

**Clean Air Council Meeting**

**Renewable Natural Gas**

**Meeting Notes Summary**

**Friday October 27, 2017**

## CAC Joint Actions Discussion

* Corporate Energy Managers COP: will be developing a workplan for advancing recommendations and to dos from the feedback at the last workshop and the webinar held in September for a 2018 workplan.
* Building Code recommendations from the CAC have been finalized and they are available here: <http://cleanairpartnership.org/cac/meetings/september-7th-clean-air-council-ontario-building-code-consultation/>
* There will likely need to be push from the municipal sector to achieve the goal of the recommendation of getting voluntary standards in the building code and enabling municipalities to mandate those voluntary standards within their jurisdictions. This will likely need a plan for municipal advancement of that approach and CAP seeking input from the CAC on any suggestions they have for how to go about advancing that.
* Green fleets: From the workshop help in September increasing the uptake of electric vehicles in municipal fleets is a priority action. As is the advancement of employee electric vehicle policies. Those two actions will be slated for priority to move the green fleets agenda forward. Additional priority actions for green fleets should be send to gkalapos@cleanairpartnership.org
* Having a Vulnerability Assessments workshop in November to explore the potential for the transferability of vulnerability assessments. This workshop will focus on health vulnerabilities. Will update on what came out of this workshop at a future CAC meeting.
* From the September CAC meeting in September CAP will continue to work with Pembina on municipal opportunities to address goods movement.
* A Growth Plan and CCAP alignment workshop took place in mid October. Monitoring and Reporting and Communications and Outreach were two of the priority items that were raised at the workshop.

**CAC Action items coming in early 2018**

* Fostering Collaboration Workshops
* Green Procurement Webinars
* Transition 2050 funding stream is slated to be announced sometime in early 2018 that will support at least 5 municipalities efforts to collaboratively implement mitigation actions.
* FCM staff funding stream is also slated to be announced in early 2018
* Car and bike share opportunities
* Air quality: advance regional collaboration to advance mobile air monitoring potential to build public support and engagementon air quality intervention actions.

CAC Meeting and Workshop Proceedings available at: <http://cleanairpartnership.org/cac/meetings/>

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**Renewable Natural Gas Presentations and Discussions**

Goals for this Meeting:

* Explore how RNG can contribute to a circular economy and other policy goals
* Explore options for how to address the price differential between conventional natural gas and renewable natural gas
* Discuss potential policy options to promote renewable gas

**Jennifer Green, Canadian Biogas Association, Renewable Natural Gas – Where we are now, where we could go and what we would need to do to get there**

* CBA is a national non-for-profit that is focused on the production chain aspects of biogas (technical) but also works on research, strengthening education and outreach efforts, and informing policy.
* Biogas consists of a mixture of methane gas (50-60%) and carbon dioxide that is released through the anaerobic digestion process associated with the breakdown of organic material. This biogas needs to be purified to reach levels of 90% methane in order to be interchangeable with natural gas.
* Renewable natural gas and digestate produced can promote a circulator economy: the biogas gas can then be injected into the natural gas grid, produce transportation fuel, and offset on-site energy needs. The digestate material is nutrient rich and (depending on where it came from) can be land applied.
* Sources: organic material from farms, landfills (gas is usually flared), residential and commercial green bin materials show potential, and wastewater treatment plants
* Benefits to using RNG: odour control, small footprint, diverts organic material from landfill, can handle higher levels of contaminants (glass and plastic), new form of revenue through energy generation, and addresses GHG reduction potential.

**Policy Landscape**

* Trend: there is a convergence of provincial policies within the areas of climate change, energy and waste management.
* RNG responds to these various policies as it can be used for diversion targets to meet **Waste-Free Ontario Strategy**, is demonstrated as a viable solution to reduce emissions targets in the **Climate Change Action Plan**. RNG is able to meet renewable energy supply requirement within the energy pipeline addressed in the **Long Term Energy Plan** and lastly, it can be used as a compliance option within **Cap and Trade** program.

