



December 02, 2011

Ontario Energy Board
P.O. Box 2319
27th Floor
2300 Young Street
Toronto, Ontario M4P 1E4

Attention: Board Secretary

Re: Renewable Natural Gas Program Applications EB-2011-0242 and EB-2011-0283; letter of comment

I. Introduction

Xebec Adsorption is a Canadian supplier of gas filtration, separation and purification equipment with head offices, engineering and manufacturing in Blainville, Quebec; and research & development, engineering and laboratory facilities in Burnaby & Surrey, British Columbia. Xebec has been providing adsorption-based solutions to the renewable and alternative energy sector since the 1980s, first with our gas dryers for the compressed natural gas vehicle market, followed in the 1990s by our hydrogen purification products for fuel cells, and since 2005, with our biogas upgrading plants.

Xebec respectfully submits the following comments to the Ontario Energy Board with regard to the proposed Renewable Natural Gas Application by Enbridge Gas Distribution Inc. and Union Gas Limited. These comments address the needs of landfills with their larger scales of flow and significantly more complex biogas compositions, and the need to provide added RNG capacity for the anticipated natural gas vehicle market. The steps requested will further facilitate the viability of biogas-to-RNG projects for all producers of biogas.

II. Comments

A. Complexity of Landfill Gas

Upgrading landfill gas is the most technically challenging of the biogases because of the physical means by which the biogas is collected and the extremely broad variety in organic feedstock. The added complexity requires more capital

investment for the extra processing equipment to remove nitrogen, oxygen and siloxanes. This extra equipment also brings additional operating and maintenance costs.

Since the biogas is drawn from the landfill by a network of wells connected to a collection blower operating at sub-atmospheric pressure, there will always be some oxygen and nitrogen present due to the ingress of air through the top of the landfill. The concentrations of oxygen and nitrogen can be well above the gas utilities' pipeline quality specifications. Oxygen needs to be kept low to limit corrosion effects on the materials used for the piping. Nitrogen dilutes the energy content of the gas. Removal of these gases present significant, though not insurmountable, technical challenges not typically encountered with biogas produced in digesters.

The organic feedstock for landfills is significantly more varied than with digesters because the input material is drawn from a very broad base and there is minimal ability to control what people throw away. Consequently, the variety and concentration of volatile organic compounds is many times more complex. Especially of concern is the presence of siloxanes, which can show up in concentrations up to two orders of magnitude greater than with the highest siloxane loading seen in municipal digesters.

