

Agenda

Public Works & Transportation Committee

Anderson Room, City Hall 6911 No. 3 Road Wednesday, November 20, 2013 4:00 p.m.

Pg. # ITEM

MINUTES

PWT-4 Motion to adopt the minutes of the meeting of the Public Works & Transportation Committee held on Wednesday, October 23, 2013.

NEXT COMMITTEE MEETING DATE

Wednesday, December 18, 2013, (tentative date) at 4:00 p.m. in the Anderson Room

ENGINEERING AND PUBLIC WORKS DEPARTMENT

1. **2013 CORPORATE ENERGY MANAGEMENT UPDATE** (File Ref. No. 10-6000-01) (REDMS No. 4022107 v.5)

PWT-10

See Page **PWT-10** for full report

Designated Speaker: Peter Russell

STAFF RECOMMENDATION

That the staff report titled 2013 Corporate Energy Management Program Update from the Director, Engineering, dated October 31, 2013 be received for information.

2. ALEXANDRA DISTRICT ENERGY UTILITY BYLAW NO 8641, AMENDMENT BYLAW NO 9073 AND 2013 PERFORMANCE SUMMARY

(File Ref. No. 12-8060-20-9073; 10-6600-10-01) (REDMS No. 4014235 v.6)

PWT-23

See Page **PWT-23** for full report

Designated Speaker: Peter Russell

STAFF RECOMMENDATION

That the Alexandra District Energy Utility Bylaw No. 8641, Amendment Bylaw No. 9073 be introduced and given first, second and third readings.

3. UPDATE ON 2013/2014 SNOW AND ICE RESPONSE PREPARATIONS (File Ref. No.) (REDMS No. 4026186)

PWT-32

See Page **PWT-32** for full report

Designated Speaker: Ben Dias

STAFF RECOMMENDATION

That the staff report titled Update on 2013/2014 Snow and Ice Response Preparations, dated October 31, 2013, from the Director, Public Works Operations be received for information.

4. TOWARDS CARBON NEUTRALITY: IMPLEMENTATION STRATEGY

(File Ref. No. 10-6000-01) (REDMS No. 4022113 v.3)

PWT-39

See Page PWT-39 for full report

Designated Speaker: Peter Russell

STAFF RECOMMENDATION

That the staff report titled Towards Carbon Neutrality: Implementation Strategy, dated October 24, 2013, which identifies a pilot program to offset greenhouse emissions from corporate operations by implementing the Richmond Carbon Marketplace, a mechanism for purchasing communitybased carbon offsets be approved. 5. MANAGER'S REPORT

ADJOURNMENT



Minutes

Public Works & Transportation Committee

- Date: Wednesday, October 23, 2013
- Place: Anderson Room Richmond City Hall
- Present: Councillor Linda Barnes, Chair Councillor Chak Au Councillor Derek Dang Councillor Linda McPhail Councillor Harold Steves Mayor Malcolm Brodie
- Call to Order: The Chair called the meeting to order at 4:00 p.m.

MINUTES

It was moved and seconded That the minutes of the meeting of the Public Works & Transportation Committee held on Wednesday, September 18, 2013, be adopted as circulated.

CARRIED

NEXT COMMITTEE MEETING DATE

Wednesday, November 20, 2013, (tentative date) at 4:00 p.m. in the Anderson Room

ENGINEERING AND PUBLIC WORKS DEPARTMENT

1. TRANSLINK 2014 CAPITAL PROGRAM COST-SHARING SUBMISSIONS

(File Ref. No. 01-0154-04) (REDMS No. 4001650)

In reply to a query, Victor Wei, Director, Transportation, advised that the City of Richmond's costs are typically at 50% of the total project costs but for this year it is slightly higher than 50% as some components of the submissions are not eligible for cost-sharing under the program.

It was moved and seconded

- (1) That the submission of:
 - (a) road improvement project for cost-sharing as part of the TransLink 2014 Major Road Network & Bike (MRNB) Upgrade Program,
 - (b) bicycle facility improvement project for cost-sharing as part of the TransLink 2014 Bicycle Infrastructure Capital Cost-Sharing (BICCS) Regional Needs Program, and
 - (c) transit facility improvements for cost-sharing as part of the TransLink 2014 Transit-Related Road Infrastructure Program,

as described in the staff report, be endorsed; and

(2) That, should the above submissions be successful and the projects receive Council approval via the annual capital budget process, the Chief Administrative Officer and General Manager, Planning and Development be authorized to execute the funding agreements and the 2014 Capital Plan and the 5-Year Financial Plan (2014-2018) be updated accordingly dependent on the timing of the budget process.

CARRIED

Mayor Brodie left the meeting at 4:01 p.m. and returned at 4:02 p.m.

2. UNIVERSAL SINGLE-FAMILY WATER METER PROGRAM – 4966P (File Ref. No. 10-6650-02) (REDMS No. 3989995 v.2)

In response to a query, Lloyd Bie, Manager, Engineering Planning, stated as the project moves forward, staff will now prepare several tiers of notification informing residents throughout the implementation period. It was moved and seconded

That the Universal Single-Family Water Meter Program be contracted to Neptune Technology Group (Canada) Ltd. for a six-month term with a City option to extend to a three-year term.

CARRIED

3. WATER LOSS MANAGEMENT UPDATE

(File Ref. No. 10-6650-02) (REDMS No. 3979772 v.3)

Mr. Bie advised that reducing the water pressure has a two-fold benefit to the City; (i) it would reduce system leakage, and (ii) it would potentially extend the replacement curve of the ageing infrastructure for the water meter system reducing monies required for capital replacements each year.

It was moved and seconded

That the Water Loss Management Update report (dated September 26, 2013 from the Director, Engineering) be received for information.

CARRIED

4. GREEN FLEET ACTION PLAN

(File Ref. No. 02-0780-00) (REDMS No. 3982693 v.2)

Suzanne Bycraft, Manager, Fleet & Environmental Programs, explained that there were a number of factors taken into consideration with vehicle replacement, such as, age, condition, mileage, technology, market availability, and departmental needs and objectives.

It was moved and seconded

That the "Richmond Green Fleet Action Plan" as outlined in the report from the Director, Public Works Operations dated September 24, 2013, be approved as the City of Richmond's action plan and business strategy for improving fuel efficiency, reducing greenhouse gas emissions and reducing overall environmental impact of equipment and vehicle operations.

CARRIED

GARBAGE COLLECTION - REVIEW OF SERVICE LEVEL OPTIONS (File Ref. No. 10-6405-01) (REDMS No. 3997638 v.2)

Ms. Bycraft advised that the report outlines the various levels of garbage collection service available for Committee discussion and direction.

In response to a query on which option would be recommended based on environmental or waste reduction factors, Ms. Bycraft stated that it is estimated that options #4 and #5 would achieve an approximate additional 8% reduction in solid waste. Ms. Bycraft noted that the bi-weekly collection may be a motivating factor for those who have yet to participate in the waste reduction program. Discussion ensued regarding the various levels of service, particularly options #4 weekly and #5 biweekly collections. As good statistics are not available Committee discussed staff conducting a pilot program, in combination with a major education program.

Councillor Dang left the meeting at 4:14 p.m.

In response to further queries, Ms. Bycraft commented that green gas emission statistics, from municipalities involved in the cart collection program, are not available and that although bi-weekly collection will reduce emissions those reductions would not be as significant as one might expect. She further commented that garbage service must be provided whether or not a resident uses the service. Ms. Bycraft noted that since the implementation of the Green Cart program, staff has received inquiries related to carts for garbage pick-up.

Councillor Dang returned to the meeting (4:16 p.m.).

Discussion continued on the need for more environmental performance statistics and it was suggested that the report be referred back to staff (i) to construct and recommend, including cost implications, a six-month pilot project to start in 2014, (ii) to construct an educational program in general and specific to the pilot areas, and (iii) report on the relative expectations on environmental reductions and costs.

Robert Gonzalez, General Manager, Engineering & Public Works, suggested that the pilot project be conducted on both option #4 and #5. The City provides a high level of service and has seen an 8% reduction in waste through the organics program. Staff could conduct two small pilot projects to report back in 2014 with the objective to implement a new program in 2015.

Mr. Gonzalez indicated that staff could request Sierra Waste Services to track fuel consumption in order to report any environmental benefits to the program. Emissions from the garbage trucks are not significant overall.

At the conclusion of the discussion the following **referral** motion was introduced:

It was moved and seconded

- (1) That garbage collection service levels report be referred to staff :
 - (a) to construct and recommend, including logistics and cost implications, a six-month pilot project to start in 2014 for Options No. 4 and No. 5;
 - (b) to develop an educational program for residents in general and specific to the pilot areas; and
 - (c) to report on the relative expectations on the environmental reductions and costs.

CARRIED

5A. GARBAGE

(File Ref. No.) (REDMS No.)

Councillor Steves advised that Neil Grant, Harvest Power, is arranging a meeting with interested parties with regard to implementing a pilot project using the compost material, from the yard and food waste collected in Richmond, as fertilizer. The project farm land would use regular fertilizer on a portion of land and the compost material on another portion for comparison and study purposes. The following **referral** motion was introduced:

It was moved and seconded

That the compost project be referred to staff in order for staff to continue to work with Harvest Power and the agricultural community on the compost project.

CARRIED

6. MANAGER'S REPORT

(a) Public Works Department Update

Ms. Bycraft stated that correspondence had been received from Metro Vancouver advising that they will be starting consultation regarding a proposed organics ban and are seeking input from the public on the types of organics that should be included, what type of enforcement should occur, and the way the ban should be phased in with the intent for implementation of the ban in 2015. The ban primarily targets the restaurant and commercial industry but would affect individuals as well.

Staff was advised to include the Chamber of Commerce and Richmond Tourism in the consultation process.