Chart on the left addresses how renewable natural gas would be able to meet 2-5% increase in demand within the *next 3-5 years*. Currently, we are at approximately 0.01% (only RNG project operating is in Hamilton)

Data supporting this chart are based off of 3 studies; [2011-2012 Alberta Innovates](http://bio.albertainnovates.ca/library/researchers-and-experts/ai-bio-researchers-and-experts/), [2014 Canadian Gas Association](http://www.cga.ca/wp-content/uploads/2015/04/The-Renewable-Natural-Gas-Technology-Roadmap.pdf), and [2017 ICF international](https://static1.squarespace.com/static/53a09c47e4b050b5ad5bf4f5/t/590767ce59cc68a9a761ee54/1493657553202/ICF_RNG%2BJobs%2BStudy_FINAL%2Bwith%2Binfographic.pdf)**.** More resources can be found in [“Closing the Loop Binder”](https://biogasassociation.ca/resources/close_the_loop) which showcase RNG possibilities

**Economic Viability**

* Peel Region, Durham Region, York Region, Simcoe County, Hamilton, Brantford and Ottawa are looking into developing RNG business cases. Municipalities have a lot of options for how they can choose to incorporate RNG into their asset profile. Reasons as to why municipalities would be interested in doing so include: produces higher value product from a low value waste product; preserves landfill capacity, greenhouse gas reductions, stimulates economic development, creates clean-tech jobs, and leverages existing natural gas pipeline infrastructure.
* Early adopters are interested in revenue incentives through long term power procurement policies, increased support for technology, innovation and the use of cap and trade proceeds.
* Transportation sector (Heavy-Duty Vehicles): [Recent study done by the California Air Resources Board](https://www.arb.ca.gov/research/single-project.php?row_id=65186), found RNG resulted in a low to negative carbon intensity factor making a compelling case to substitute diesel as an alternative fuel source.

**Communication Pieces to Promote RNG**

* Displacing natural gas with RNG availability in Ontario is estimated to be able to reduce GHG emissions equivalent to taking approximately 200,000 cars off the road each year.
* In a municipality with 10,000 residents, a biogas plant could produce enough RNG to fuel one collection truck for a year.

**Challenges:**

* Approvals and Connection: There needs to be a lot of information gathered regarding appropriate location for RNG site approval, access to local pipeline, undertaking public consultation and increasing public awareness to decrease “not in my backyard” sentiment (building relationships with stakeholders is essential), and undertaking feasibility studies
* There also needs to be the presence of provincial incentives upwards of around $30/GJ—it is still uncertain how the Cap and Trade funds will be allocated to support RNG opportunities. Low prices of conventional natural is a major barrier to advancing RNG projects.
* Limits on feedstock through the presence of cheaper disposal options and/or limits on contracts with suppliers as they are hesitant to sign anything longer than a 3-year period—the consistent amount of stock can be an issue depending on the type of stock.

**B.C and Quebec:**

* BC: $30 a gigajoule under the voluntary market with a landfill and agricultural application
* Quebec: $7-27/ gigajoule at a preferred rate (dependent on the project type). They have 4-5 projects underway that are owned by the utilities (utilities work together with the province and work in partnership with the municipality)
* Both these provinces are leaders in RNG because they have a strong Climate Change and GHG reduction target and action plan
* Both have voluntary and rate based financial mechanisms set in place to pay for the price differential between RNG and natural gas. Voluntary at first and then a rate base allocation is applied above a certain threshold of RNG used.

## Questions:

### Is the process of extracting 90% methane from biogas energy intensive?

Within any type of energy extraction/generation process, there will always be energy lost to produce serviceable energy units. That being said, it is better to focus on how RNG is being used in order to understand how it can best displace intensive GHG emitting energy demand practices. Additionally, there needs to be more awareness of different RNG projects that can lead to municipalities supplying their own energy/fuel source outside of the grid. Combining an anaerobic digestion component with a combined heat and power plants are great applications for RNG as it can use both the RNG gas and subsequent waste heat as energy sources.

## Tom Chessman, City of Hamilton—Renewable Natural Gas Lessons Learned and Next Steps

* Hamilton council mandated an Energy Policy in 2005 that focused on managing energy consumption and costs. They have also aligned with the provincial GHG reduction target of 80% reduction by 2050 using 2005 as the base year. This has lead the municipality to create and manage operations with Hamilton Renewable Power Inc. (HRPI), a renewable energy corporation, to meet these target goals.

