



Biogas/RNG market: Current status, barriers and future potentials in Canada

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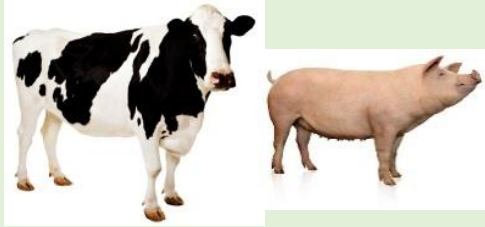
CH Four Biogas Inc.



- Company founded in 2006
- Successfully adapted European Anaerobic Digestion technology to the North American market
- Currently 19 deployed projects generating over 10 MW of green energy
- Driving innovation in biogas technology



What is Biogas?



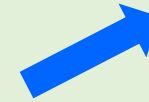
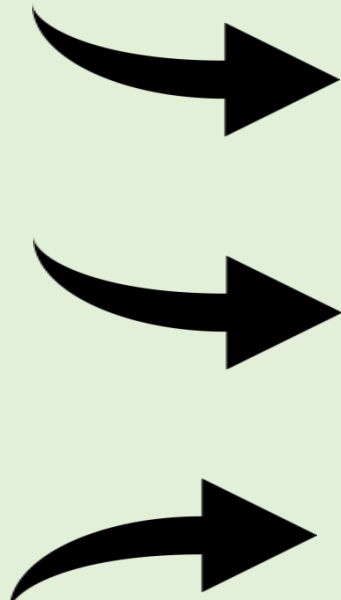
Animal Manure and Slurries



Food and Municipal Wastes



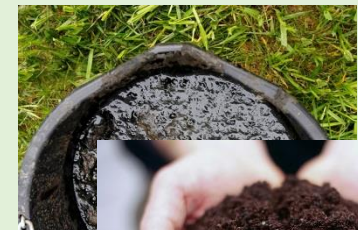
Energy Crops



Electricity



RNG



Fertilizers

Biogas/RNG Market: Current Status

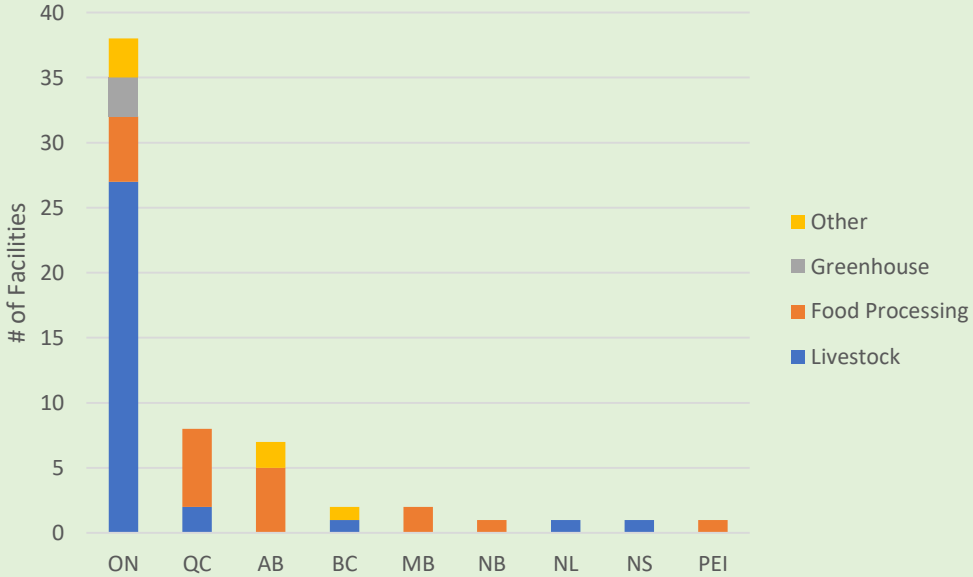
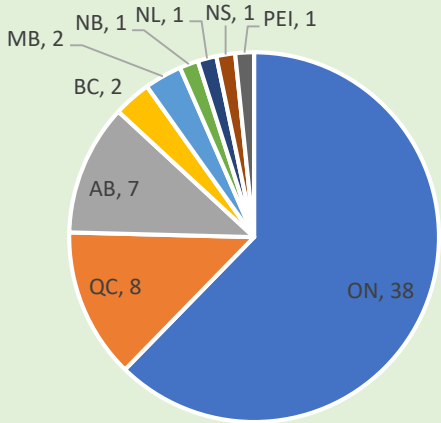


- Canada currently has over 60 operational facilities in the agriculture and agri-food sector
- 70% of facilities generate electricity for sale to the grid
- 3% (two facilities) generate RNG for sale