(b) Transportation Department Update

Mr. Wei updated Committee that an oversize truck, heading northbound on Highway 99, struck the Cambie Road overpass. RCMP had closed Highway 99 for approximately 45 minutes in order to allow the truck to back up and take the off-ramp. Based on the visible damage observed by RCMP the damage appeared to be minor. Transportation Division staff have now confirmed that the damage was minor in nature.

ADJOURNMENT

It was moved and seconded *That the meeting adjourn (4:32 p.m.).*

CARRIED

Certified a true and correct copy of the Minutes of the meeting of the Public Works & Transportation Committee of the Council of the City of Richmond held on Wednesday, October 23, 2013.

Councillor Linda Barnes Chair Heather Howey Committee Clerk



Re:	2013 Corporate Energy Management Update		
From:	John Irving, P.Eng, MPA Director, Engineering and Public Works	File:	10-6000-01/2013-Vol 01
То:	Public Works and Transportation Committee	Date:	November 1, 2013

Staff Recommendation

That the staff report titled "2013 Corporate Energy Management Program Update Report" from the Director of Engineering and Public Works, dated November 1, 2013 be received for information.

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

Att. 2



Staff Report

<u>Origin</u>

The Corporate Energy Management Program (EMP) supports the following Council Term Goal;

Council Term Goal #8.1: "<u>Continued implementation and significant progress towards</u> <u>achieving the City's Sustainability Framework</u>, and associated targets.

The EMP is a key contributing program towards achieving the Sustainability Framework Goals of a Sustainable Resource Use-Energy Smart City and Climate Prepared City.

This report summarizes the recent achievements of the Corporate EMP and highlights upcoming initiatives. The report information is also summarized in an attached brochure, to further illustrate key information and highlights of recent City energy projects and initiatives (Attachment 1).

Energy Management Program - Overview

The City has been following three corporate strategies, as adopted by Council in the Energy Sustainability Strategic Program, to guide the transition towards more sustainable energy use and lower greenhouse gas (GHG) emissions;

- 1. Empower building awareness and capacity
- 2. **Reduce** reduce overall energy consumption through conservation and efficiency
- 3. **Renew and Localize** accelerate transition to locally supplied renewable and clean energy

To put these strategies into actions, the corporate EMP has been focused on three main areas;

- 1. Energy conservation reduce the overall demand for an energy service (e.g., increased corporate energy use awareness and improved operational control to reduce waste)
- 2. Energy efficiency reduce the energy required to provide an equivalent energy service (e.g. lighting retrofits to more efficient technologies)
- 3. **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. installation of solar thermal energy systems at existing facilities)

The Energy Management Program, through these strategies and actions, is a major component of the Towards Carbon Neutrality Implementation Strategy. An overview of key energy management initiatives connected with the Towards Carbon Neutrality Implementation Framework is provided in the report to council titled Towards Carbon Neutrality: Implementation Strategy.

In addition to the Sustainability Framework and Carbon Neutral goals and targets, the City of Richmond, in collaboration with BC Hydro, agreed to a reduction target of approximately 1.3% or 650,000 kWh in corporate electrical use by April 2014 from 2012 levels, which is equal to the energy used by approximately 20 homes in BC per year. The City of Richmond is presently on-pace to better this target by early 2014. This target and the continued collaboration with BC

Hydro helps to maximize the incentive funding from BC Hydro (one of our key EMP external funding partners), and allows for the continued development and delivery of projects.

EMP Achievements - 2007-2011 EMP Highlights

Based on the continuing corporate emphasis on increased energy use efficiency, the City of Richmond remains the only municipality in BC to achieve the Leadership Excellence Award recognition from BC Hydro, which is the highest level of recognition BC Hydro awards for energy efficiency and conservation work. New excellence awards will be issued for energy efficiency and conservation work in the fall of 2014.

Energy conservation work at the City and energy related projects have saved approximately 28.4 GWh of energy (equal to the energy consumption in 790 BC homes per year) since 2007, which amounts to approximately \$1,500,000 in total operational cost avoidance and over 5,000 tonnes of greenhouse gas emissions (equal to emissions from 1500 Richmond cars). During that time the City received approximately \$1,000,000 in external funding to help support its EMP, which has been used to proceed with additional and expanded Energy Management projects, increase the repayment of capital funding to the corporate Enterprise Fund for projects related to Energy Management, and develop energy related projects.

Findings of Fact

Corporate Energy Use Overview - 2012

The corporate energy manager actively manages or coordinates energy use reporting, inventory, and reduction programs, for all civic buildings, lighting, and water/wastewater services, and in addition reports on energy use at the Richmond Oval.

In 2012 City assets under the EMP consumed approximately \$6.0 million dollars of conventional energy¹ (electricity and natural gas), which equals 80.6 GWh (this is equivalent to the amount of energy used on average each year by approximately 2,300 homes in BC). This total does not include the energy used in our corporate fleet operations. Compared to 2011 the corporate energy consumption for buildings, water/wastewater services, and lighting has remained stable, at the same time that corporate asset inventory has increased.

Energy use at civic buildings accounts for a majority (approximately 82%) of total reported corporate energy use². As shown in the following Figure 1, civic building energy use intensity has decreased from approximately 373 kWh/m2 in 2007 to 326 kWh/m2 in 2012. Decreasing energy use intensity in civic buildings (improving energy use efficiency) demonstrates that corporate energy management is effective.

² This total corporate energy use does not include Fleet services.

¹ There are civic buildings that have renewable energy systems (e.g. solar thermal hot water heating at Minoru Aquatic Centre), which obtain "free" solar energy that is not accounted for in our total corporate energy use/cost amount.



EMP Achievements - 2012/2013 EMP Highlights

With the commitment of Council and staff to increased corporate energy use efficiency, it is anticipated that by early 2014 the City will achieve a reduction of approximately 1.4 GWh of electrical and natural gas energy use (approximately 1.8% of current corporate use) from a variety of 2012/2013 energy related projects. This reduction represents approximately \$100,000 in operational cost avoidance savings and a reduction of approximately 170 tonnes of CO_2e (equal to removing approximately 50 Richmond cars from our roads each year).

Other select highlights of the City's energy management program and other energy related corporate activities from 2012 and 2013 include:

- **External Funding:** Secured over \$100,000 of external funding to support the Corporate Energy Management Program and Sustainability Unit.
- <u>Employee Engagement:</u> Completed Year 3 of a 4-year corporate energy awareness program, branded "Because Energy Awareness Matters (BEAM)" with support of BC Hydro and staff Energy Champions, to promote energy conservation measures with staff.
- <u>Showcase projects:</u> Achieved higher than anticipated energy conservation results for two projects, a heat recovery installation at Minoru Arena and a lighting retrofit at Burkeville tennis courts.
- **Policy Review:** On-going facilitation of a working group to update the Corporate High Performance Building Policy, with emphasis on space functionality, and operational and energy efficiency.
- <u>New Technology</u>: Continued feasibility work on the integration of new high efficient light-emitting diode (LED) street lighting fixtures into the City's street lighting system to displace higher energy using high pressure sodium fixtures.

Further summary of EMP projects highlights in 2012 and 2013 are provided in Attachment 2.

In addition to corporate initiatives listed above, the City, the Engineering Department, and the District Energy Management Program are working on the establishment of new district energy centre locations powered by renewable energy, namely River Green and City Centre. The

development and connecting of renewable energy to new corporate facilities, would allow the City of Richmond to further reduce its corporate greenhouse gas emissions, by displacing more conventional heating and cooling energy sources.

Future EMP Vision and Goals

In continuation from the Vision and Goals from last year's Energy Update Report, the following main focus areas remain in place for the EMP for 2014;

- Increase energy use awareness within the organization and community
- Pursue external funding and partnerships with outside agencies
- Maintain a leadership role in terms of municipal energy systems and policy
- Improve the "usability" of our energy use data at key facilities, to allow for more detailed analysis and the increased optimization of our energy use
- Incorporate a more systematic approach to building energy use performance analysis and benchmarking of our civic facilities, to allow for the continued improvement of our facilities, and the extension of their usefulness
- Continue to ensure that energy use and GHG emission accounting (in relation to reduction goals) is a high priority during the designing of new facilities and developments

The funding strategy for these programs will be brought forward as part of the operating budget process for consideration by Council.

Planned Upcoming Capital Projects

There are numerous proposed energy initiatives for 2014, as part of the EMP capital submissions as well as longer term projects, which in summary includes the following key actions items.

- Retro-commissioning of select high consuming buildings
- Completion of building automation system upgrades at several civic facilities
- Lighting retrofits at various facilities, including Minoru Park tennis courts
- Pool heating system optimization at Steveston and South Arm facilities

Financial Impact

There is no financial impact as a result of this report. Capital projects related to energy management are reviewed and approved by Council as part of the capital budget process.

<u>Conclusion</u>

Through Council's continued commitment to corporate energy efficiency and the collaborative staff effort between departments, energy efficiency awareness is becoming more embedded into the City's corporate culture and decision making processes every year. Cumulatively since 2007, energy conservation projects in buildings at the City have saved approximately 28.4 GWh of energy (equal to the energy consumption in 790 BC homes per year), which amounts to

approximately \$1,500,000 in total operational cost avoidance and over 5,000 tonnes of greenhouse gas emissions reduced (equal to emissions from 1,500 Richmond cars). These efforts have allowed the City to bring on new facilities and infrastructure, without significantly increasing our overall energy use.

Further work and initiatives to increase the effectiveness of the corporate EMP, will focus on maximizing energy efficiency opportunities for new capital projects and replacement equipment, increasing operational efficiencies through building automation systems, and continuing to retrofit existing buildings for improved energy performance. The EMP will also investigate the feasibility of district energy connectivity for replacement of facilities at Minoru Park and other areas of the community where district energy is being implemented.