**Hamilton’s renewable energy portfolio:**

* Hamilton currently has 250 KW installed PV solar at their **Wentworth Operation Centre**. The city receives revenue through leasing out the roof space, the solar system itself is owned and operated by Alectra (Local Distribution Company). There was a possibility of increasing this capacity with the construction of a new city building but due to changes in snow load calculations in code this is now not possible on that building.
* **Woodward** is a 1.6 megawatt co-generation plant that uses methane produced in anaerobic digestion from a waste water treatment plant. It has a biogas purification unit that has the ability to process the bio-methane into a pipeline-quality natural gas used by city facilities or sold to market. This co-gen generates $910,000 in revenue per year. It cost $ 4.4 million that was paid through a power purchasing agreement contract. Recent digester upgrades were partially funded through the Infrastructure Stimulus Funds since it was considered an infrastructure investment. The upgrade led to an increased solid digestion time that increased the overall quality of the sludge. This resulted in an increase in resource recovery and biogas generation (an increase of 72% by 2031).
	+ It is important to note that the digestion process does not result in a steady output of biogas as there is a large range in variability, this is common and derives from how rainfall influences the sewage mixture.
	+ The technology used in Hamilton is called “Water Scrubbing” technology which is injected into union gas’ pipeline. Technology compresses biogas, known as the “drying process” which releases purified methane, the liquid used in the compression process contains the impurities also known as “sludge” that can be refined and can be used for land application purposes.
* **Glenbrook** is a 3.2 MW landfill gas generator. The landfill receives a total of 140,000 tonnes of refuse annually, out of which 3,100 tonnes is green bin waste. The generators have an average of 90% uptime, the 10% downtime accounts for utility outages that occur for upstream maintenance. It generates 18,000,000 kWhr per year and provides an annual gross revenue to the city of approximately $2.2 million dollars. It is measured that these generators are able to process 54% of overall methane gas. Hamilton is looking into installing ground-mount solar on site as well over time.
	+ There has been an increase in methane diversion overall, but it is important to note that methane degrades between 20 to 30 years—there needs to be a better way of forecasting methane production variables in the industry.
	+ Well extraction rates are an issue: management must be careful to not run out of sufficient capacity or else the landfill will get drained of useable biogas too early.
* Hamilton’s Compressed Natural Gas Bus fleet goal: to achieve 50% of fleet running on RNG by 2018. Started off with 18 new CNG buses in 2015 and will be adding an additional 80-100 CNG buses into fleet by the end of next year. There has been a positive response as this is resulting in decreased costs in comparison to diesel and also a decrease in GHG emissions. Municipal mechanics responded very well with CNG buses—it was well received which is great news as it would have been a barrier otherwise.
* Barrier: There is an interest to compare renewable natural gas vs diesel within the transportation industry. The main issue deals with capital cost. There needs to be a strong relationship with the utility to ensure buy-in and support to assist with RNG project development and pricing.

**Note to Municipalities:**

* You need to have technical expertise in-house with a reasonable understanding of the natural gas industry
* Technology in the field is not the issue because there are various technologies available in the market, it is important to understand the features you need to accommodate for
* Operations management need to undertake service contracts/build strong relationships with utilities, as there needs to be constant monitoring, especially regarding the energy demand and supply inputs of the system.

## ****Questions:****

### What have been the key factors that have influenced Hamilton’s leadership in RNG generation?

This is a tough question. It is a mixture of council and senior management support when assessing the business case that was presented. There was support from the energy office as there is an initial high capital cost and a lower lifecycle cost. Both supported a strong, solid business case. Constant dialogue between senior management and councilors also helped. Plus, proven success from such projects in the past.

Another indirect influence was to move away from the previous “Big Smoke” stigma that has been historically known for Hamilton. The community is more sensitive and aware of air pollution implications.

Noise has been an issue in regards to the landfill; silencers were added to the engines in Woodward. Method of solving issues was based on addressing overall site impacts—this is how the municipality was able to solve odor through the generators

### 2. What assets did the municipality own?

Hamilton owns HRPI, which is responsible for the co-generation, they also own the landfill engines.

Hamilton has energy ownership and is responsible for managing energy. There is a very strong relationship developed between the municipality and Toromont regarding the operation and the maintenance of the landfill site machinery.

### 3. What mechanisms are in place to develop rate prices?

Looking to OEB to create a program that would develop a rate process. There should be a change from RFQ’s to prescriptive prices. Currently, the position of having Hamilton sell to the grid is not a viable revenue source that can warrant RNG efforts

Hamilton continues to investigate opportunities for renewable natural gas expansion; they have 4 old digesters and 4 new ones. The policy landscape towards addressing the price differential between NG and RNG is needed to advance RNG opportunities. The circular economy policy goal is also supportive of RNG efforts.

