



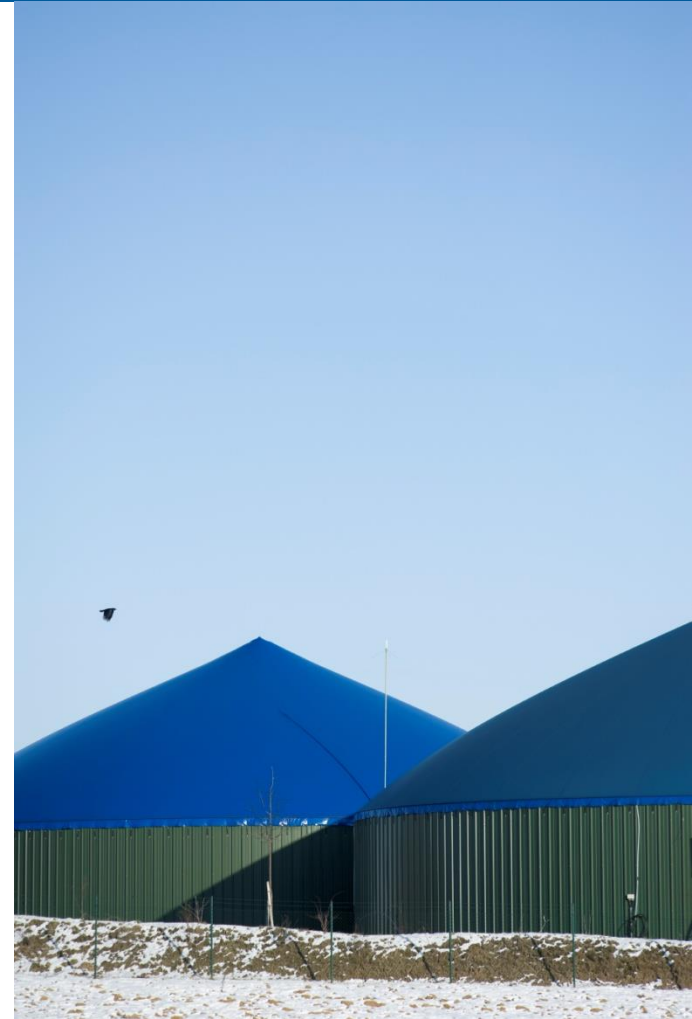
Closing the Loop: Climate Resilient Food Systems in the GGHR



Building the Biogas Sector With You

Canadian Biogas Association

- **Mandate**
 - The collective voice of the biogas industry promoting development of biogas to its fullest by capturing and processing organic materials through anaerobic digestion to maximize the utility and value inherent within that material
- **Roles**
 - Education and outreach
 - Advocacy and policy
 - Research