Levi Higgs Corporate Energy Manager (604-244-1239)

Attachment 1	Energy Report Summary – 2012	REDMS# 4026277
Attachment 2	City Energy Management Program 2011/2012 Key Initiatives	REDMS# 4021018

Attachment 1

Energy Update Report Summary 2012/2013





City Energy Use

Overview 2012

- Cost of energy in 2012 for the City of Richmond buildings, lighting, water and wastewater services = \$6.0 million dollars or 80.6 MWh (this is equal to the average power consumed in ~2,300 homes in BC in 1 year).
- Although overall energy use has not decreased as compared to 2011, our building energy use intensity (kWh/m2) continues to decrease. This indicates that corporate energy use efficiency is increasing.
- Although overall energy use has not decreased as compared to 2011, our building energy use intensity (kWh/m2) continues to decrease, which indicates that corporate energy use efficiency is increasing.
- Cumulatively since 2007, energy conservation projects at the City have saved approximately 28.4 GWh of energy (equal to the energy consumption in ~790 BC homes per year), and over 5,000 tonnes of greenhouse gas emissions (equal to emissions from ~1500 Richmond cars).









City of Richmond

City Energy Use

- In 2012, the majority of corporate energy use (excluding fleet services) was by buildings-82%, followed by lighting-11% and water/wastewater services-6%.
- Recreational pools and ice arenas remain our highest energy consuming facilities - with Richmond Olympic Oval, Watermania, Richmond Ice Centre, Minoru Pools and Minoru Arenas accounting for approximately 56% of the energy used by civic buildings in 2012.
- This focus of energy usage on a smaller number of buildings has lead the Energy Management Program to continue to focus its assessment and auditing resources on the higher consuming buildings.
- A further three high consuming buildings, in addition to five that are already in the program, are participating in the BC Hydro continuous optimization (COp) program, which aims to increase energy efficiency by 5-20% through site energy investigations and operational changes.







Energy Management

Program Highlights 2012/2013

- Secured over **\$100,000** of external funding to support the Energy Management Program.
- The City of Richmond remains the only Municipality recognized by BC Hydro for the City's energy efficiency and conservation work as being a **Power Smart Leader**.
- City is on course to achieving, by early 2014, an estimated reduction of **1.4 GWh** in electrical and natural gas use and approximately **170 tonnes** of greenhouse gas emissions from a variety of current projects.
- This energy reduction represents approximately 1.8% of our current corporate annual energy use and the GHG emissions reduction is equal to removing approximately 50 vehicles from Richmond roads each year. In addition, these energy reductions will result in approximately \$100,000 in operational cost avoidance savings.











Program Highlights 2012/2013

Energy Management

- Energy Strategic Planning: Development of a yearly building energy audit schedule that aligns with yearly building condition assessments.
- **Policy Review:** Facilitation of a working group to update the Corporate High Performance Building Policy, with emphasis on space functionality, operational and energy efficiency, and the incorporating of building energy use reduction targets.
- Employee Engagement: Completed Year 3 of a 4-year corporate energy awareness program with support of BC Hydro and staff "Energy Champions", to promote energy conservation measures within the corporation.
- Showcase projects: Achieved higher than anticipated energy conservation results for two 2012 projects, a heat recovery installation at Minoru Arena and a lighting retrofit at Burkeville tennis courts. Completed "first of its kind" sanitary sewer heat recovery installation at Gateway Theatre.
- New Technology Integration: Continued feasibility work on the integration of new high efficient light-emitting diode (LED) street lighting fixtures into the City's street lighting system to displace higher energy using high pressure sodium fixtures.











City of Richmond

Minoru Arena Ice Plant Replacement

Energy Management Program

- Continue to implement and work towards corporate goals associated with the Sustainability Framework - Sustainable Resource Use-Energy Smart City and Climate Prepared City, and the Towards Carbon Neutrality Implementation Strategy.
- Research and facilitate the maximizing of energy efficiency opportunities for new capital projects and replacement equipment, increasing operational efficiencies through building automation systems, and continuing to retrofit existing buildings for improved energy performance.
- Complete evaluation of the feasibility of connecting replacement facilities at Minoru Park to a district energy centre.
- Continue to increase energy use awareness within the organization and community.

Action Items include:

- Finalize the upgrading of our corporate energy use database, to improve energy reporting capabilities and corporate energy use information sharing.
- Finalize the establishment of corporate building energy use targets, to help drive energy efficiency goals within the corporation.
- Continue to align energy management project funding requests with upcoming building improvement projects to maximize co-benefits of coordinating project activities at the same time.
- Complete a building automation system integration plan for new and existing buildings, to increased building operational energy efficiency and analysis capability.







City Energy Management Program -2012/2013 Key Initiatives

Management Areas	2012/2013 Key Initiatives
Plan	 Energy Strategic Planning: Secured over \$100,000 in external funding in the past year to support energy initiatives efficiency initiatives such as; Numerous lighting retrofits and re-lamping projects Funding in Energy Manager and Sustainability Project Manager positions Energy modelling work for new City Centre Community Centre In the process of updating the Corporate High Performance Building Policy, which will include corporate energy and greenhouse gas emission reduction targets for buildings. Development of a building energy audit schedule that aligns with yearly facility condition assessments, to streamline Energy Management project development. Working with BC Hydro and BC Procurement to establish an LED purchasing guidelines and consortium to lower material costs.
Do	 Building Capacity Workplace conservation Awareness program Year 3 completed (initiatives included What's Watt online challenge, lighting information workshop and a turn down the heat campaign). Program will be continued in 2014. Greater alignment of capital submissions for yearly building improvement and energy management related requests, to ensure that projects are delivered seamlessly (e.g. building envelope work at West Richmond Community Centre delivered at the same time as lighting improvements). Audited natural gas and electricity billing accounts, and are working to streamline billing and energy tracking processes.
	 Reducing Energy Use or Displacing conventional energy sources Various heating ventilation and air-conditioning unit replacements (South Arm and West Richmond Community Centres, and Public Works Yard) Lighting retrofits and re-lamps at various facilities (e.g. South Arm and Thompson Community Centres, Gateway Theatre, and City Hall) New LED Tennis Court lighting piloted at Burkeville Completion of natural gas use reduction projects at Gateway Theatre that included a major boiler and coupling replacement. Increasing Financial Security & Stability
Maxitan O	over \$100,000 in energy and maintenance cost avoidance
Monitor & Report	 Improving Energy Monitoring System Corporate energy database is currently being updated to a system with increased functionality (e.g. greater energy use reporting capabilities to stakeholders, and increased efficient reporting function for BC reporting requirements) Inclusion of three additional facilities in to the BC Hydro Continuous Optimization program (Steveston and South Arm Community Centres, and the Works Yard), which includes the installation of real-time energy monitoring devices
	Reporting Performance • Annual Corporate-wide Energy update report to Council • Semi-Annual reporting to Senior Management, on Energy Management Program status and work plan • Quarterly reporting to BC Hydro – currently on pace to meet established BC Hydro electricity reduction targets for this year • Interdepartmental quarterly reporting of Energy Management project status
Innovate & Improve	Exploring New Approaches and Technologies • The following projects and feasibility of further evaluation will be assessed in the coming months • Corporate LED parking lot lighting retrofit implementation • Upgrade of building control systems, to fully web-based • Mini district energy centre for corporate precinct, as part of Minoru re-development • Street light LED change over project plan evaluation and development • BC Hydro energy management system assessment to be conducted in the fall.



Report to Committee

Re:	Alexandra District Energy Utility Bylaw No 864 and 2013 Performance Summary	41 Amendr	ment Bylaw No 9073
From:	John Irving, P.Eng. MPA Director, Engineering	File:	10-6600-10-01/2013- Vol 01
То:	Public Works and Transportation Committee	Date:	October 16, 2013

Staff Recommendation

That the Alexandra District Energy Utility Bylaw No. 8641, Amendment Bylaw No. 9073 be introduced and given first, second and third readings.

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

Att. 1

REPORT CONCURRENCE				
ROUTED TO:	Concu	IRRENCE	CONCURRENCE OF GENERAL MANAGER	
Finance Division		V		
REVIEWED BY STAFF REPORT / AGENDA REVIEW SUBCOMMITTEE		Initials: DW	APPROVED BY CAO	

Staff Report

Origin

In 2010, Council adopted the Alexandra District Energy Utility Bylaw No. 8641 establishing the charges that constitute the rate for the service of delivering the energy for space heating and cooling and domestic hot water heating within the Alexandra District Energy Utility (ADEU) service area.

The purpose of this report is to recommend the 2014 ADEU service rates.

This initiative aligns with Council Term Goal #8.1, which states:

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

Background

2013 Performance Summary

The ADEU Phases 1 and 2 were commissioned in July 2012 and currently provide energy to two developments (Mayfair Place and Remy) with over 600 residential units. The ADEU will potentially service up to 3100 residential units and 1.1 million sq. ft. of commercial uses at build out in approximately 10 to 15 years.

Since the start up of the system in July 2012, the system demand has been gradually increasing. Both Mayfair Place and Remy developments were occupied in phases and it took 12 months until both buildings were completely occupied.

As of September 30, 2013 (end of third billing quarter), the ADEU system has delivered 1,829 MWh of energy to customers for space heating, cooling and domestic hot water heating. While some electricity is consumed for pumping and equipment operations, all of this energy (100%) was produced locally from the geo-exchange field in the greenway corridor. The backup and peaking natural gas boiler in the energy centre has not operated once in this period. Staff estimate that this reduced 339 tonnes of GHG emissions¹ in the community.

¹ Assumed that all energy was provided for heating. The business-as-usual (BAU) assumed that 40% of the building heating load would be provided from electricity and the remaining 60% would be from gas make-up air units.

Since system start up and initial adjustments, the system operation has been smooth and constant without service interruptions. Corix Utilities is engaged under contract as the system operator to perform system functional verification to ensure continuous operation.

Incoming revenue from ADEU customers has been gradually increasing in pace with the gradual occupancy of serviced buildings. Total revenue for 2013 is projected to be approximately \$480,000.