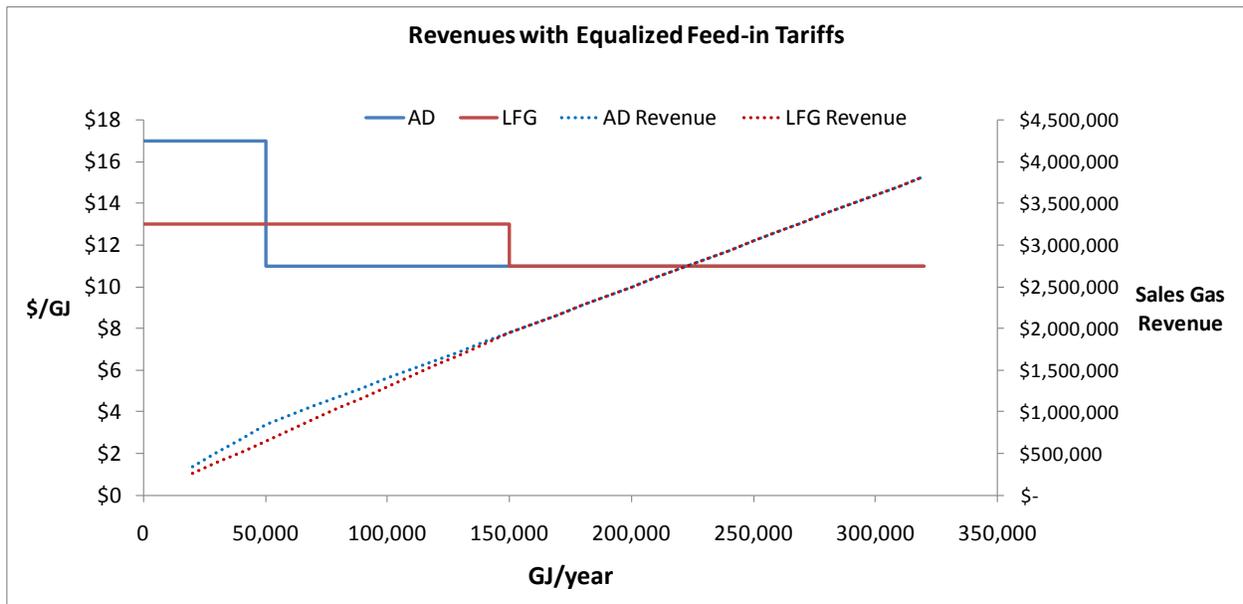
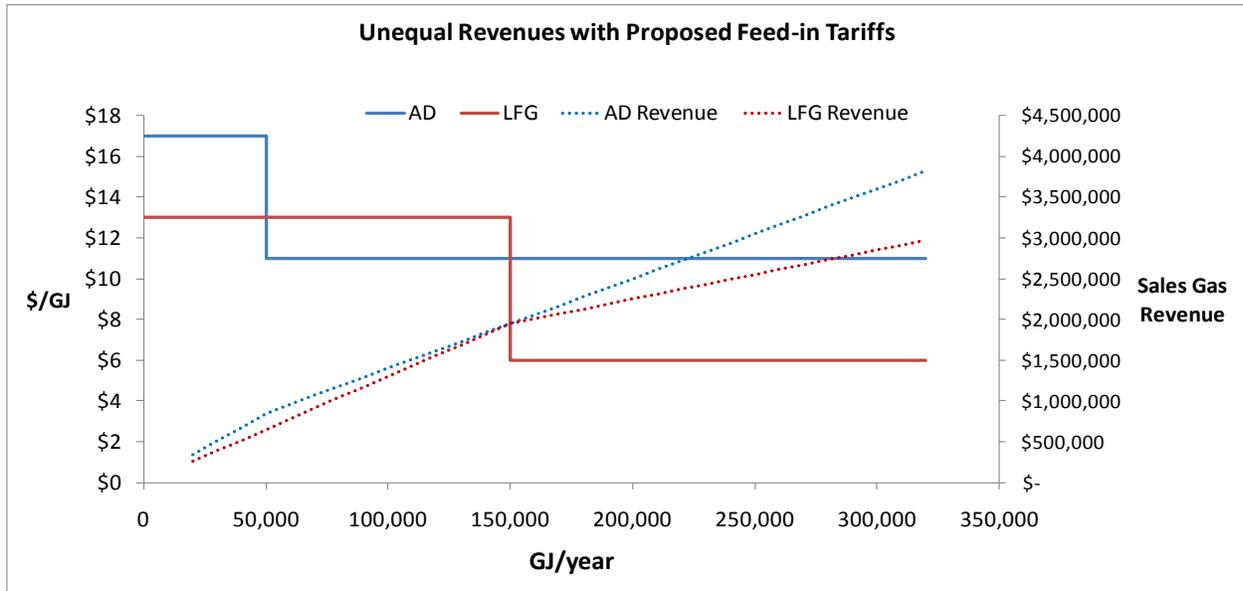
B. Volume of Biogas Production

Larger landfills will have more sophisticated collection systems that permit collection of the biogas in a controlled manner such that ingress of air can be limited to tolerable levels. While there are many smaller landfills producing biogas in the 150,000 GJ/y range, the more viable landfill sites having better control of air ingress will typically be much larger than this. These bigger landfills often produce biogas in the range of 500,000 GJ/y to 1,000,000 GJ/y.

The scale of digester projects is climbing higher. As a supplier of upgrading plant technology, Xebec is increasingly seeing municipal digester projects that produce biogas at the 350,000 GJ/y level. Industrial digesters treating organic waste from bio-ethanol plants can produce as much biogas as landfills, up to 1,000,000 GJ/y.

C. Feed-in Tariff

Up to 150,000 GJ/y of RNG production, digester and landfill projects can expect the same \$1.95m in product sales gas. After that, landfill projects are penalized by a 54% drop in the feed-in tariff, but not digesters. This effectively eliminates the more viable landfills from the program. Xebec thinks it is more equitable if the step reduction in the feed-in tariff for landfills beyond 150,000 GJ/y be raised to \$11/GJ in alignment with the rate for digesters.