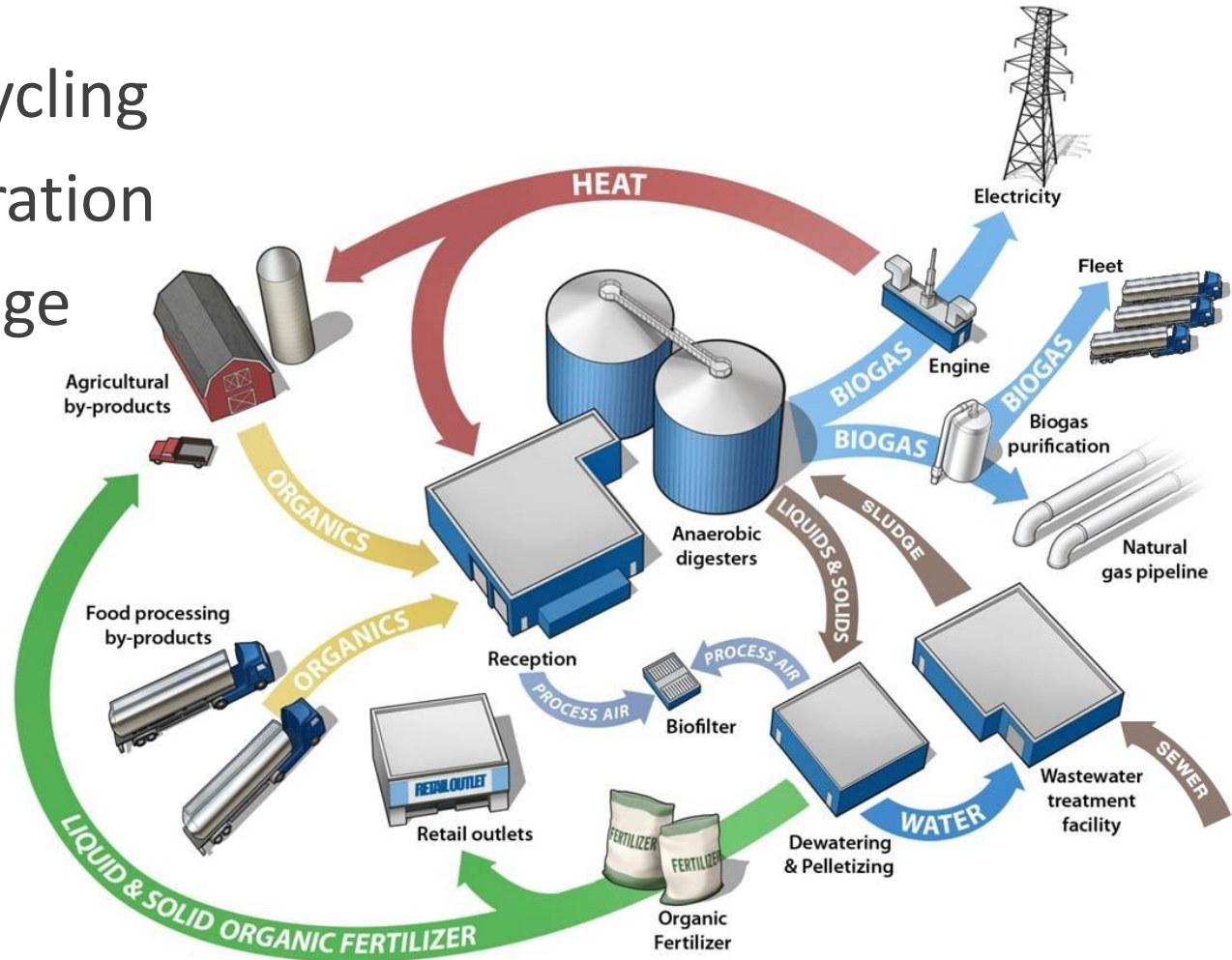


Food Systems and GHGs

- Livestock GHG footprint
 - Manure lagoons
- Transportation
- Food waste
- Landfills