The actual revenue, when compared with the projected revenue in the ADEU financial model, is within acceptable ranges with projected expenses lower than expected. This is due to multiple reasons:

- Equipment is Still Under Warranty: Maintenance expenses are minimal due to new system components and one year warranty period.
- Lower than Expected Utility Expenses: Utility expenses (natural gas and electricity) are low due to phased development occupancy which resulted in a gradual increase in demand. The 2012/2013 winter was also very mild and short.
- Reduced Financing Costs for Expansion: Financing expenses projected in the financial model for expansion planned for this year are zero since the capacity of the Phase 1 and 2 is adequate to service existing two developments plus a third development (Omega by Concord Pacific) that is scheduled for connection early next year.

It is estimated that this will result in a surplus at the end of the year that is approximately \$135,000 greater than originally budgeted. As per the financial model approved by Council, surpluses for up to ten years are set aside to build a reserve fund. Staff will bring forward recommendations to Council in 2014 for the system expansion and financing as required to service new developments currently under consideration, including the Smart Centres development.

For its 1st year of operations and in the context of a small customer base, the above financial, operational and environmental results show as expected and outstanding performance of the ADEU system.

Analysis – 2013 Rates

The 2013 rate is comprised of:

- Capacity Charge (Fixed) monthly charge of \$0.078 per square foot of the building gross floor area, and a monthly charge of \$1.04 per kilowatt of the annual peak heating load supplied by DEU as shown in the energy modeling report required under Section 21.1.(c); and
- 2. Volumetric Charge (Variable) charge of \$3.328 per megawatt hour of energy consumed by the building.

Factors that are considered when developing 2014 ADEU rate options include:

- **Competitive Rate:** The rate should provide end users with annual energy costs that are less than or equal to conventional system energy costs based on the same level of service.
- **Cost Recovery:** The ADEU was established on the basis that all capital and operating costs would ultimately be recovered through revenues from user fees. The financial model included recovery of the capital investment over time and built in a rate increase year over year to cover for the fuel cost increases, inflation, etc. to ensure the financial viability of the system.
- Forecasted Utility Costs: Utility cost (electricity and natural gas) increases are outside of the City's control. Nonetheless, these commodity costs directly impact the operation cost of the ADEU. Media have recently reported that the BC Hydro electricity rate will increase 26.4% from 2014 to 2016 (8.2% annually). Fortis BC increased the natural gas rate in July by 7%². However, due to a decline in the natural gas prices, the Fortis BC lowered their rate in October. US Energy Information Administration estimates that the natural gas price will increase 7.9% on average from 2013 to 2014.
- **Consumer and Municipal Price Indexes:** Other factors to consider include various price indexes. For example, the consumer price index (CPI) is estimated by the Finance Department at 2%, while municipal price index (MPI) is estimated at 3.2%.

As a comparison to conventional system energy costs, the proposed 4% ADEU rate increase is below estimated electricity cost increase (up to 8.2%) and natural gas cost increase (approx. 7.9%).

Taking into consideration the above factors, three options are presented for consideration.

Option 1 – No increase to ADEU rate for services (Not recommended).

The rate under the "status quo" option would not change from the 2013 rate.

The ADEU is in early days of its operation, and as a result the utility (electricity and natural gas), operation and maintenance costs are still largely based on projections of the original financial model. Variation from the model will affect the long term performance of the ADEU. For example, the revenue may vary from the projected revenue in the financial model depending on the speed of development and occupancy. The financial modeling of the ADEU has taken into consideration modest rate increases similar to projected increase rates for conventional energy. A status quo approach may have a negative impact on the financial performance of the ADEU if it does not follow market trend. For example, it may cause an extension of the payback period, reduction of internal rate of return, etc.

² Based on an average residential customer using approximately 95 GJ annually.

Option 2 – 2% increase to ADEU rate for services (Not recommended).

The rate under this option would increase modestly to follow consumer price index (CPI). While a 2% rate increase will partially cover the estimated fuel (electricity and natural gas) and operation and maintenance cost increases, it is below the increase projected in the ADEU financial business model and below the estimated increase of conventional energy commodities (electricity and natural gas). Even though ADEU system has operated now for one full heating and on full cooling season, the first two buildings were being occupied in phases. Complete occupancy of both buildings happened only in August this year. This affects the collection of actual building's energy consumption data and provides some level of uncertainty on electricity and natural gas consumption. Since the natural gas and electricity costs are expected to increase over the CPI, this option is not recommended.

Option 3 – 4% increase to ADEU rate for services (Recommended).

The 4% rate increase under this option follows the ADEU financial model. This rate will cover estimated increases in fuel (electricity and natural gas) cost and operation and maintenance costs.

The ADEU financial model follows the principle of full cost recovery. As a new utility service, with the limited information about the connected building's energy loads and consumption and only estimated operation and maintenance costs projections, ADEU business case heavily relies on the developed financial model. Inevitably, there are inherent business and financial risks with the ADEU business model that uses advanced capital financing. One of the ways to mitigate these risks is to follow the financial model as much as possible in the early years of the utility operation and annually adjust the rates as per model. As the utility collects more actual data about the connected building's energy loads and consumption, operation and maintenance costs, the model will be continuously updated and annual rate adjustment may follow more judicious year to year financial indicators to ensure that the financial performance continues to meet its obligations.

	2013	2014	2014	2014
		Option 1 0% Increase	Option 2 2% Increase	Option 3 4% Increase
Capacity Charge One - monthly charge per square foot of the building gross floor area	\$0.078	\$0.078	\$0.0796	\$0.081
Capacity Charge Two - monthly charge per kilowatt of the annual peak heating load supplied by DEU	\$1.04	\$1.04	\$1.061	\$1.082
Volumetric Charge - charge per megawatt hour of energy consumed by the building	\$3.328	\$3.328	\$3.395	\$3.461

- 6 -

The recommended rate outlined in the proposed Alexandra District Energy Utility Bylaw No. 8641, Amendment Bylaw No. 9073 (Attachment 1), represents full cost recovery for the delivery of energy within the ADEU service area.

The above rates were developed based on the residential type of customers. With the anticipated introduction of commercial and institutional customers in 2014/2015, staff will bring forward a report to Council recommending appropriate rates structures for these customers.

Financial Impact

None.

4014235

Conclusion

Since the start up in July 2012 and initial adjustments, the ADEU system operation has been smooth and constant without service interruptions. The revenue received at the end of the 2013 is projected to be as budgeted. It is estimated that the system has reduced 339 tonnes of GHG emissions in the community.

The recommended 2014 ADEU rate for services 4% increase (Option 3) supports Council's objective to keep the annual energy costs for ADEU customers at less than or equal to conventional system energy costs based on the same level of service. At the same time, the proposed rate ensures cost recovery to offset the City's capital investment and ongoing operating costs. Staff will continuously monitor energy costs and review the rate to ensure rate fairness for the consumers and cost recovery for the City.

5 Pohr

Alen Postolka, P.Eng., CEM, CP District Energy Manager (604-276-4283)

AP:ap



Alexandra District Energy Utility Bylaw No. 8641, Amendment Bylaw No. 9073

The Council of the City of Richmond enacts as follows:

- 1. Alexandra District Energy Utility Bylaw No. 8641 is amended by deleting Schedule C in its entirety and substituting Schedule C attached to and forming part of this bylaw.
- 2. This Bylaw is cited as "Alexandra District Energy Utility Bylaw No. 8641, Amendment Bylaw No. 9073".

FIRST READING	 CITY OF RICHMOND
SECOND READING	 APPROVED for content by originating dept.
THIRD READING	 X
ADOPTED	 APPROVED for legality by Solicitor

MAYOR

CORPORATE OFFICER

SCHEDULE C to BYLAW NO. 8641

Rates and Charges

RATES FOR SERVICES

The following charges will constitute the Rates for Services:

- (a) Capacity charge a monthly charge of \$0.081 per square foot of gross floor area, and a monthly charge of \$1.082 per kilowatt of the annual peak heating load supplied by DEU as shown in the energy modeling report required under Section 21.1.(c); and
- (b) Volumetric charge a charge of \$3.461 per megawatt hour of Energy returned from the Heat Exchanger and Meter Set at the Designated Property.



То:	Public Works and Transportation Committee	Date:	October 31, 2013
From:	Tom Stewart, AScT. Director, Public Works Operations	File:	
Re:	Update on 2013/2014 Snow and Ice Response Preparations		

Staff Recommendation

That the staff report titled "Update on 2013/2014 Snow and Ice Response Preparations", dated October 31, 2013, be received for information.

Tom Stewart Director, Public Works Operations (604-233-3301)

Att. 2

REPORT CONCURRENCE				
ROUTED TO:		CONCURRENCE OF GENERAL MANAGER		
Communications Parks Services				
REVIEWED BY STAFF REPORT / AGENDA REVIEW SUBCOMMITTEE	INITIALS: DW	APPROVED BY 640		

Staff Report

Origin

This report provides information on anticipated weather patterns associated with the upcoming 2013/2014 winter season, and the City's current preparedness measures, as well as those underway, to ensure a coordinated response. Also, there is information on the newest measures which are planned to increase public communications during weather events.

Analysis

In light of changing weather patterns and increased frequency of extreme weather events, Public Works Operations has implemented numerous changes over the last few years to enhance our readiness planning and response efforts. Overviews of these changes, incorporated in the next section, include; policy amendments, equipment review, enhancement to public communications/public involvement and overall response planning. Furthermore, information on expected weather patterns for the 2013/2014 season, operational preparations and planned expansion of public outreach efforts are provided.

