



City of Richmond

Report to Committee

To: Public Works and Transportation Committee **Date:** October 30, 2015
From: John Irving, P.Eng., MPA **File:** 10-6000-01/2014-Vol
 Director, Engineering 01
Re: **Carbon Neutrality and Richmond Carbon Marketplace Update**

Staff Recommendation

That:

1. The staff report titled, "Carbon Neutrality and Richmond Carbon Marketplace Update," from the Director of Engineering, dated October 30, 2015 be received for information.
2. The Chief Administrative Officer and the General Manager, Engineering and Public Works be authorized to negotiate and execute agreements with each of the five prospective Richmond-based business organizations to support community greenhouse gas emissions reductions and to ensure that the City of Richmond corporate carbon neutrality is maintained.

John Irving, P.Eng. MPA
 Director, Engineering
 (604-276-4140)

Att. 1

REPORT CONCURRENCE	
CONCURRENCE OF GENERAL MANAGER	
REVIEWED BY STAFF REPORT / AGENDA REVIEW SUBCOMMITTEE	INITIALS:
APPROVED BY CAO	

Staff Report

Origin

The City of Richmond has committed to maintaining carbon neutral corporate operations, which was first achieved in 2013. The purpose of this report is to present to Council a carbon neutrality update, and seek approval to develop and execute partnership agreements with Richmond-based organizations, as part of the Richmond Carbon Marketplace (RCM) pilot program.

This report supports Council's 2014-2018 Term Goal #4 Leadership in Sustainability:

Continue advancement of the City's sustainability framework and initiatives to improve the short and long term livability of our City, and that maintain Richmond's position as a leader in sustainable programs, practices and innovations.

4.1. *Continued implementation of the sustainability framework.*

4.2. *Innovative projects and initiatives to advance sustainability.*

The continued successful implementation of the City's corporate carbon neutral strategy also plays a minor part in achieving the Community Energy and Emission Plan goal of 33% reduction by 2020 and 80% reduction by 2050 in community GHG emissions, as compared to 2007 levels (corporate emissions represent approximately 1% of the overall community total).

Background

In September 2008, Council signed the BC Climate Action Charter, voluntarily committing the City to carbon neutral corporate operations. Carbon neutral corporate operations means that the City will reduce GHG emissions generated from its own operations and invest in additional projects, outside of the City's traditional operations, to compensate for emissions that cannot be avoided at this time. In 2013 Richmond City Council adopted the "*Towards Carbon Neutrality: Implementation Strategy*," which put in place an effective carbon neutrality strategy framework, which includes four key steps towards carbon neutrality; Measure, Reduce, Compensate or Offset, and Report.

Key mechanisms that were identified in the 2013 strategy to address the need for compensation included; assessing and quantifying beyond "business as usual" corporate activities that reduce GHG emissions, and the implementation of the Richmond Carbon Marketplace pilot program to purchase offsets from Richmond-based projects.

City of Richmond Carbon Neutral Achievement to Date

The City was recognized for achieving carbon neutral status in its corporate operations for the 2013 and 2014 reporting years. Ongoing corporate GHG emissions reductions from a continued focus on the City's Energy Management Program, Green Fleet Action Plan implementation, and High Performance Building Policy implementation, were contributors to achieving this status. Other contributors included achieving carbon offsets by undertaking actions that went beyond 'business as usual', e.g. expanded residential organics collection, organics drop-off service, and participating in the Vancouver Landfill gas capture optimization project. The success of these projects has enabled the City to carry forward a surplus of carbon credits into future years.

For the 2015 reporting year, the City is carrying forward a surplus of 5,332 tonnes of carbon dioxide equivalent (tCO₂e) credits accumulated from previous reporting years. This current surplus will help the City to maintain carbon neutral status through the 2016 reporting year. Due to Provincial regulation changes to landfill gas capture requirements (January 1, 2016); the City will not receive GHG emissions reduction credits from the Vancouver Landfill project after 2015. If further GHG emissions credits are not obtained in those years, it is projected that the City will be in a corporate carbon credit deficit starting in 2017.

Table 1: Projected Corporate GHG Emissions and Credits (tCO₂e)

	2016	2017	2018
Corporate Carbon Credits	10,471	7,682	6,016
Corporate Emissions	8,522	8,522	8,522
Net Corporate Emissions	(1,949)	-840	-2,506

Building on the 2013 carbon neutrality framework, City staff are focusing on three main actions to maintain corporate carbon neutral operations after 2016:

1. Reduce and optimize GHG emissions from existing City operations, e.g. heating and ventilation optimization at Watermania, right sizing and downsizing City fleet vehicles, and LEED Gold energy efficient replacement infrastructure.
2. Identify and quantify GHG emissions reduction activities from City operations that are beyond business as usual and outside of traditional services, e.g. district energy, concrete and asphalt recycling at Sidaway yard, and bog land conservation. Current estimates for offsets from these projects ranges from 550 to 2,000 tCO₂e potential credits. Quantification of these projects are underway with expected completion in 2016.
3. Seek community partnerships and support GHG emissions reduction in Richmond-based projects by purchasing carbon offsets through the Richmond Carbon Marketplace.

