from landfill to generate more renewable electricity.
- Shortly after, Enbridge expanded the natural gas pipeline to Stanton Farms. This gave Stanton Farms the incentive to look at expanding its biogas operation once again and supplying RNG to Ontario's natural gas system.

RNG Impacts from Stanton Farms Operation

- Stanton Farms provides over 3 million cubic metres per year of RNG to the Ontario natural gas network, enough renewable energy for the heating needs of over 1,300 homes
- This impact is helping to make the community settlement area of Ilderton, with a population of about 4,000, one of Canada's most sustainable by supplying the equivalent renewable energy for communities both its heating and electricity needs
- The RNG facility diverts 60,000 tonnes per year of community-based organic waste from landfill and eliminates 11,000 tonnes per year of GHG emissions – the equivalent to taking 2,200 passenger vehicles off the road

"By helping to divert community-based organic waste from landfill, Stanton Farms is also helping to make Ilderton one of Canada's most renewable communities by suppling renewable energy for both its heating and electricity needs."
Laurie Stanton,
President of Stanton Farms

Stanton Farms – Commitment to Innovation

- Stanton Farms operations parallel those of the most advanced manufacturers in Canada – integration of sustainability and technology
- Employs the tools of Industry 4.0, the current trend of automation and data exchange in manufacturing technologies:
  - cyber-physical systems (smart grid, process control systems, robotics)
  - Internet of Things (IoT – allowing for collection of data)
  - cloud computing (shared pools of resources)
  - cognitive computing (building platforms for specific use cases)
- Works with leading-edge Canadian researchers at Ontario universities and from private sector on collaborative agri-based research initiatives – including dairy cow production, animal science and care, biotechnology and renewable energy

On-Farm Biogas Advantages

- **Reliable Renewable Energy Generation**
  - Generates renewable energy (electricity/RNG) virtually 24/7/365
  - Renewable electricity generation provides power-grid stability
- **Numerous Environmental Benefits**
  - Decreases odour causing compounds upwards of 90%
  - Kills pathogens
  - Diverts organic waste from landfill
- **Creating a Rural Green Economy**
  - Provides alternative on-farm income sources
  - Develops value-added by-product

Challenges and Opportunities

- **Sustainable Biogas – The Green Gas**
  - Helps transition Ontario toward a green gas supply and decarbonize Canada's natural gas supply
  - Ontario imports virtually all of its natural gas supply
  - Methane has a global warming potential 84 times higher than CO2, over the first 20 years of its release into the atmosphere
  - Biogas recovery systems captures methane from decomposing organic waste and utilizes it as a renewable energy source for heat and power
  - CO2 emissions are reduced when biogas replaces fossil fuel use.
- **Greater Access to Community-Based Organic Waste is Needed**
  - Increased access to more community-based organic waste is needed to grow biogas development in Ontario
  - Source separated organics are a key component of additional access to community-based organic waste
  - On-site sorting of organic waste from inorganic waste reduces the local carbon footprint from transportation to and from sorting facilities
  - Helps communities divert organic waste from landfill, reducing local GHGs emissions

Challenges and Opportunities, cont.