Overview of Existing Initiatives

Policy Amendments: Traffic Bylaw 5870 was amended by Council on November 23, 2009 to require commercial, industrial and multi-family property owners or occupiers to clear snow and ice from sidewalks adjacent to their property. City staff will remind the public of Bylaw 5870 through media releases, as well as social media, such as Facebook, YouTube and Twitter. This Bylaw was amended to encourage the use of public transit with improved convenience for pedestrians. Section 6.1 of the Bylaw reads:

"The owner or occupier of any parcel of real property which is developed for, or used in whole or in part for, commercial, industrial or multi-family dwelling use other than a two-family dwelling shall remove all snow and ice from any sidewalk adjacent to such parcel for a distance that coincides with the property like of his real property, not later than 10:00 a.m. of everyday, including Sunday"

In response to public concerns about the lack of salting and ploughing on residential streets, Council approved an amendment to Policy 7013 (Roadways – Ice and Snow Removal) to add third priority routes. These routes include the designated collector roads and roads of local significance in residential subdivisions. This initiative will help improve vehicle access from within subdivisions to the major collector roads. However, it should be noted that third priority routes will only be cleared if first and secondary routes have been fully accommodated and if the resources permit.

Equipment: There have been a number of improvements over the past few years, including the construction of a "snow shed" in 2010, this project was approved by council and has resulted in the enhanced preparation and readiness of equipment during snow and ice events. In 2012 the City had plans of adding additional sensors in Richmond to the five already in place, and in 2013 a sixth sensor was installed on Forsyth Crescent. These sensors are monitored 24 hours per day and

provide early indications of potential road frost or freezing conditions. Each sensor is strategically located throughout the City to provide real time information concerning road conditions illustrated in Attachment 1. A full list of equipment dedicated for snow response is provided in Attachment 2.

Staff is also in the process of acquiring equipment that will allow us to mix brine (solution used to pre-treat road surfaces prior to frost and ice events) in the yard as required and without delay. This will also effectively reduce delivery costs and the amount of road salt used on City roadways.

Public Outreach: Public involvement plans are vital during the winter season when working with the community. The City has included these plans in order to work cooperatively and efficiently with the public:

- <u>Snow Angels</u>: The Snow Angels program was introduced in 2010 to connect local volunteer groups with seniors and people with disabilities who may need assistance during snowfall events. Assistance can take the form of shovelling snow from sidewalks, driveways and/or walkways. A contact list of community organizations can be accessed on the City's website or by calling the community services department, dispatch, City Hall, or any community centre. The program is activated in the event of a significant snowfall defined as an accumulation of 5+ cm of snow.
- <u>Good Neighbour Program</u>: The Good Neighbour campaign encourages everyone to clear the walkways around their property and help others who may face challenges. This neighbour-helping-neighbour campaign simply encourages residents to watch for people in their neighbourhood that could use help removing snow from their sidewalks and driveways and offer them a helping hand.

Communications Strategy: A comprehensive communication plan has proven to be an important outlet during the winter season. The communications strategy includes (but is not limited to):

- <u>Website</u>: The City updated their website to provide considerable information on snow response. Included on the site is a listing of private service providers for contractors that residents, Strata Councils, and business owners can call for snow removal services at their own cost.
- <u>Social Media</u>: This past 2012/2013 snow season staff continued to incorporate social media into the overall communication process to reach out to the community through Facebook and Twitter. The City will continue the use of social media via Facebook and Twitter and add YouTube as another source to provide frequent updates during snow and ice. These updates include weather forecasts, what preparations are underway for current and upcoming events, and pictures relating to the event (equipment, staff, road conditions, etc.). This 2013/2014 year staff would like to incorporate videos through its social media channels. There are new free Smartphone Apps (such as Videolicious) which will allow staff to create short videos (even from still photos) to visually inform residents of a variety of snow topics (tips on how they can prepare for snow and snow removal preparation done

at the works yard for any predicted snow events). These videos can then be shared to the public through the City's Facebook, Twitter and YouTube pages.

• <u>Coordinated efforts with other City departments</u>: If and when snow events affect the public the City's various departments have established communications protocols they follow that will reinforce the Snow Response communications program. For instance the Transportation department has public communications programs in place which will assist the public. These include public access to the intersection traffic cameras located throughout the City (<u>http://www.richmond.ca/services/ttp/trafficcameras.htm</u>) as well as their email and online posting distribution process.

2013/2014 Weather Forecast

City staff continuously monitors Richmond's specific weather forecasts and conditions. Richmond's unique geography often results in exclusive weather patterns. Forecasts with Richmond-specific weather information and forward-looking forecasts are received daily. The current long-term weather forecast for this upcoming winter season, according to Northwest Weathernet, has been predicted as:

"Expect a 'normal' winter this year. The various elements that could impact our winter are pretty much all in the mid-range, which means that there shouldn't be any bias on the warm/cold or dry/wet side in any region of British Columbia. There will be one or two arctic outbreaks that make it into the Lower Mainland, though there could be a third if the first outbreak occurs in November."

Operational Preparations

Operational preparations are underway which include equipment preparation, meetings to coordinate efforts between departments, and training for staff. Training is crucial for preparation and is always an integral part of the groundwork for the snow season every year. This training is to ensure a sufficient number of personnel are available to respond during short-term and long-term events.

The City of Richmond's salt supplies have been secured for this winter season. There are currently 960 metric tonnes secured under contract and an additional 500 metric tonnes on reserve. In addition to the Public Works Yard, a second location (Sidaway Site) will be stocked with salt for the reloading of trucks during snow events. This secondary location will reduce travel times and increase efficiencies for equipment working on the east side of Richmond.

The City will continue to closely monitor and record equipment locations, route(s) start and completion times and salt distribution through a centralized control centre. This will allow for accurate responses to public enquiries, better record keeping and post event summaries. Costs will also be tracked per lane kilometer to provide additional information for evaluation and future forecasting of expenditures.

2012/2013 Winter Season Summary

During the November 2012 to April 2013 winter season there were 2 snow events and 21 frost events of varying duration and severity. The City of Richmond used 700 tonnes of salt and cleared/salted 1935 lane kilometres of 1st and 2nd priority roads during snow events.

Conclusion

Currently, preparations for the 2013/2014 winter season are underway and will be completed in time for the upcoming season. The City is continuously seeking opportunities to improve service levels, communications and community involvement. Public outreach, through social media, will continue to be implemented to inform, provide current event information and involve the public in an effort to minimize risks associated with snow and ice.

Ben Dias Manager, Roads & Construction Services (604-244-1207)
Attachment 1



City of Richmond - Road Temperature Sensor Locations

Road Temperature Sensors:

- Armoury
- No. 6 Road South
- 👂 Oval
- Queensborough
- Steveston
- Forsyth (installed in 2013)

Attachment 2

City of Richmond - Snow Response Equipment

Number of Units	Description					
4	Single-Axle Dump Trucks with Flinks and Belly Plows					
1	1-tonne Flat Deck Truck with Insert / Brine Tank					
6	Tandem Dump Trucks with Insert and Plough Attachments					
1	Crane Truck with Insert					
5	F550S with Snow Plows					
1	Flusher Truck (Brine)					
4	Mobile (Walk-Behind) Snow Blowers					
5	Backhoes					
1	Front End Wheel Loader					
1	Holder					
2	Bobcat Skid Steer					
3	Hydro Excavators					
960 tonnes	Salt					
14,000 litres	Brine Mix (for pre-wetting)					



То:	Public Works and Transportation Committee	Date:	October 24, 2013
From:	John Irving, P. Eng, MPA Director, Engineering	File:	10-6000-01/2013-Vol 01

Re: Towards Carbon Neutrality: Implementation Strategy

Staff Recommendation

That Council adopt the attached report titled *"Towards Carbon Neutrality: Implementation Strategy"*, dated October 24, 2013, which identifies a pilot program to offset greenhouse emissions from corporate operations by implementing the Richmond Carbon Marketplace, a mechanism for purchasing community-based carbon offsets.

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

REPORT CONCURRENCE								
ROUTED TO:	CONCURRENCE	CONCURRENCE OF GENERAL MANAGER						
Corporate Communications Finance and Corporate Services	D D	46						
REVIEWED BY STAFF REPORT / AGENDA REVIEW SUBCOMMITTEE	INITIALS: DW	APPROVED BY CAO						

Staff Report

Origin

The City of Richmond has committed to becoming carbon neutral in its civic operations. The purpose of this report is to present to Council a strategy for meeting this commitment in accordance with Councils *Towards Carbon Neutrality* Framework. The proposed approach supports the following Council Term Goal:

Council Term Goal #8.1: "Continued implementation and significant progress towards achieving the City's Sustainability Framework, and associated targets"

Background

In September 2008, Council signed the BC Climate Action Charter, voluntarily committing the City of Richmond to carbon neutral operations. This commitment to carbon neutrality means that the City must reduce GHG emissions generated from its own operations and invest in additional action, outside of the City's operations, to compensate for emissions that could not be avoided. The City's commitment to carbon neutrality is one of the targets established to-date in the City's Sustainability Framework.

In 2012, Richmond City Council adopted the "*Towards Carbon Neutrality: Progress Report* 2012" to define how the City would achieve this goal. A key focus of the City's approach has been to ensure that achieving carbon neutrality is done in a manner that investments remain in the community and achieve multiple benefits. Five key principles were identified to help ensure that the City's actions focussed on reducing GHG emissions within the community and working towards achieving the overarching goal of sustainability:

- 1. Focus on Sustainability
- 2. Invest in the Community
- 3. Reduce First, Offset Second
- 4. Focus on Action, not Accounting
- 5. Reduce Harm and Restore

The purpose of the City of Richmond "*Towards Carbon Neutrality: Implementation Strategy*" is to assess past emission reduction initiatives and develop an effective carbon offsetting program based on the above principles, that will allow the City to achieve carbon neutrality over time.

The objectives of the Implementation Strategy are to:

- Assess the impact of current and future emission reduction and carbon offsetting initiatives;
- Determine the amount of emissions that must be compensated to achieve annual carbon neutrality;
- Develop an effective compensation program to offset remaining emissions.