The momentum and interest in biogas is growing in Canada in response to:

- Climate change
- Supportive policies
- Carbon pricing
- New RNG targets

Agriculture and Agri-Food Biogas Facilities in Canada



Biogas/RNG Market: Current Status



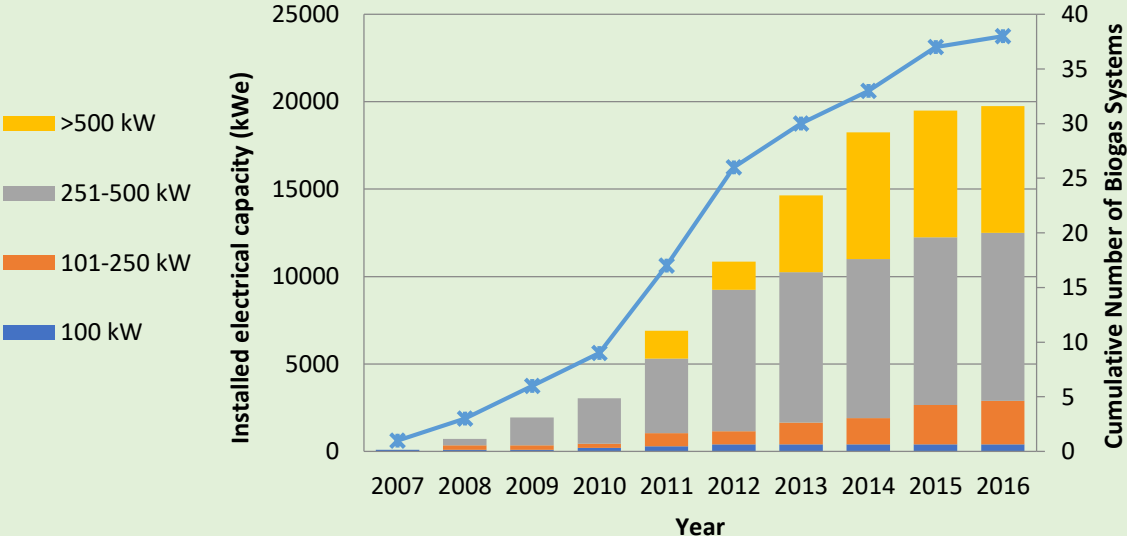
British Columbia, Quebec and Ontario are leading the way with RNG policy and programs

Province	Date of RNG program	Cost per GJ	Number of Projects
British Columbia	2007	Up to \$30	5 (Others expected soon)
Quebec	2017	\$7-22	4 (Others expected soon)
Ontario	TBD	TBD	1 (Others expected soon)

Benefits of RNG:

- Renewable, low-carbon
- Reduce GHG emission
- Low Carbon intensity
- Reduce odour and pathogen risks

Ontario Biogas Projects



Biogas/RNG Market: Policies in Canada



Province	Policies
British Columbia	<ul style="list-style-type: none">•Climate Leadership Plan promoting RNG as vehicle fuel•Voluntary RNG Program
Alberta	<ul style="list-style-type: none">•Climate Leadership Plan•Renewable energy incentives being discussed for small scale systems•Bioenergy Producers Program
Ontario	<ul style="list-style-type: none">•Climate Change Action Plan with initiatives and \$100M in funding allocated for Renewable Natural Gas•Waste-free Ontario Strategy and commitments to food and organic waste framework•Cap & Trade and carbon offsets
Quebec	<ul style="list-style-type: none">•Energy Policy 2030 to decarbonize the province and reduce energy consumption and increase energy efficiency, including RNG•Organics ban by 2022

Biogas/RNG Market: Barriers



Challenges limiting RNG market:

- Poor profitability (not enough supportive policies, discouraged investors,...)
- Project financing and financial viability (long permitting processed disappoints investors,...)
- Regulatory approvals (long processing times, Complicated procedures,...)
- Feedstock supply and cleanliness (availability and consistency,...)
- Grid and gas line connections (distance to injection station, specification,...)
- Community acceptance (close to residential areas, odours, safety,...)

Biogas/RNG market: Future Potentials



- New technologies, design optimization and operation adjustments can increase RNG production and reduce costs
- Tangible target/Goal
- Strong market pull: reasonable and stable government's policy and programs to support sustainable, long term product demand
- Established market to produce financial stability and drive investment
- Clear market mechanism: Well-defined approach that sends strong signal and enables broad participation by industry
- Organics diversions from waste management systems and support for value added end products
- Technical support and education related to digester operations and new technologies



Thank you!



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