- Carbon can be utilized through biogas production

Biogas Market Drivers

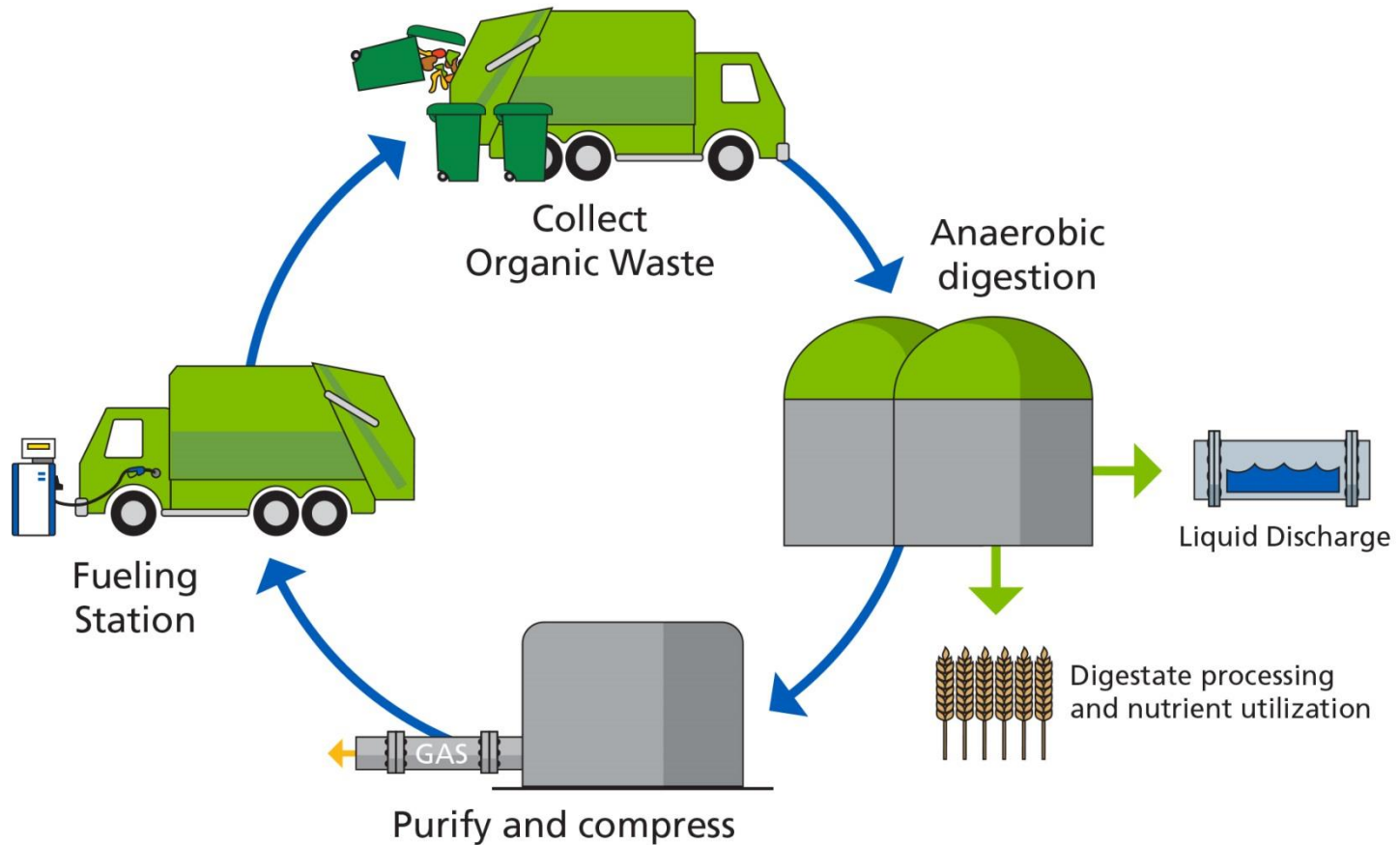
- Organics recycling
- Energy generation
- Climate change