Completion of the Implementation strategy fulfils the City's commitment to develop a corporate energy and GHG emissions reduction program, as defined in the Richmond Sustainability Framework.

- 3 -

Analysis

Under the Climate Action Charter, the Province struck the Green Communities Committee (GCC) to develop the Carbon Neutral Framework as part of its mandate to develop a common approach to determine carbon neutrality for local governments. The GCC's Green Communities Carbon Neutral Framework was defined by the following four key steps along the path to carbon neutrality: *Measure, Reduce, Balance and / or Offset, and Report.* The City used this approach to define how it would pursue carbon neutrality in its *Towards Carbon Neutrality: Progress Report* (2012).



Significant progress has been made in the reduction of building and fleet energy consumption. The City's Green Fleet Action Plan, adopted in 2013, aims to achieve a 21% reduction in GHG emissions by the year 2020. Additionally, the Energy Management Program and High Performance Building Policy are ongoing programs that are reducing energy consumption through retrofit projects and transitioning to use of renewable energy sources.

Richmond Current Carbon Emissions

In 2010, the City produced its first comprehensive analysis of corporate energy consumption, costs and GHG emissions. This report established the City's baseline, based on 2007 levels, for measuring and reporting on future progress. Annually, the City emits over 10,000 tonnes of CO_2 (eq).

Due to the City's scale of operations, achieving neutrality through reduction projects is a multi-decadal undertaking. Achieving carbon neutrality means that investments must be made to offset or compensate for remaining emissions.



City of Richmond Baseline GHGs (2007)

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How Carbon Offsetting Works



One carbon offset = One tonne of greenhouse gas emission reductions.

The Climate Action Secretariat's Carbon Neutral Framework, summarized below, offers three options for local governments to compensate corporate emissions and achieve carbon neutrality. Depending on the amount of corporate emissions a local government needs to balance in any given year, it may choose to use one or more of the three options outlined below.

Climate Action Secretariat:	City Initiatives
Framework for Carbon Neutrality	to Date
Option 1 Projects : Invest in a GCC Supported Project:	Annual offsets achieved
Energy efficient building retrofits, fuel switching, solar hot	from household organic
water, household organic waste composting, and low	waste program, approx.
emission vehicles	600 offset credits / year.
Option 2 Projects: Invest in Alternate Community GHG reduction Projects beyond Option 1	The City has not pursued this option to date. This strategy defines a program that uses this option.
Option 3 Projects: Purchase Offsets from a Credible Provider such as the Pacific Carbon Trust (PCT)	The City has not pursued this option to date.

The City recognizes the benefits of investing in community based GHG reduction projects (GCC Options 1 and 2) rather than purchasing offsets from external offset providers (Option 3). Several efforts have been carried out by the City to invest in community projects and compensate for corporate emissions; however a more comprehensive framework is required.

The Richmond Carbon Marketplace – A Proposed Mechanism for Purchasing Local Offsets

The Richmond Carbon Marketplace (RCM), proposed in the Implementation Strategy, is the centrepiece program for achieving corporate carbon neutrality. The RCM is envisioned to be a community-based carbon exchange that enables the City, and businesses and individuals at a future date, to meet carbon-neutral objectives by purchasing carbon offsets from local projects that reduce greenhouse gas (GHG) emissions and build community resilience. By directing offsetting investments back into the community, where they originate, the RCM will create a multiplier effect that supports community-based initiatives, green jobs growth and the ongoing development of the local low-carbon economy.

Benefits of the Richmond Carbon Marketplace:

- Local control over carbon offsetting dollars, how and where these funds are used.
- Creates a mechanism for investing public and private sector carbon offsetting dollars into local energy and emissions reductions strategies and infrastructure.
- Provides access to the carbon market for community organizations and small businesses.
- Provides a new revenue stream for offset project proponents that support valuable community services, local job creation, development and growth of the local low-carbon economy.
- A community-based carbon exchange system that is accountable and accessible.

Taking into consideration the above factors, three options are presented for consideration.

Option 1 – Adopt the Towards Carbon Neutrality: Implementation Strategy and implement the Richmond Carbon Marketplace as a pilot program (Recommended).

The community carbon marketplace model was deployed in the City of Duncan as a pilot in 2012 by Cowichan Energy Alternatives (CWA), a Vancouver Island-based non-profit organization. The deployment of the program in Richmond will represent a regional first and a much larger scale deployment. The model is also currently being deployed on Vancouver Island in smaller communities and being supported by CWA and local economic development agencies. CWA will provide consulting support services in deploying the program with City staff providing a direct liaison role with local stakeholders.

A pilot RCM is proposed for 2014 with an expected duration of 14 months. The five steps required to grow Richmond's low-carbon economy and to achieve carbon neutrality through the Richmond Carbon Marketplace are outlined below. An approximate timeline is included.

Overview of Richmond Carbon Marketplace Deployment Phases

Phase 1	 Determine the Potential for Local GHG Reduction Projects: Launch outreach campaign, including workshops and targeted meetings, to create awareness of the City's intent and identify potential offsets supply Launch web resources to provide background information, outlining the City's intent, criteria for interested parties. Work with community and industry organizations (e.g. waste management, alternative fuels, etc) to develop their capacity to supply offsets 	Winter 2013
Phase 2	 Identify Potential Local GHG Reduction / Offset Projects: Launch "Request for Community Carbon Credits (RFC3)" and press release announcing that the market is "open for business" Launch web "hub" to provide background information, outlining criteria and online "self-assessment" tool for interested parties. GHG Reduction proponents respond to the RFC3 and assessed. 	Winter 2014
Phase 3	 Assessment and Quantification of local GHG Reduction Projects: Eligible projects from Phase I are short-listed for full GHG assessments. Selected GHG reduction projects are listed by organization on the RCM Registry. 	Spring Fall 2014
Phase 4	 Achieving Carbon-Neutrality for the City of Richmond: The City selects from an eligible project shortlist, Council will be engaged in this process GHG reductions/carbon credits purchased are retired to ensure no double counting Press release issued for highlighting projects The City's achievement of Carbon Neutrality is demonstrated to the Province, if achieved 	Winter 2015
Phase 5	 Continued Growth of Richmond's Local Low-Carbon Economy: Buyers other than the City wishing to offset their carbon footprints select projects they wish to support from those listed on the RCM registry 	Ongoing

Online Registry

If Phase 1 is

and there are

completed successfully demonstrated offset 05/8/2012 Quantified quantified Cowichan Community Duncan, \$30.00 Quantity: 239 supply opportunities, organization Credits EC MCCs 1 Co-op and the RCM will launch (CB-DC) alternative (s MCC - 0.3 tannes Coas) on online carbon fuel producer Offset

Carbon Marketplace Registry – Sample

registry.

The online hub provides a novel approach to ensuring transparency of available offset projects and allows other groups to purchase credits, should they choose to pursue carbon neutral operations. For the pilot year, it is proposed that the City of Richmond will be the only purchaser of offsets. Once offset supply has surpassed the City's needs, other organizations will be invited to purchase offsets from the registry.

Phased Reporting to Council

With Council's support of this option, staff will provide regular updates on the status of the program at each phase. If fully executed and following completion of the pilot, staff will report back to Council and the public on the program's effectiveness and make recommendations for program continuance and refinements based on outcomes.

Anticipated Offset Projects in Richmond

Phase 1 is being carried out as it is difficult to determine the types of offsets projects the City can expect to see without issuing a request for proposals (RFP). Outcomes of Phase I will help the City decide whether there is strong interest in the community and if the full pilot is worth deploying. The City does have some expectations as to the types of projects it would like to see however. While not en exhaustive list, Phase 1 and the RFP (Phase 2) will identify the following potential projects types that meet the City's carbon neutrality framework principles:

- Fuel switching / energy efficiency projects in the industrial and agriculture sectors
- Multi-family residential, commercial or institutional solar thermal projects
- Replacement of lower efficiency boilers in rental or affordable housing projects
- Land dedication to create carbon sinks.

Option 2 – Do not Implement the Richmond Carbon Marketplace (Not Recommended).

In this scenario, the City will not achieve carbon neutrality until such a time that a new approach is developed. The City will not benefit from the community investment that is offered by the program in this case. For these reasons, this option is not recommended.

Option 3 – Purchase Offsets from Pacific Carbon Trust (Not Recommended).

The City has always had the option to purchase offsets from Pacific Carbon Trust and other offset providers but has not pursued this option. The main reason for not pursuing this approach is that Richmond would not be able to guarantee investments would remain in the community. For this reason, this option is not recommended.

Financial Impact

Administration Costs

For *Phase 1 and 2*, funding is required to cover outreach, development and administrative costs, including website development. The total estimated cost for pursuing *Phase 1 and 2* is \$22,500.

In *Phase 3*, offset verification costs are expected to be assumed by offset project proponents. Initial seed money to complete first assessments and further build the local market may be needed however depending on the financial capacity of respondents. In this case, the City may choose to support verification costs depending on the proposed projects, benefits for the community and the financial capacity of the proponent to pay for verification. Council previously approved \$90,000 in funding to support carbon neutrality. Phase 1 administrative costs would be funded from this amount.

Cost of Offsets (Phase 4)

Cost associated with *Phase 4* will be brought forward to Council for approval. Council will have the opportunity to review and approve the proposed offset projects and to approve funding to purchase offsets. If the amount of available offsets in the community can support the City's needs, the total cost of purchasing offsets, valued at \$25 per tonne, would be approximately \$200,000. As the amount of offsets available the first year is expected to be lower than the City's corporate emissions, the cost is anticipated to be lower for the pilot year. Offset purchases are envisioned to be funded by the City's Carbon Tax Provisional Account, which receives the carbon tax rebate from the Climate Action Revenue Incentive Program (CARIP) each year for approximately the same amount. In this scenario, the program will be cost neutral to the City.