**Renewable Natural Gas Roundtable (updates from jurisdictions looking to advance RNG opportunities – what has been explored, what issues have come up, what business plan development has occurred, next steps?)**

**Durham Region**

* **There is an incentive to advance RNG opportunities. Durham’s waste management plant is currently flaring the methane that is emitted from the digestion process.**
* **In 2014, Durham Region undertook a feasibility study that focused on the potential of resource recovery in the wastewater sector. The goal is to recover energy, water and decrease overall GHG emissions. The study provided 62 options, of which 12 were shortlisted as priorities.**
* **Options being considered: CHP run by biogas, and vehicles run on CNG through a detailed economic model and a triple-bottom-line approach.**
* **The biggest barrier faced is the price differential between conventional natural gas and RNG prices.**
* **The municipality is waiting to see what will come out of Cap and Trade in order to understand how to navigate the potential benefits from advancing RNG opportunities.**
* **Motivation, interest, and potential are there.**

**City of Toronto**

* **I**nterested in developing a renewable natural gas model from solid waste treatment plant. The City currently owns two anaerobic digesters and some landfill sites that are both categorized as operational and non-operational.
* There is an overall agreement on advancing RNG, there have commissioned a study to explore the triple bottom line approach to renewable natural gas.
* Unknown: what the end users would be—upgrade current corporate assets or integrate CNG into its transportation sector. The city would work with Enbridge gas.

**Other Updates:**

* Peel region and the City of London are also interested and exploring opportunities to advance renewable natural gas projects.
* GHG challenge fund is of interest regarding future RNG programs.

**Discussions: Opportunities for Policy Development**

1. Grants for capital costs versus performance based pricing: General consensus is that there are more cons than pros to going the capital grants approach. Right now, there are so many grants available with laborious application procedures that do not ensure the long-term financial stability of an RNG program. Grants need to be more aligned to certain streams, and be longer term than they often are at present.
2. Performance-based pricing for RNG gigajoule: Cons: FITT fatigue as the customer has become fearful of paying too much, which could lead to consumer backlash. Pros: promotes transparency, is based on performance, and has long-term prices and longevity.
3. Funds by Cap and Trade: ratepayers would benefit from getting their money back from cap and trade. It can also help with the price differential barrier, as funds would be able to close the gap between conventional natural gas prices and RNG. Questions that need to be asked of the Cap and trade funds would be: how much funds? And for how long? Consider the whole base vs. segment of base approaches.
4. Rate based: is a long-term financing mechanism. Need to consider how to spread price out over the 3.6 million customer base. The price for RNG for all ratepayers would be $6/GJ
5. Voluntary market should be allowed
6. Conventional natural gas sells for $4.5 gigajoule, an addition of $1 is due to cap and trade. Renewable natural gas averages around $21
7. Definitions of “Offset” need to be addressed—there needs to be a common understanding regarding the difference between achieving an amount that is below requirement vs. destroying the presence of methane. The definition needs to be clarified in the policy that asks for 8% compliance of renewable energy sources within the pipeline. Look into Western Climate Initiative to understand offset protocols.
8. Need to understand the ownership and marketability potential for the resulting “green molecule” into the grid.
9. Need to make sure that this RNG sector is involved in the conversations around where the funds coming from Cap and Trade are being allocated. How can these funds best be used to support RNG opportunities.
10. There ideally should be a focus on financing as a long-term commodity vs. focusing on initial capital costs during the onset of project implementation.
11. Need to understand more if there is a preference for capital grants in order to advance RNG via the cap and trade funds and if so why? What are the issues the province is facing? How can municipalities work with the province to find the right approach to advance RNG in Ontario that takes the provincial and municipal pros and cons into consideration. Conversations need to take place to better understand what RNG approach is most likely to work in Ontario.
12. Grant money should be allocated to feasibility studies
13. Also need to consider:
	* Offsets are cheaper than RNG opportunities as such the offset market is not likely to address the business case differential between RNG and conventional natural gas.
	* Long-term contracts for feedstock are often only available for a 2-3 year time period. These contracts need to be longer to build certainty within the RNG business case. This is especially true for commercial sector feedstock; this is not a problem for the sewage side.

**Next Steps**

* Bring together Municipal staff working on RNG; MOECC staff working on RNG, offsets and the circular economy; and MOE staff working on Gas Supply Planning.
* CAP will reach out and contact these teams to learn more about the conversations that are occurring, and facilitate conversations between various teams to advance the RNG opportunities discussion.