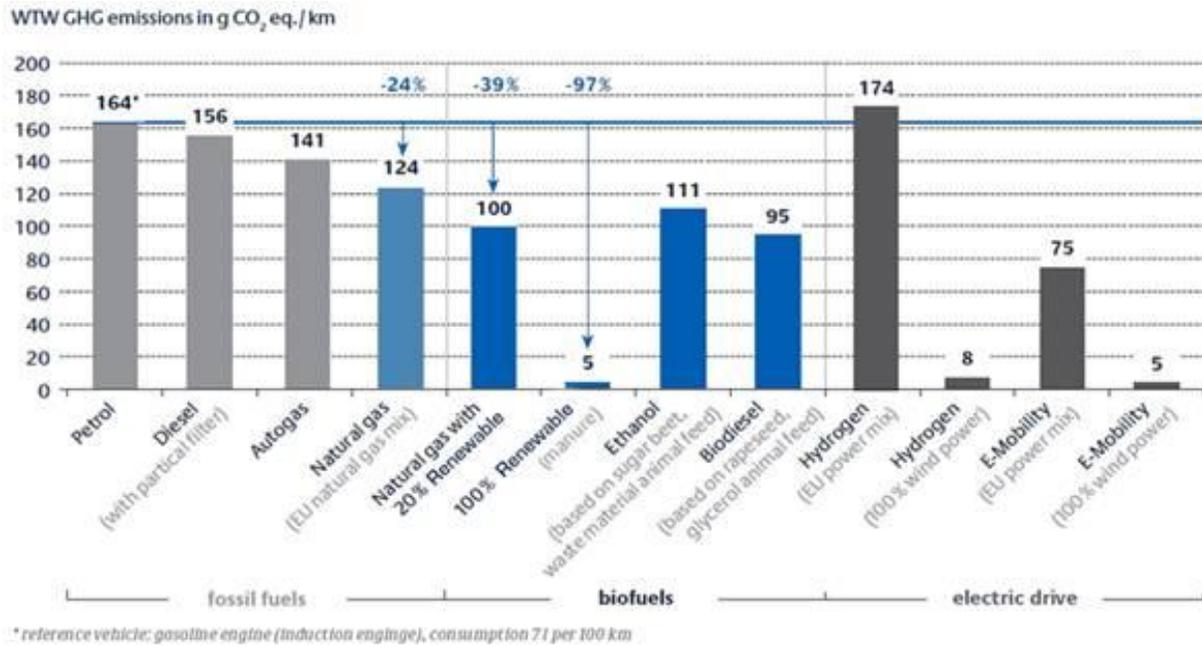
D. An Acknowledged Trend Toward Natural Gas Vehicles (NGV)

There is a widening spread between the price of diesel fuel and the potential savings from switching to vehicles fueled by compressed natural gas. Long-haul transport companies and natural gas suppliers are moving towards this alternative.

Recent business decisions announced by industry leading companies such as Goupe Robert, Gazmetro¹ and EnCana² are evidence of this trend.

E. RNG Content Significantly Increases GHG Reductions in NG Vehicles

The switch to natural gas vehicles produces a 24% reduction in greenhouse gas emissions. Adding 20% renewable natural gas content brings the GHG reduction to almost 40%. Natural gas as a transportation fuel has a higher added value compared to injection for general use, is transparent to the consumer, and has great potential for growth over the period foreseen by this program.



F. EU and USA Targeting Renewable Content in Transportation Fuels

The United States and the European Union are setting targets for renewable content in transportation fuels. The EU will have 10% renewable content in its supply of transportation fuel by 2020, and the US will have 30% renewables by 2030. In both plans, the source of the renewable fuels will be decided by market drivers and competition between the various fuel options.

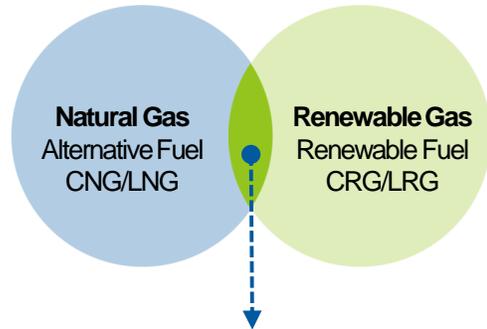
¹ http://www.corporatif.gazmetro.com/corporatif/communique/en/html/2754184_en.aspx?culture=en-ca

² <http://www.ngvglobal.com/encana-grows-network-of-cng-stations-0930>

Economic Driver – Renewable Fuel Standards

Renewable Fuel a Driver for Renewable Gas

- **European Union** - 5% share of renewables in transport fuel by **2015** and a **10%** target by **2020**
- **California** - **1 January 2011**: Effective date of the carbon intensity reference values for the **Low-Carbon Fuel Standards (LCFS)** determined in 2009 by the California Air Resources Board (CARB).
- **2030 Target** year set by the U.S. Department of Energy to displace **30 %** of gasoline demand (from 2004 levels) in the United States with renewables.



Fuels will be blended with renewables at an accelerated rate for industry compliance.

This will drive demand for the biogas upgrading solutions that Xebec provides.

Renewable Fuel Standard II – Biogas identified as “advanced biofuel”

G. Mechanism to Expand RNG Capacity into the NGV Sector

A capacity ceiling of 145 million m³/y of RNG will not support the potential for growth in the NGV transport sector. Xebec proposes that provision for a NGV renewable fuel content of 20% RNG by 2020 be added to the program. Billing for this would be applied directly at the filling station and not to the general ratepayer. By this measure, the 145 million m³/y limit would only be a limit imposed only for the proposed ratepayer scheme, and not an absolute limit on the amount of RNG that can ultimately be injected into the gas distribution networks. The anticipated development of market demand for CNG and LNG would be the only ceiling on the amount of RNG injected.

III. Conclusion

Xebec appreciates the opportunity to provide these comments. Ontario has led all North American jurisdictions in regards to clarity, definition and support for



production of renewable electricity, and is preparing to do the same for renewable natural gas. Xebec hopes that its comments regarding equalization of the tariffs at higher flow rates and addition of a 20% renewable content for NGV transportation fuels helps the Ontario Energy Board make the right choices for all parties.

For questions or more information, please contact:

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