Conclusion

In 2012, Richmond City Council adopted the "Towards Carbon Neutrality: Progress Report 2012" to define how the City would achieve carbon neutral operations. A key focus of the City's progress to-date has been on ensuring that achieving carbon neutrality is done in a manner that reduces GHG emissions and investments remain in the community. While a strong start has been made, further work is needed to develop a compensation framework focused on direct actions that reduce GHG emissions and provide value to the community. The City aims to achieve carbon-neutrality by catalyzing and growing a Richmond-based low-carbon economy through the Richmond Carbon Marketplace. The Richmond Carbon Marketplace will be a community-based carbon exchange that will enable the City, businesses and individuals to meet carbon-neutral objectives while building community resilience.

<u>Peter Russell</u> Senior Manager, Sustainability and District Energy (604-276-4130)

PR:

City of Richmond

Towards Carbon Neutrality

IMPLEMENTATION STRATEGY





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Executive Summary

Introduction

The City of Richmond committed to becoming carbon neutral in its own operations in 2008 when it signed the BC Climate Action Charter. In 2012, Richmond City Council adopted the "Towards Carbon Neutrality Strategy" to define how the City would achieve this goal. A key focus of the City's approach has been to ensure that achieving carbon neutrality is done in a manner that investments remain in the community and multiple benefits are achieved. Five key principles were identified to help ensure that the City stayed focussed on the underlying issue (reducing GHG emissions) and overarching goal of sustainability.

Richmond's principles for achieving carbon neutrality:

- 1. Focus on Sustainability
- 2. Invest in the Community
- 3. Reduce First, Offset Second
- 4. Focus on Action, not Accounting
- 5. Reduce Harm and Restore

The purpose of the City of Richmond's Towards Carbon Neutrality: Implementation Strategy is to summarize past emission reduction initiatives and develop an effective carbon offsetting program based on the above principles, that will allow the City to achieve carbon neutrality in the coming years.

The objectives of the Implementation Strategy are to:

- Assess the impact of current and future emission reduction and carbon offsetting initiatives;
- Determine the amount of emissions that must be compensated to achieve annual carbon neutrality;
- Develop an effective compensation program to offset remaining emissions.

Completion of the Implementation strategy fulfils the City's commitment to develop a corporate energy and GHG emissions reduction program, as defined in the Richmond Sustainability Framework.



City of Richmond



Context for Carbon Neutrality in BC

Under the Climate Action Charter, the Province of BC struck the Green Communities Committee (GCC) to develop the Carbon Neutral Framework in order to develop a common approach to determine carbon neutrality for local governments. The GCC's Green Communities Carbon Neutral Framework was defined by the following four key steps along the path to carbon neutrality: *Measure, Reduce, Balance and / or Offset, and Report.* The City used this approach to define how it would pursue carbon neutrality in its Towards Carbon Neutrality strategy (2012), summarized in Figure 1 below.



Figure 1: Carbon Neutrality Implementation Summary

Measure

Measuring GHG emissions is the first step in implementing a carbon neutrality program. In 2010, the City produced its first comprehensive corporate analysis of the City's energy consumption levels, costs and direct GHG emissions. This report established the City's baseline, based on 2007 levels, for measuring and reporting on future progress. Specifically, the analysis identified the need to focus action on reducing fossil fuel use in civic buildings and corporate fleet. Combined, these two activities account for the vast majority of GHG emissions currently being measured. Figure 2 compares Richmond's corporate energy use and greenhouse gas emissions in 2007.



Figure 2: Richmond 2007 Corporate Energy Consumption and GHG Emissions

Reduce

Significant progress has been done on the reduction of building and fleet energy consumption. The City's Green Fleet Plan aims to achieve a 21% reduction in GHG emissions by the year 2020 by reducing assets, downsizing vehicles at the time of replacement best-in-class energy efficient , such as electric vehicles. Additionally, the Energy Management Program and High Performance Building Policy have a target of reducing GHG emissions by 33%, from 2007 levels by 2020, by reducing energy consumption through retrofit projects and transitioning to use of renewable energy sources. Figure 3 shows the estimated impact of these initiatives and the remaining emissions that must be compensated to reach carbon neutrality.



The "Business as Usual" curve represents the GHG emissions that would result if the City was not taking action. This is based on past growth rates in energy consumption and also considers future emissions that would be expected to result from facility and fleet growth as a result of population growth in the community.

Compensate (Offset)

The City pursues internal emission reduction projects that provide a reasonable payback on investment. The City also considers projects that have high demonstration value as a means to showcase new technologies to residents and stakeholders. Due to the City's scale of operations, achieving neutrality through reduction projects is a multi-decadal initiative. Achieving carbon neutrality means that investments must be made to offset or compensate remaining emissions. Several efforts have been implemented by the City to compensate for corporate emissions; in 2011 the City purchased the last remaining parcel of the Northeast Bog Forest to protect the land for its habitat value and for public enjoyment. The protected land was also purchased to act as a carbon sink. Carbon offsets that are realized using this approach provide low annual offset, unlike many projects that yield one time emission reductions.

Since 2012 the City has successfully used offsets obtained through organic waste diversion and anticipates future offsets from Richmond's portion of solid waste that is sent to the Vancouver Landfill in Delta. Vancouver has been implementing a methane capture project that will yield offsets for their benefit and the benefit of other municipalities using the landfill. A full overview is provided in Section 4 and summarized below in Table 1. The table shows the estimated emissions that must be compensated in the upcoming years to reach carbon neutrality.

	2013	2014*	2015*	2016*	2017*	2018*	2019*	2020*
Total Corporate Emissions	10,275	10,256	10,255	9,694	9,615	9,337	9,161	8,985
Option 1								
Organic Waste Diversion**	683	703	751	800	851	902	954	1,007
Option 2								
NE Bog Forest		100	100	100	100	100	100	100
Vancouver Landfill***	1,094	TBD	TBD	TBD	-	-	-	-
Option 3							1.1.1	
Purchased Offsets		TBD	TBD	TBD	TBD	TBD	TBD	TBD
Remaining Emissions	8,498	9,453	9,374	8,794	8,664	8,335	8,107	7,878

Table 1: Estimated Emissions that Must Be Compensated to Reach Carbon Neutrality (Tonnes of CO2e)

Notes: * Assumes emissions are reduced annually through internal building and fleet initiatives.

** Richmond's portion of waste going to the Vancouver Landfill is 8%.

*** Information obtained from Metro Vancouver.

Richmond Carbon Marketplace

The City aims to achieve carbon-neutrality by catalyzing and growing a Richmond-based low-carbon economy by developing the Richmond Carbon Marketplace. The Richmond Carbon Marketplace (RCM) will be a community-based carbon exchange initiative that will enable the City, and businesses and individuals at a future date, to meet carbonneutral objectives by purchasing carbon offsets from local projects that reduce greenhouse gas (GHG) emissions and build community resilience.

The five steps required to grow Richmond's low-carbon economy and to achieve carbon neutrality are outlined below.

Phase 1: Determining the Potential for Local GHG Reduction Projects

- Phase 2: Identify Potential Local GHG Reduction / Offset Projects:
- Phase 3: Assessment and Quantification of Local GHG Reduction Projects
- Phase 4: Achieving Carbon-Neutrality for the City of Richmond
- Phase 5: Continued Growth of Richmond's Local Low-Carbon Economy

For 2014, the City will be pursuing the program on a pilot basis and will report back to Council and the public on program effectiveness and make recommendations for program continuance and refinements based on the outcomes of the pilot.

Report

Climate Action signatories are required to report on their progress towards carbon neutrality annually (reporting on outcomes from the previous calendar year). Local governments demonstrating a "net zero" balance of carbon emissions on an annual basis will be able to claim carbon neutrality for the purposes of the Climate Action Charter for that reporting year. The City of Richmond has been completing the annual Climate Action Revenue Incentive Program (CARIP) since 2013. The CARIP Report can be found online at <u>www.richmond.ca</u> and summarizes actions, recent and proposed, to reduce corporate and community-wide energy consumption and greenhouse gas emissions.





Chapter 1: Introduction

Introduction

As part of its efforts to advance community sustainability objectives, and specifically to address the issue of climate change, the City of Richmond has committed to achieving carbon neutrality in its own corporate activities. Realizing carbon neutrality corporately means that every year, the City reduces greenhouse gas (GHG) emissions generated through the delivery of its service to the best extent possible and then invests in initiatives to compensate for those GHG emissions that could not be avoided.

In 2012, Richmond City Council adopted the "Towards Carbon Neutrality Strategy" to define how the City would achieve this outcome. A key focus of the City's approach has been to ensure that achieving carbon neutrality is done in a manner that investments remain in the community. Five key principles were identified to help ensure that the City stayed focussed on the underlying issue (reducing GHG emissions) and overarching goal of sustainability.

Richmond's principles for achieving carbon neutrality:

- 1. Focus on Sustainability
- 2. Invest in the Community
- 3. Reduce First, Offset Second
- 4. Focus on Action, not Accounting
- 5. Reduce Harm and Restore

The purpose of the City of Richmond Towards Carbon Neutrality: Implementation Strategy is to formalize past emission reduction initiatives and develop an effective carbon offsetting program based on these principles, that will allow the City to reach carbon neutrality in the coming years.

The objectives of the Implementation Strategy are to:

- Assess the impact of current and future emission reduction and carbon offsetting initiatives;
- Determine the amount of emissions that must be compensated to achieve annual carbon neutrality;
- Develop and effective compensation program to offset remaining emissions.

Completion of the Implementation strategy fulfils the City's commitment to develop a corporate energy and GHG emissions reduction program, as defined in the Richmond Sustainability Framework.



Background

The City of Richmond committed to becoming carbon neutral in its own operations in 2008 when it signed the BC Climate Action Charter – a voluntary agreement among the Province, UBCM and local governments in BC.

