City of Richmond

Report to Committee

To:	Public Works and Transportation Committee	**Date:**	August 15, 2012
From:	Cecilia Achiam, MCIP, BCSLA Interim Director, Sustainability and District Energy	**File:**	10-6600-10-01/2012-Vol 01

Re: **Partnership with FortisBC to Utilize and Promote Renewable Natural Gas from the Lulu Island Waste Treatment Plant**

Staff Recommendation

1. That a letter be sent, on behalf of Council, to the British Columbia Utilities Commission (BCUC) indicating that the City of Richmond:
   - Supports the FortisBC application to convert biogas from the Lulu Island Wastewater Treatment Plant to renewable natural gas; and
   - Will purchase up to 360 GJ of renewable natural gas, which represents approximately 10% ($1,870) of the annual natural gas consumption of City Hall and South Arm Community Centre, from FortisBC in 2013.

2. That the City commit to purchasing 10% of the City's annual corporate natural gas consumption of all City facilities under the corporate energy management program as renewable natural gas produced at Lulu Island Wastewater Treatment Plant (Lulu RNG) when it comes on stream with an opt out clause with 90 days notice at the sole discretion of the City.

3. That staff develop and report to Council on a pilot incentive program, including any financial implication and external funding opportunities, to encourage community utility users (i.e. property and business owners) to reduce GHG emissions by shifting up to 10% of their natural gas consumption to the Lulu RNG.

Cecilia Achiam, MCIP, BCSLA
Interim Director, Sustainability and District Energy
(604-276-4122)
Att: 2

REPORT CONCURRENCE			
ROUTED TO:	CONCURRENCE	CONCURRENCE OF GENERAL MANAGER	
Budgets Project Development	☑ ☑	FOR RC	
REVIEWED BY TAG SUBCOMMITTEE	INITIALS:	REVIEWED BY CAO	INITIALS:

Staff Report

Origin

Goal # 8.1 in the Council Term Goals for the Term 2011-2014 states:

"Sustainability – Continued implementation and significant progress towards achieving the City's Sustainability Framework, and associated targets."

Furthermore, in April 2010, Council illustrated its commitment to sustainability by adopting the provincial targets and approved an amendment to the Richmond Official Community Plan (OCP) Bylaw 7100, Amendment Bylaw No. 8599. The OCP amendment contained a series of actions including the following:

- Establish a grant, rebate and/or low interest loan program to assist property owners to retrofit their buildings to reduce GHG emissions;

Council also adopted community-wide Greenhouse Gas (GHG) Reduction Targets of 33% below 2007 levels by 2020, and 80% below 2007 levels by 2050.

The proposed initiatives in this report meet the intent of these Council directives.

Background

Staff have been collaborating with Metro Vancouver to explore ways to utilize the energy recovered from solid waste treatment produced at the Lulu Island Wastewater Treatment Plant. Two potential energy sources have been identified:

1. Waste heat recovery for a local district energy system; and

2. The recovery of biogas, which can be refined into a carbon neutral natural gas "substitute".

MetroVancouver completed a study, in consultation with the City, which has concluded that there is insufficient development potential in the vicinity of the Lulu Island Wastewater Treatment Plant to warrant development of a district energy system at this time. On the other hand, it has been deemed feasible to develop the recovery of biogas from the plant to support the production of a natural gas substitute in partnership with a utility provider. As there are significant costs to the production of biogas, Metro Vancouver and FortisBC Energy Inc. (Fortis), a division of FortisBC, have been exploring arrangements to develop the most effective way to bring biogas into production on a cost recovery basis (**Attachment 1**).

Biogas is produced when in the absence of oxygen, in a process called anaerobic digestion, bacteria break down organic waste from sources like landfills, wastewater plants and agriculture. In its raw form, biogas contains other gases that are not typically found in natural gas. It can, however, be purified (or upgraded), so that it is interchangeable with natural gas. Once upgraded it is often referred to as biomethane or renewable natural gas (RNG).

The provincial government considers RNG to be a carbon neutral source of energy. As a result, FortisBC is now able to offer its customers wishing to reduce their carbon footprint the option to purchase a maximum of 10% of their natural gas consumption as RNG.

FortisBC's renewable natural gas has been granted Carbon Neutral Product status by Offsetters BC after assessing the expected lifecycle emissions savings of the program[1]. Offsetters BC is a company that verifies carbon offset in accordance with the British Columbia Carbon Protocol. As RNG is considered to be carbon neutral in BC, displacing a portion of the traditional natural gas purchased with RNG will lower respective customers' GHG emissions.