Analysis

Richmond Carbon Marketplace Pilot Program Projects

The Richmond Carbon Marketplace (RCM) pilot program is a tool to reduce GHG emissions and build community resilience by investing in Richmond-based projects through the purchase of carbon offsets for completing emissions reduction projects. When the pilot was introduced, Council endorsed a funding strategy for purchasing offsets that uses funds gained through the Province's Climate Action Revenue Incentive Program. The RCM pilot program was previously approved by Council, and is currently being implemented in a phased approach:

- Phase 1: Determine the Potential for Local GHG Reduction Projects (through outreach)
- Phase 2: Identify Potential Local GHG Reduction / Offset Projects, and complete pre-feasibility assessments
- Phase 3: Complete final assessments and quantify the RCM submissions, and enter into agreements with proponents to offset corporate GHG emissions
- Phase 4: Maintain corporate carbon neutrality
- Phase 5: Continue to help grow the City's low carbon economy

Staff have completed Phase 1 and Phase 2 of this pilot project, and are seeking approval to complete Phase 3.

Five submissions were received as part of this pilot program, and project summaries for each submission are listed below for Council consideration. For further description and information on each organization and submission, please see Attachment 1.

Table 2: Community Project Submissions for Richmond Carbon Marketplace Funding

Proponent	Project Description	Project Status	Est. GHG emissions reduction available (tCO₂e)	Max Funding (\$25/tCO₂e)
1. EcoWaste Industries	Enhanced landfill re-vegetation and carbon sequestration	Initial implementation underway – not yet fully implemented	200	\$5,000
2. Harvest Power	Packaged organics separation and recycling	Not yet implemented	1,000-1,500	\$37,500
3. Pacific Gateway Hotels	Building energy efficiency retrofits	Completed in 2015	200	\$5,000
4. RDH Building Engineering	Building energy renewal and retrofits in Richmond	Not yet implemented	300-500	\$12,500
5. TnT Supermarkets	Organic waste diversion and bio-digester, to achieve a zero waste grocery operation	Initial testing underway – not yet fully implemented	400-800	\$20,000
Total			2,100-3,200	\$80,000

The GHG emissions reduction associated with the projects listed above, once verified and confirmed as eligible, could qualify to be used to offset the City's corporate emissions and help maintain carbon neutral status in the long term. In order to be used to offset corporate emissions, project funding agreements will need to be developed with each proponent for the associated GHG emissions reductions only. These agreements will stipulate, but will not be limited to the following items:

1. Project schedule and timeline,
2. Quantification methodology and confirmation of eligibility requirements
3. GHG emission credit amount,
4. Funding amount (not to exceed \$25/tCO₂e),
5. Clear transfer of GHG emissions credit ownership to the City

The total maximum City funding commitment under these agreements would be \$80,000 in the 2015/16 operating years, as identified in Table 2. Depending on project completion dates, the earliest that associated GHG emissions reductions from these projects could be applied to reduce corporate emissions, would be for the 2016 reporting year. Any surplus carbon credits that the City obtains in any given year can be carried over to the following reporting years. Agreements to purchase GHG emissions credits through this pilot program will be time specific based on the calendar year or years, e.g. Jan 1 to Dec 31, 2016. If further credits were sought by the City from these projects after these initial agreements are executed, additional agreements would need to be drafted and approved by Council.

Based on the City's own experience and investments in corporate energy projects, staff estimate that for every tonne of carbon, valued at \$25/tonne, that was reduced, \$100 will be invested by the private sector in new equipment, technology, and/or services.

The funding for this pilot program, allocated from the Provincial Climate Action Revenue Incentive Program grant, was previously approved in the 2014 operating budget process (\$200,000), and remains in place to fulfill the completion of these potential funding agreements. Once the community projects are completed, it is envisioned that the City will recognize the pilot program participants for their commitment to sustainability and community GHG emission reductions.