RNG: The Next Renewable Fuel

- Why? Economics and the environment
- Transportation is the largest contributor of GHGs in Ontario, at 34%
 - From 1990 to 2012, transportation GHGs increased by 24%
 - Switching to CNG from diesel reduces GHGs by up to 30%
 - RNG can be a carbon negative fuel

How is RNG Produced?



Ontario Biogas Facilities

Projects

Across Ontario, the majority of member projects so far have been in agricultural biogas, which fit seamlessly into many farming operations.

Choose a project description



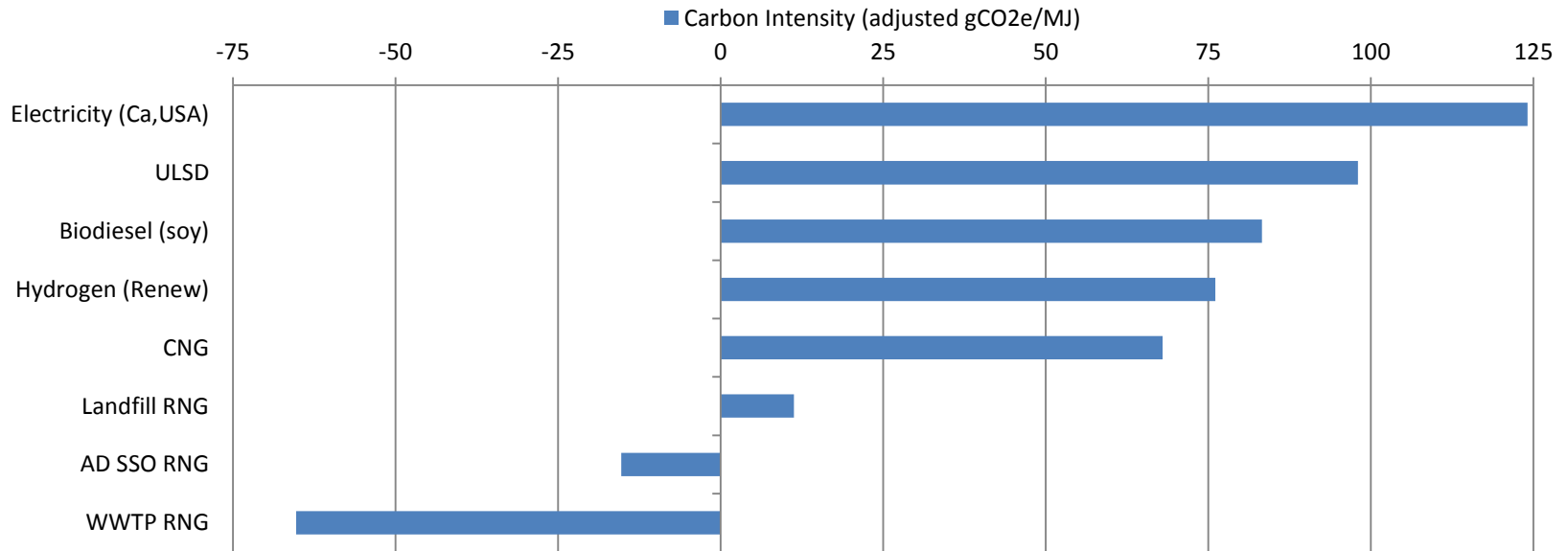
Building the Biogas Sector With You

Building RNG Production



GHG Benefits

Carbon Intensity of Alternative Fuels in California Heavy-Duty Vehicles



(Data Source: Carbon Intensity Lookup Table for Diesel and Fuels that Substitute for Diesel, California Air Resources Board)

Economic Analysis

- Return-to-base fleets converting to natural gas
- Can supplement with RNG to reduce GHG emissions
 - 10% blend adds ~5 cents/litre, keeping economic case strong

Fuel	Price
Gasoline and diesel	~\$1.00/litre
Compressed natural gas	~\$0.60/litre
Compressed RNG*	>\$1.00/litre
CNG/RNG blend (90%/10 %)	~\$0.65/litre

RNG Momentum

- Surrey
- Hamilton
- London
- Niagara
- Peel Region
- Toronto
- St. Hyacinthe
- Quebec City
- Edmonton

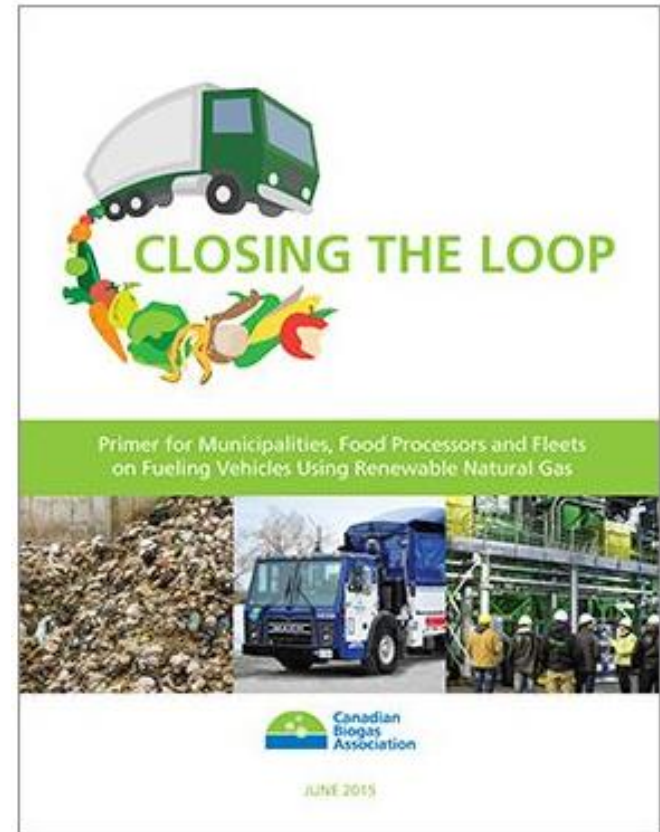


Peel: Biogas Objectives

- **Maximum utilization:** use all of the biogas, always
- **Economic return:** offset capital and operating expenses
- **Reduce impact of waste management:** GHG reduction, air, traffic
- **Demonstrate value to residents:** organics powers Regional operations
- **Minimize risk:** technical, commercial, decision
- **Minimize administrative burden:** energy marketing not core business

Closing the Loop Primer

- For municipalities, food processors, fleets
- Introduction to RNG and its value
- CNG and RNG considerations and benefits
- Connection to planning and operations
- Steps to success
- Case studies and best practices



RNG Advancement in 2016/17

- Looking for municipalities to join RNG Working Group to ask for supportive policies:
 - Target: Provincial government
 - With industry associations: CGA, OWMA, OFA
- Developing tools
 - Financial, environmental impacts; case studies, checklists
- Regional workshops and media strategy



Policy Asks

- The CBA is asking the province for a mandate within the Climate Change Action Plan to set RNG targets, as follows:
 - up to 2% of Enbridge and Union Gas system gas supply by 2020
 - Technical potential of 16% of all natural gas consumed in Ontario by 2030. CBA proposes 10% in this same timeframe.
- To achieve the RNG target, establish a renewable portfolio standard (RPS)
- Expedite the development of an “Organic Waste Digestion” protocol and consideration for offsets

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