Fortis is already offering its customers the ability to designate 10% of their energy use as renewable via RNG purchase in BC. For example, Fortis has partnerships with Catalyst Power of Abbotsford, BC and the Columbia Shuswap Regional District to capture, upgrade, and market RNG from agricultural and landfill sources. Fortis is actively researching and developing additional sources for RNG as it looks to expand its market into renewable clean energy.

From a local perspective, FortisBC and Metro Vancouver are currently co-developing biogas from the Lulu Island Wastewater Treatment Plant (Lulu RNG) and installing new equipment to upgrade the biogas into renewable natural gas on a cost recovery basis. The renewable natural gas from the Lulu RNG is anticipated to come on stream in late 2013 upon completion of the British Columbia Utilities Commission (BCUC) regulatory approval process and will be delivered using the existing Fortis infrastructure.

Analysis

Richmond has been an early adopter and recognized leader in the municipal energy management and renewable energy development. Council adopted assertive community targets of 33% GHG emissions reduction below 2007 by 2020 and 80% by 2050.

The City has been following three overarching strategies, as adopted by Council, for transitioning towards a more sustainable energy and low carbon future with lower GHG related emissions:

- **Energy conservation** - reduce the overall demand for an energy service (e.g., insulating buildings)
- **Energy efficiency** - reduce the energy required to provide an equivalent energy service (e.g., take rapid transit to work instead of driving a vehicle)
- **Renewable and clean energy** – increase the use of renewable energy sources and reduce the carbon intensity of emissions resulting from an energy service (e.g., fuelling the same vehicle with gasoline that includes 5% renewable content)

[1] The full report titled "Biomethane Greenhouse Gas Emissions Review, FortisBC, dated May 30th, 2011", completed by Offsetters, is available at http://www.fortisbc.com/NaturalGas/Homes/Offers/RenewableNaturalGas/Documents/BiomethaneGreenhouseGasEmissionsReview.pdf

The purchase of RNG is another opportunity to incorporate more sustainable energy into the City's operation. While the City's primary focus is to reduce GHG emissions through energy conservation and efficiency, our facilities will continue to require natural gas for many of their operations. Increasing the use of renewable energy sources, such as RNG, will help to further reduce GHG emissions.

The availability of RNG captured from the solid waste produced in Richmond at the Lulu RNG, represents a "made in Richmond" opportunity for the City to replace up to 10% of the corporate natural gas consumption using RNG to offset greenhouse gas emissions locally. This approach is considered to be preferable to purchasing GHG emission offsets from the private market that often pays large corporations to switch fuel from more polluting sources, such as coal, to less polluting sources. Unlike purchasing offsets from the private market, the Lulu RNG initiative supports the development of locally produced renewable energy.

Another significant advantage of RNG is the ease of conversion for customers. In addition to being considered a carbon neutral renewable resource, there is no new equipment needed for the businesses and residents to receive RNG. Fortis is responsible for constructing the new infrastructure at the waste treatment plant to convert the biogas to RNG and to inject the equivalent quantity of RNG purchased by its customers to displace conventional natural gas into the supply. Further benefits include the ease of monitoring and accurate verification.

There are two components to this proposal: Corporate Leadership and Community Action. Depending on Council's instruction, these components can be executed independently. However, staff believe that adopting both components will generate the best results.

Corporate Leadership

As a leader in municipal energy conservation, the City can show its support for the development of local green house gas offset solutions during the developmental phase of the Lulu RNG by:

1. Providing a letter of support for the FortisBC application to the British Columbia Utilities Commission to bring an additional renewable natural gas supply to customers in British Columbia as described in the Staff Recommendation.

2. In 2013, purchasing 360 GJ of renewable natural gas from FortisBC will result in an additional net cost of $1,210 (as compared to the projection for current natural gas contract costs - See **Attachment 2**). This gesture of support for the development of RNG to reduce green house gas emissions symbolically represents approximately 10% of the natural gas consumption of City Hall and South Arm Community Centre.

   Richmond will be amongst the first municipalities to take this symbolic step to support the FortisBC initiative. While the incremental premium in 2013 of approximately $1,210 is modest, it represents a meaningful gesture and a triple bottom line (TBL) approach in decision making. The total GHG emissions reduction from this purchase in 2013 would be equal to approximately 18 tonnes, which is the equivalent of diverting 13,160 lbs of waste from landfills.

