

# Creating a Community Biogas Model for Rural Ontario



**Graeme Millen**  
Genesys Biogas Inc.

# Introduction

- Carleton University honours thesis project in cooperation with Genesys Biogas Inc.
- Objective:
  - To create a community biogas model to understand the potential and limitations of implementing this technology in rural Ontario

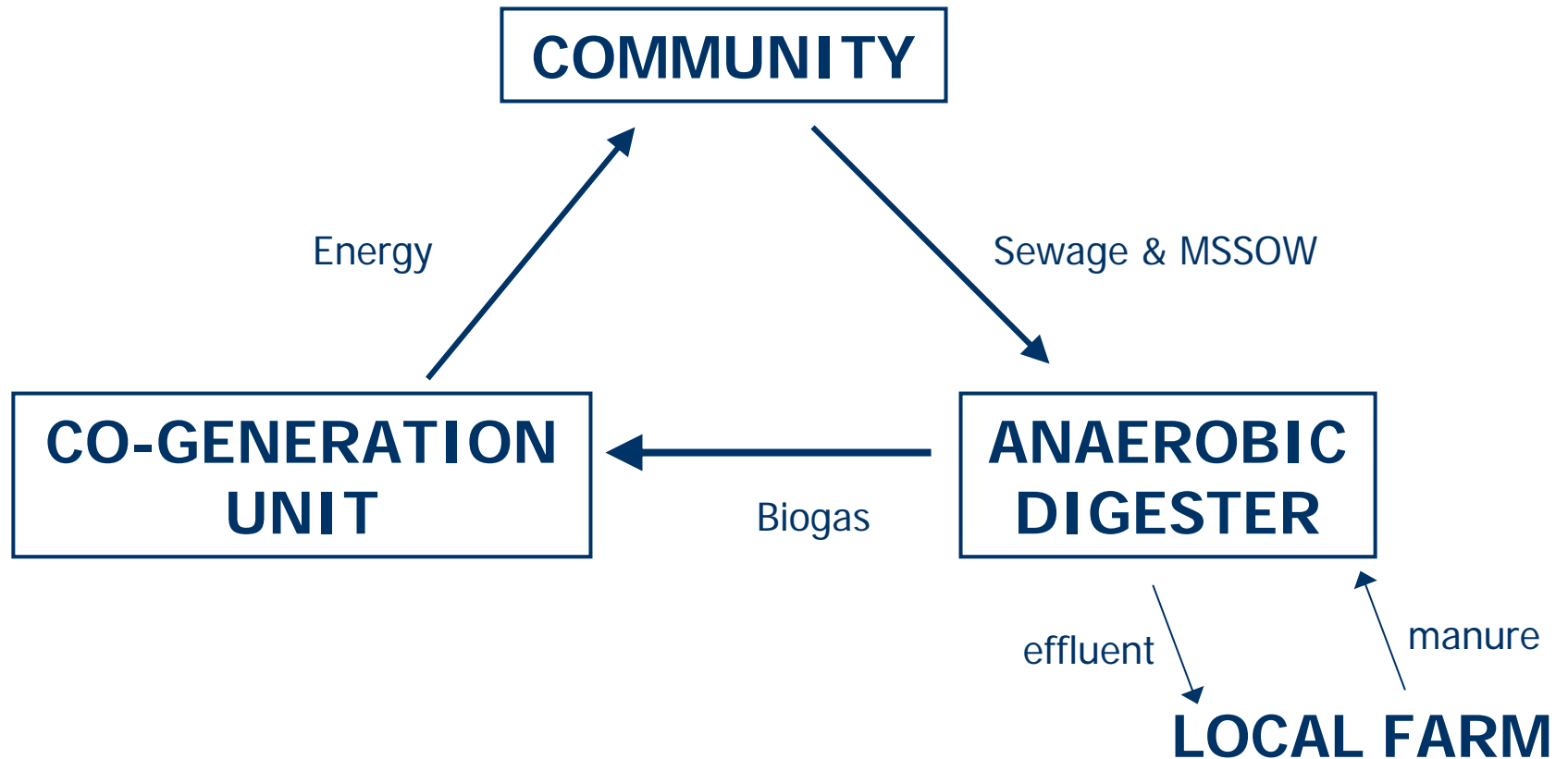


# Why Community Biogas?

1. Provide energy for community
  - Reduce dependence, increase local energy security
2. Provide alternative waste management strategy
  - Landfill diversion
  - Wastewater treatment
  - Recycle nutrients
3. Develop long-term community sustainability



# Premise of the Model



# Approach to Developing the Model

- 1. Define outputs of Co-generation units**
  - Defined limits (biogas input, kWh output)
- 2. Determine required biogas input**
  - Extrapolated from co-generation size
- 3. Determine required biogas system feedstocks**
  - Based on known values for given feedstocks

## Logistical considerations

- Proximity to wastewater treatment facility
- Source separation of organic wastes
- Community participation
- Proximity to farming community



# Sample Model

Model	CHP	Hrs/yr (85%)	Total kWh	System Demand (5%)	Net Electrical Production
1	500kW	7446	3,723,000	186,150	3,536,850
2	2000kW	7446	14,892,000	744,600	14,147,400



Model	Avg. household E use	Households w/ E demand met	Estimated Community Population
1	10,000 kWh	350	910
2	10,000 kWh	1400	3640

# Sample Model

Model	kWh Produced	Estimated biogas required
1	3,723,000	1,861,500 m <sup>3</sup>
2	14,892,000	7,446,000 m <sup>3</sup>

Waste	Estimated biogas yield (m <sup>3</sup> /t)	Annual Per Capita Production (t/yr)
Sewage	15	0.65
Organic Waste	150	0.138

Model	Population	Total Biogas Available	Percentage of required input
1	910	27,615 m <sup>3</sup>	1.5%
2	3640	110,790 m <sup>3</sup>	

## How to create more biogas?

- A community does not produce enough municipal organic wastes and sewage to operate a community biogas system able to meet its entire energy needs.
- Possible solutions:
  - ✓ Commercial & Industrial Wastes
  - ✓ Downsize biogas system
  - ✓ Find an alternative feedstock that is still produced within the community

## Energy Crops

- Locally grown, still within “community”
- Can be non-food crops, grown on marginal land
- Boost biogas & energy production
  - Roughly 1kW continuous for every acre
  - 500 acres will provide all the energy needed for a 500kW generator
- Create a self-perpetuating, localized energy economy
  - Supports local farmers, supports local energy production, supports local environment

## Conclusions

- A community biogas system is feasible
- Requires community-specific investigation
- To completely supply energy demands, energy crops are a valuable asset
- Whether supply 100% of energy needs or not, a community biogas system is still a net positive

## QUESTIONS?

---

Genesys Biogas Inc.  
107-1390 Prince of Wales Dr.  
Ottawa, ON K2C 3N6

T: 613 224 8308

F: 613 224 1642

[info@genesysbiogas.ca](mailto:info@genesysbiogas.ca)

[www.genesysbiogas.ca](http://www.genesysbiogas.ca)