Additional Benefits to the City

Additional benefits for purchasing community-based carbon offsets for each project is listed in Attachment 1, but in general relate to the following:

- Reductions in organic waste at the landfill, supporting regional landfill diversion targets
- Increase in local generation of renewable energy
- Enhanced landfill reclamation that improves discharge water quality, reduces dust control issues, increases wildlife habitat
- Investments in energy efficiency upgrades that support local jobs and reduce energy related costs for Richmond building owners.
- Reduced truck traffic and exhaust, through the reduction of waste pick-ups and deliveries.

Staff believe the Richmond Carbon Marketplace is a viable tool for delivering community-based carbon offset projects over time. Staff intend to continue issuing calls for proposals of offset reduction projects as needed; this is a key strategy for increasing awareness over time and growing the list of potential projects active in the program.

Financial Impact

None at this time. Should Council approve the recommendation to purchase community GHG emission reduction credits, approved funding for the maximum total of \$80,000 is already in place to execute the agreements.

Conclusion

The City of Richmond continues to meet its commitments as a signatory of the BC Climate Action Charter. City staff will continue to work towards Council's objective of maintaining the City of Richmond's carbon neutral status in the long term and support community-based GHG emission reduction projects. Through the continued strategic implementation of its carbon neutral plan, the City is well positioned to maximize corporate and community benefits of transitioning towards lower carbon energy sources and a low carbon economy.



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Att. 1: Richmond Carbon Marketplace Pilot Program - Submission Summary



Proponent Submissions Summary

A formal request for community greenhouse gas (GHG) emissions reduction project plans was issued publicly in the June of 2015, as part of the Richmond Carbon Marketplace pilot program. The purpose of this request was to determine the scale of the potential opportunity for the City to invest in community based projects that result in quantifiable GHG emissions reductions, which then could be used to offset the City's corporate GHG footprint.

Five submissions were received as part of this pilot program, and detailed project summaries and organization information is indicated below.

1. Ecowaste Industries

- **Business type:** Ecowaste Industries is a waste management group specializing in construction and demolition waste, and recyclables. They have been operating in Richmond since 1971.
- **Location:** Ecowaste Landfill, Triangle Road, Richmond
- **Type of Project:** Enhanced landfill reclamation through re-vegetation and carbon sequestration – Option 2
- **Project Description:** In 2008 Ecowaste initiated an innovative, value added phytoremediation system to the capped areas of the Ecowaste landfill in Richmond. By 2013, an enhanced reclamation process was fully implemented using hybrid coppice willow and poplar, as well as grasses to sequester both above ground and below ground carbon. Currently, the reclamation areas are irrigated, using partially treated leachate collected from the landfill, which helps to accelerate plant growth. The reclamation plants are easily harvested and will be used for composting purposes to return sequestered carbon to soils. In addition, engineered and fabricated soils are used to support this plant biomass system and help to capture fugitive methane that can leak through the landfill cap. Both the irrigation system and the biomass systems are considered to be significant incremental improvements beyond the business as usual landfill reclamation processes. Business as usual practices for landfill reclamation is to cap with a layer of soil, which is then fertilized and seeded with grasses only. The enhanced landfill reclamation areas are part of the long term leachate management and development strategy for the landfill, and are expected to remain in place for over 20 years. The project quantification will assess the difference in GHG emissions between the enhanced landfill reclamation process and business as usual reclamation.
- **Pre-feasibility Estimated GHG Emissions Reduction:** 170 tCO₂e per year
- **Project Timeline:** Full project implementation date was in 2013, with further enhancement reclamation work occurring in the fall of 2015. The baseline carbon sequestration monitoring period will be conducted for 12 months between the end of 2015 and 2016, with the first sequestration report completed at the end of 2016. After this report, a sequestration report will be completed every three years over the life of the system.

- **Additional Community Benefits:** Enhanced landfill reclamation improves the ecosystem quality of the overall property, improving the water discharge quality, reducing dust control issues, increasing wildlife habitat, and improving the overall aesthetics of the land.

2. Harvest Power

- **Business type:** Harvest Power is an organics and food waste recycling company with locations throughout North America, including Richmond. Harvest Power purchased Fraser Richmond Soil and Fibre, and the existing composting site in East Richmond in 2009. In 2013 Harvest Power opened North America's first large scale high solids bio-digester, called the Energy Garden that began converting food waste to an energy source.
- **Location:** 7028 York Road, Richmond
- **Type of Project:** Packaged organics separation and recycling – Option 1 or 2
- **Project Description:** This project involves the separation of packaged organic material from its packaging to allow for the recycling of both the packaging and organics/food waste. This material and organics recycling is a separate stream than the municipal organics and food waste recycling that is also conducted on-site. Presently there are few recycling options in the region for intermingled packaging and organics waste. With this project Harvest Power will open up new sectors of organics recycling market. The organic material will be introduced as feedstock into the Energy Garden's anaerobic digester, where it will be used to produce biogas and then electricity (which is made available to the main BC Hydro power grid). The project quantification will assess the difference in GHG emissions between business as usual landfilling of the packaged organic material and emissions from the de-packaging and recycling of the waste.
- **Pre-feasibility Estimated GHG Emissions Reduction:** 1,000 tCO₂e per year
- **Project Timeline:** The de-packing operation is currently completing its permitting process and is anticipated to start operation before the end of 2015.
- **Additional Community Benefits:** Reduce landfilling of inorganic packaging resources and increased renewable energy production through the facility's Energy Garden.