In 2013

The additional cost for 360 GJ at $5.191 per GJ incremental cost	= $1,870
Cost avoidance for carbon offset $30/ton of C02e	=$ 660
Net additional cost to the City in 2013	**=$ 1,210**

3. When the Lulu RNG becomes available (estimated to be in 2014), based on the availability or RNG production, the City will have the option to replace up to10% of the natural gas energy use of all City facilities managed under the corporate energy management program with Lulu RNG. The estimated net incremental cost for 2014 is approximately $32,857 (See **Attachment 2**) after including the cost avoidance of the carbon offset. Staff recommend including an "opt out" clause in the contract with 90 day termination notice at the sole discretion of the City.

   The GHG emission reduction would be approximately 405 tonnes, which is the equivalent of diverting 304,790 lbs of waste from landfills. In addition, this GHG emissions reduction would avoid the need to purchase approximately $18,015 worth of carbon offsets[2] to meet the City's carbon neutral commitments to the province.

In 2014

The additional cost for 360 GJ at $5.191 per GJ incremental cost	= $ 50,872
Cost avoidance for carbon offset $30/ton of C02e	=$ 18,015
Net additional cost to the City in 2013	**=$ 32,857**

Corporate energy retrofit projects are funded based on the capacity of the project to pay back the investment through cost avoidance and successful application for external grants. While the cost of Lulu RNG will be higher than conventional natural gas, it is anticipated that the incremental increase in the natural gas cost for 2013 ($1,210) and 2014 ($32,857) can be fully offset by the projected cost avoidance from the corporate energy management program in 2013 and 2014 (**Attachment 1**).

Capital costs for energy management projects are funded from the Corporate Enterprise Fund. Cost avoidance and grants received are used to reimburse the fund. Enterprise fund repayments for energy management projects, through savings from utility operating budgets, have totalled over $1 million dollars since the program's inception in 2008. The Corporate Energy Management program, through a variety of energy saving projects, has avoided over $300,000 in additional operational costs (2009-2011). In addition, the program has secured approximately $660,000 in incentive and grant funding support over that same time period. Three energy management projects have been fully paid ahead of schedule and closed, and two other projects recently had their repayment schedule timelines reduced by three and five years respectively. It is expected that an additional $200,000 will be repaid to the Enterprise Fund by the end of this year, from Energy Management Program incentive funding.

[2] Given the anticipated average price of private market carbon offsets at $30/ton of CO2e.

The purchase of up to 10% of the City's corporate building natural gas consumption as Lulu RNG, is a highly viable way to offset unavoidable corporate GHG emissions while supporting a made in Richmond innovation. The projected annual net incremental cost of approximately $33,000 from 2014 onwards is one way for the City to continue demonstrating corporate leadership.

Community Action

Regardless of the success of the City's corporate energy management program, it will require significant community participation in energy conservation, reduction actions, and the development of other renewable energy sources to meet Richmond's community GHG emissions and energy reduction targets. The Lulu RNG represents a seamless way to switch a portion of the community natural gas consumption to a locally produced carbon neutral renewable energy source at a relatively low conversion cost. This makes the Lulu RNG a viable and simple option for Richmond residents.

According to FortisBC, an average BC residential single family household uses approximately 95 Gigajoules (GJ)/year of natural gas, which is currently approximately $875/yr. Fortis has offered its customers the option to purchase 10% of their natural gas consumptions as RNG. According to Fortis, the incremental cost of purchasing of RNG for such a household is approximately $67/yr (or $5.60/mo).

At this time, according to FortisBC, only 1,200 BC residential customers are taking advantage of the 10% RNG purchase offered by FortisBC. Of these 1,200 households, 36 households (approximately 3%) are from Richmond.

One of the barriers preventing more community participation may be the higher cost of RNG when compared to conventional natural gas, which does not take into consideration the costs of the higher GHG emissions of conventional natural gas.

From a community perspective, since taking specific actions to reduce energy or emissions is completely on a voluntary base, the best approach the City can take to encourage community action would be through:

- **Corporate leadership** – the City leading by example
- **Increasing awareness** – raising awareness about the value and benefits of reducing energy consumption and GHG emissions
- **Providing incentives** – developing an incentive program to encourage energy reduction and switching to the "made in Richmond" available renewable energy source[4]

In consideration of this approach, staff recommend that a report be brought to Council for consideration after investigating the following:

[4] For example, FortisBC Energy Inc. has partnered with AIRMILES to offer airmiles for participating customers. Fortis could work with the City to offer additional bonuses to offset the incremental cost and run special promotions to raise awareness and encourage participation.

1. A pilot incentive program designed to encourage Richmond businesses and residents to purchase the Lulu RNG, and the associated costs of the program; and

2. Explore opportunities to work with external partners to establish an incentive (i.e. grant/rebate) program for the purchase of Lulu RNG by residents and businesses.