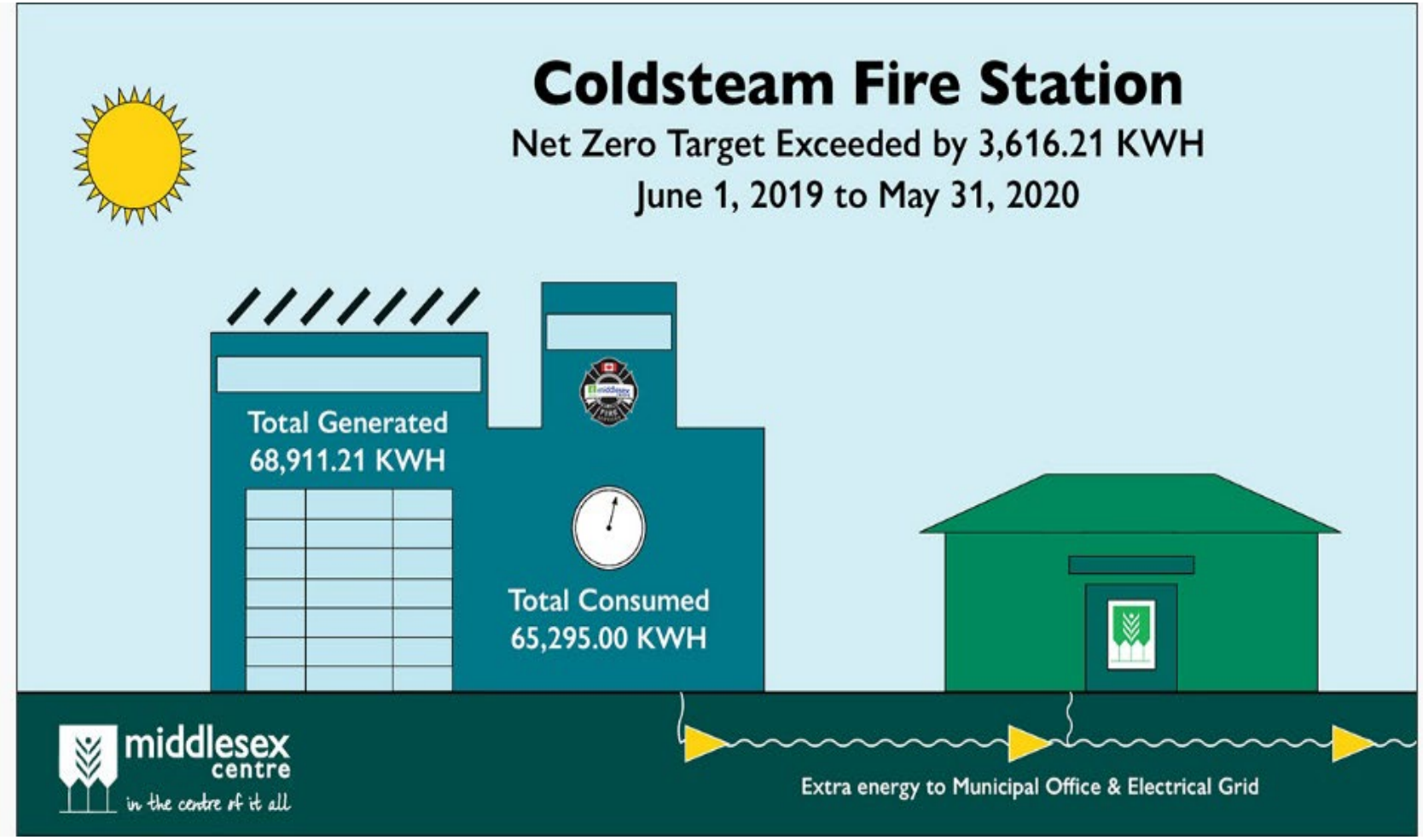
- **Focus on Agriculture-Based Biogas Sector is Warranted**
  - Anaerobic digestion is a more environmentally responsible way to deal with on-farm nutrient management, kills pathogens/eliminates 90% of odour causing compounds
  - Biogas is a valuable by-product of decomposing organic waste from livestock operations. Biogas typically contains 60-70% methane, the primary constituent of natural gas. Biogas recovery systems are a source of renewable energy that reduces greenhouse gas emissions.
  - Use of manure alone is not economically feasible: need for community-based organics.
- **Additional Considerations**
  - Local RNG fueling infrastructure (RNG fueling pumps) for local fleet transportation (municipal/local delivery fleets)
  - Bluewater Recycling Association operates Ontario's first RNG powered recycling truck
  - Potential for CO2 capture for the carbonated beverage/greenhouse/other industries, helping further decarbonize the environment

Middlesex Centre Green Initiatives

- Sustainability initiatives
  - Net-Zero Emissions Coldstream Fire Station
  - Energy Conservation and Demand Management Plan
  - Green Builder Program
  - Clean and Green Community Clean-Up
  - Green Fleet and Electric Vehicle Charging Stations
  - Mayor’s Monarch Pledge
  - University of Western Ontario Study on Net-Zero Arena for Ilderton
  - Green Bin Program (2024 implementation)
- Always seeking energy efficiency and improved sustainability in all aspects of operations

Net Zero Emissions – Coldstream Fire Station

Coldstream Fire Station – Powering the Municipal Office



Further Reading

- Stanton Farms
  - **An ‘ag-citing’ advancement on Ontario’s RNG scene, Enbridge**
    https://www.enbridge.com/Stories/2022/October/Stanton-Farms-first-Ontario-agriculture-based-RNG-supplier-connecting-with-Enbridge-Gas-network
  - **Stanton Farms becomes first agricultural-based renewable natural gas supplier, CTV News London**
    https://london.ctvnews.ca/stanton-farms-becomes-first-agricultural-based-renewable-natural-gas-supplier-1.6109575
  - **Area dairy farm first in Ontario to produce renewable natural gas, London Free Press**
    https://lfpress.com/news/local-news/area-dairy-farm-first-in-the-province-to-produce-renewable-natural-gas
- Coldstream Fire Station
  - **Canada’s First Net-Zero Fire Station, LAS/AMO**
    https://www.las.on.ca/learning/blog/canadas-first-net-zero-fire-station

Michael Di Lullo
MPA, CMM III

Chief Administrative Officer

Municipality of Middlesex Centre

Stay in Touch:

T: 519-666-0190 ext 5226

E: dilullo@middlesexcentre.ca

W: middlesexcentre.ca