3. Pacific Gateway Hotel

- **Business type:** Pacific Gateway Hotel is a 374 room hotel, resort, and marina operation on Sea Island in Richmond. The hotel is affiliated with Preferred Hotels and Resort International, which represents a global collection of 650 independent hotels in 85 countries.
- **Location:** 3500 Cessna Drive, Richmond
- **Type of Project:** Building energy efficiency retrofits – Option 1
- **Project Description:** The facility has undergone and is continuing to conduct energy efficiency upgrades to the building structure and systems to reduce energy use and GHG emissions, including;
 - Building automation system upgrades
 - Boiler plant replacement with domestic hot water pre-heat
 - Upgrade and replacement of make-up air units and exhaust fans
 - Lighting re-lamp and retrofit
 - Resealing the building envelope to decrease conditioned air leaks.

The project quantification will assess the difference in GHG emissions between business as usual energy use of the building as compared to the post energy efficiency retrofit operation.

- **Pre-feasibility Estimated GHG Emissions Reduction:** 80 tCO₂e per year
- **Project Timeline:** Most of the energy efficiency upgrades will be completed by the end of 2015, with some building envelope work being conducted in separate phases in 2016 and 2017.
- **Additional Community Benefits:** Economic investments in energy efficiency upgrades at the hotel help support local jobs and economy.

4. RDH Building Engineering

- **Business type:** RDH Building Engineering is a building engineering and science consultant firm that specializes in energy efficiency integration for existing and new buildings. The firm was founded in 1997 and has its head office in Vancouver, with energy efficiency projects located throughout the Province.
- **Location:** Various multi-family residential buildings in Richmond
- **Type of Project:** Building energy efficiency retrofits – Option 1
- **Project Description:** RDH Building Engineering proposes to aggregate the emissions reductions of several multi-family residential building energy efficiency projects in the City of Richmond that have not yet been completed. RDH will be partnering with building owners to develop and deliver these Richmond based GHG emissions reduction projects. The project quantification will assess the difference in GHG emissions between business as usual energy use of the buildings as compared to their post energy efficiency operations.
- **Pre-feasibility Estimated GHG Emissions Reduction:** 300 tCO₂e per year
- **Project Timeline:** This project has not yet been implemented.
- **Additional Community Benefits:** Reduced energy related costs for Richmond building owners.

5. T & T Supermarkets

- **Business type:** T & T Supermarkets is a supermarket chain, which is headquartered in Richmond, BC, and has locations throughout Canada. The first T & T Supermarket was opened in 1993. The supermarket chain was purchased by Loblaw Companies in 2009.
- **Location:** Unit #1000 – 3700 No.3 Rd, Richmond
- **Type of Project:** Organic and Waste Reduction and Recycling – Option 2
- **Project Description:** T&T Supermarkets have been working on creating a zero waste grocery store at the Richmond location for a number of years. One of the keys to this zero waste initiative is to employ on-site technology that can digest organic food waste and in turn produce a liquid fertilizer for agricultural use. T & T Supermarkets have been testing devices that can process on-site organic waste into liquid fertilizer since 2012. Another key component of the T&T Supermarket zero waste strategy is to convert unrecyclable waste into solid recovered fuel pellets that can be used to replace fossil fuels typically used to operate cement kilns (e.g. Lafarge cement plant in East Richmond). The project quantification will assess the difference in GHG emissions between business as usual organic waste and

unrecyclable material disposal, and emissions of the on-site processing of organic waste and the processing and reuse of unrecyclable material.

- **Pre-feasibility Estimated GHG Emissions Reduction:** 100-650 tCO₂e per year
- **Project Timeline:** The project has been undergoing testing and refinement of the digester system since 2012, but has not been fully implemented yet. The processing of the non-recyclable waste into fuel pellets has not yet been implemented, but is anticipated to be initiated before the end of 2015.
- **Additional Community Benefits:** Reduced truck traffic and exhaust, through the reduction of waste pick-ups and deliveries.