This approach follows Council's direction (April 26, 2010 Council meeting) to

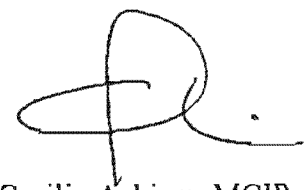
> "*Establish a grant, rebate, and/or low interest loan program to assist property owners to retrofit their buildings to reduce GHG emissions*",

Financial Impact

There is no request for additional funds at this time. The net incremental cost is $1,210 for 2013 and approximately $32,857 for 2014 which takes into consideration the reduced cost of carbon offsets to meet the City's carbon neutral commitments. Based on the track record of the corporate energy management program, the cost avoidance and external grants resulting from the corporate energy management is expected to fully offset the marginal cost increase to purchase the Lulu RNG.

Conclusion

The successful implementation of this initiative will represent a positive step forward to meeting our corporate GHG reduction targets in City-owned buildings and structures. As well, it provides an example of a simple alternative for Richmond residents and businesses to participate in achieving the adopted community-wide energy and GHG reduction targets.



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Att. 1	Letter – Metro Vancouver, Jeff Carmichael, dated May 2, 2012	REDMS #3532966
Att. 2	Table 1: Natural Gas Purchase Trend for Corporate Buildings 2009-2014	REDMS#3640112

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File No.: CP-03-04-LW022

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Cecilia Achiam
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Dear Mr. Polstolka and Ms. Achiam.:

This letter is in response to a request for clarification regarding the financial plan for the proposed Green Biomethane project at the Lulu Island Wastewater Treatment Plant, specifically with respect to how the project costs will be covered. The proposed project is led by Metro Vancouver, but includes FortisBC, Paradigm Environmental Technologies Inc., the Innovative Clean Energy Fund, and the Union of British Columbia Municipalities as partners, funders, or suppliers to the effort.

The project includes two distinct elements: the use of MicroSludge technology to enhance biogas creation, and the use of a biogas upgrading technology to create pipeline-grade biomethane which is expected to be sold to FortisBC. Both of these elements use new equipment that is not part of the existing wastewater treatment process.

The total project capital cost is estimated to be $13.1 million. These capital costs will be recovered through a combination of grants, in-kind contributions, and revenue from the sale of the biomethane. No sewage charges collected from users of the Lulu Sewerage Area wastewater treatment facility will be used for this project. Economic analysis indicates that the project is expected to break even: no profits will be generated by the project.

Agencies and individuals who choose to purchase "green" biomethane from FortisBC will be contributing to the recovery of capital costs necessary to upgrade the biomethane, allowing it to be transported and used through the FortisBC system. They will also be contributing to the region by reducing greenhouse gas emissions, by replacing fossil fuel-based natural gas with biomethane. Metro Vancouver encourages its residents and municipal members to consider this option as one of several possible means of contributing to meeting greenhouse gas reduction targets.

Please feel free to contact me if you need further information or clarification on this issue.

Yours Truly,

Jeff Carmichael
Division Manager, Utility Research and Opportunity Projects

JC:*lah*

Orbit #: 6119010

Table 1: Natural Gas Purchase Trend for Corporate Buildings 2009-2014

	Actual	Actual	Actual	Projection (to be recognized at end of year)	Projection	Projection	
	2009	2010	2011	2012*	2013*	2014*	* including cold weather contingency to conform to industry best practice
Natural Gas Consumption (GJ)	$94,176	$85,391	$92,875	$98,000	$98,000	$98,000	Note: Increase form 2011 includes the Richmond Olympic Oval in full operation post Games
Gas Purchase from Marketer	$705,760	$667,911	$686,950	$837,492	$852,442	$0	Note: Negotiated termination of gas marketer purchase contract ending 2013
Gas Purchase from Fortis	$593,724	$350,673	$360,669	$439,708	$447,558	$1,010,472	
Total Cost	$1,299,484	$1,018,584	$1,047,620	$1,277,200	$1,300,000	$1,010,472	2013 Projected costs for natural gas after renegotiation of contracts = $8.5/GJ (dropping from $13.5/GJ in 2013)
Projected Incremental Cost of RNGas Purchase					$1,870	$50,872	Based on a purchase of 360 GJ of RNG in 2013 and 9800 GJ in 2014
Avoided Carbon Neutral Costs					-$660	-$18,015	@ $30/ton of CO_2e
Total Projected Costs					$1,301,210	$1,043,329	