The City's corporate emissions are relatively small and contribute a fraction towards overall community, regional and provincial emissions. While small, taking action corporately is important for "leading by example" and establishing a strong foundation for working in partnership and facilitating broader action.

The City's carbon neutral commitment is one way that the City of Richmond is taking leadership action to address climate change. Adopted in 2010 as part of the City's Sustainability Framework the City's Climate Change Strategic Program establishes five (5) climate change targets. Together, these targets seek to build capacity, reduce emissions both corporately and in the community, and prepare for anticipated changes to the community.

The City's five (5) climate action targets are:

- 1. Reduce community-wide GHG emissions by 33% (from 2007 levels) by 2020 and 80% by 2050.
- 2. Be carbon neutral in corporate activities by 2012.
- 3. Engage 100% of Grade 6 students in climate action by 2015.
- 4. Build corporate awareness and understanding of climate change.
- 5. Prepare a Climate Change Adaptation Plan.

The City's carbon neutral and other climate change targets have been embedded within the City's Sustainability Framework. The Sustainability Framework recognizes that for sustainability to be achieved, action must be taken to address climate change as well as other key priorities. Accordingly, because it is part of the City's Sustainability Framework, the City is better positioned to allocate the appropriate level of investment towards carbon neutrality in proportion to the relative priority of other key action areas (e.g., resilient economy, local agriculture and food, affordable communities, etc.).

Provincial Carbon Neutral's Framework

The Province's Green Communities Committee (GCC) has developed the Green Communities Carbon Neutral Framework as part of its mandate to develop a common approach to determine carbon neutrality for local governments under the Climate Action Charter. The GCC's Green Communities Carbon Neutral Framework (Carbon Neutral Framework) describes the four key steps along the path to carbon neutrality: *Measure, Reduce, Balance and / or Offset, and Report*. Table 2 shows a summary of the activities involved in each step.

Table 2: Summary of GCC's Carbon Neutral Framework (Green Communities Committee 2011).

Measure	 Identify local government operations that fall within corporate boundaries. Determine a tool for measuring emissions. Measure corporate emissions annually.
Reduce	 Implement GHG reduction project within corporate emissions boundaries, e.g., by improving energy efficiency in government buildings or switching to cleaner fuels for vehicle fleets.
Balance/Offset	 Invest in GCC-supported community emission reduction projects (Option 1). Invest in alternate community emission reduction projects (Option 2). Purchase offsets (Option 2).
Report	 Complete a project specific report for community emission reduction projects. Complete the annual CARIP report. Make all the information available publicly.



With the above approach as a guide, Council adopted the Carbon Neutrality Implementation Framework in the Towards Carbon Neutrality Strategy in 2012. The City has been taking actions for some time as part of its broader sustainability objectives. An overview of key initiatives is provided on Figure 4.



Figure 4: Carbon Neutrality Implementation Framework

Chapter 2: Measure

Measuring GHG emissions is the first step in implementing a program for reaching carbon neutrality. The GCC Carbon Neutral Workbook provides guidance on which emissions local governments should measure. The local government corporate emissions boundaries described in that Workbook are based on the operation and maintenance of the following traditional service areas:

- Fire protection.
- Solid waste collection, transportation and diversion.
- Arts, recreational and cultural services (provided by the local government).
- Road and traffic operations.
- Drinking, storm and waste water.
- Administration and governance.

Once energy consumption data is gathered, local governments can calculate the GHG emissions related to the energy consumed using an appropriate emissions measurement tool, and report publicly on total corporate emissions from these traditional services. In 2010, the City produced its first comprehensive analysis of the City's energy consumption levels, costs and direct GHG emissions corporate-wide. This report established the City's baseline, based in 2007 levels, for measuring and reporting on future progress. Additionally, this report provided trend data to better enable the City to advance strategic reduction action. Specifically, the report identified the need to focus action on reducing fossil fuel use in civic buildings and corporate fleet. Combined, these two activities account for the vast majority of GHG emissions currently being measured. Figure 5 compares Richmond's corporate energy use and greenhouse gas emissions in the baseline year (2007).



Figure 5: Richmond 2007 Corporate Energy Consumption and GHG Emissions

Chapter 3: Reduce

Reducing internal corporate GHG emissions is the second step in implementation. The City has been taking actions to reduce emissions for some time as part of its broader sustainability program, prior to becoming a signatory to the BC Climate Action Charter. Highlights in three of the most important areas (e.g., buildings, fleet, and solid waste) for reducing emissions are provided in the following sections. Significant progress has been made on the reduction of building and fleet energy consumption. In 2004, the City implemented its corporate High Performance Building Policy. This policy sets performance standards for new and existing civic buildings which strive to reduce energy consumption and emissions. The City's Project Development and Corporate Energy Management Programs serve to advance initiatives that meet these policy objectives. Additionally, the City's Sustainable Fleet Program procures high performing and alternative fuel vehicles (e.g., SMART cars, hybrids, electric vehicles) and increases efficiency through right-sizing vehicles, undertaking preventative maintenance procedures, improving driver practices and improving the fuel management system. These initiatives have resulted in significant levels of avoided energy consumption, reduced GHG emissions as well as various other benefits. Figure 6 shows a summary of these initiatives and the projected GHG reductions.



Figure 6: Summary of Corporate GHG Reduction Strategies



¹ Municipal Collaboration for Sustainable Purchasing

A group of Canadian municipalities collaborating to share information, resources and best practices in sustainable purchasing and other key supply chain topics. The group operates with participation from diverse municipalities across Canada in networking teleconferences, webinars and action planning sessions. Participants share sustainable purchasing lessons, best practices and tools enabling them to fast track their individual program development. Participating cities include: Calgary Surrey Vancouver Saskatoon Guelph, Victoria, Kingston, Whitehorse, Kelowna, Saanich, London, Halifax, Ottawa, Prince George, Olds, Grande Prairie, and Edmonton.

Fleet - Green Fleet Action Plan

Originally implemented in 2006 and updated in 2012, Richmond's Sustainable Fleet Policy aims to meet the City's mobility needs in a manner that:

- Reduces corporate costs.
- Conserves natural resources (e.g., energy, materials, etc.).
- Reduces emissions and wastes.
- Supports broader sustainable economic development.

The Policy is implemented through the City's Sustainable Fleet Program which procures high performing and alternative fuel vehicles (e.g., SMART cars, hybrids, electric vehicles) and increases efficiency through various tactics (e.g., right-sizing vehicles, undertaking preventative maintenance procedures, improving driver practices and improving fuel management system).

In 2013, efforts were directed at installing electric vehicle charging stations at key civic facilities, most of which will be publicly accessible. Additionally, the City developed a Green Fleet Action Plan which summarized progress made to-date, identified future action opportunities and recommended a GHG emission reduction target for fleet operations. The City's Green Fleet Plan aims to achieve a 21% reduction in GHG emissions by the year 2020 by reducing assets, downsizing vehicles at the time of replacement best-in-class energy efficient, such as electric vehicles.

Solid Waste

Solid waste not diverted through recycling and composting programs goes to landfills where it decomposes and releases methane, a potent greenhouse gas. The City of Richmond has been active in reducing corporate waste generation since the early 1990s. Various initiatives have been advanced to reduce the amount of resources consumed in the delivery of City's services, and to increase the diversion and recycling of waste materials.

Key initiatives include:

- Sustainable Procurement: In 2000, the City was one of the first municipalities to adopt an Environmental Purchasing Policy and Guidebook to guide how the City could greener choices in its procurement. To ensure the City is implementing best practices for sustainable procurement, the City joined the Municipal Collaboration for Sustainable Purchasing¹ in 2013.
- *E-Agenda:* More recently, the City introduced its E-Agenda Initiative. This Initiative provides digitized agenda packages for Committee and Council meetings, aiming to significantly reduce the amount of paper needed for these meetings.

 Other Corporate Waste Management Programs: When waste generation cannot be avoided, corporate reuse and recycling initiatives help ensure that as much waste as possible is diverted from the waste stream. Some of the City's recycling initiatives include the City's office recycling program, the composting of Park green waste into soil and its re-use in the City's nursery, as well as the reclamation and re-use of material from the City's drainage projects.

Buildings

Corporate Energy Management Program

In support of the City's Sustainability Framework – Energy Sustainability Strategic Program (adopted in 2010), the EMP is focused on achieving the City's energy reduction goals and GHG emission reduction targets. Between 2011 and 2012, an estimated 1.8 GWh reduction in electrical and natural gas use and approximately 200 tonnes of greenhouse gas emissions were achieved. On an annual basis, the GHG emissions reduction, on average, is equivalent to removing approximately 50 vehicles from Richmond roads each year. This represents approximately \$110,000 in operational cost avoidance savings.

Key recent innovative projects include: a heat recovery installation at Minoru Arena; lighting retrofits at various facilities; and a solar thermal air wall at South Arm Community Centre. To date, more than 6.1 GWh in electricity and natural gas savings have been achieved.





High Performance Building Policy

In 2004, the City implemented its corporate High Performance Building Policy. Using the Canadian Green Building Council's Leadership in Energy & Environmental Design (LEED), this Policy defines performance standards for new and existing civic buildings which strive to:

- Reduce resource consumption (energy, water, materials).
- Accelerate transition to use of renewable energy sources.
- Reduce corporate costs.
- Reduce emissions and wastes.
- Protect local ecosystems.
- Support healthy work environments.

The City's Project Development and Corporate Energy Management Programs serve to advance initiatives that meet these policy objectives. Key initiatives that support the City's carbon neutral initiatives have included development of LEED Gold buildings, installation of renewable energy systems into existing facilities and lighting retrofits. These initiatives have resulted in significant levels of avoided energy consumption, reduced GHG emissions as well as various other benefits (e.g., reduced water consumption, improved indoor air quality, etc.).

Since investments in energy efficiency measures have a quantifiable payback, the policy is anticipated to be revised in 2014 to increase the emphasis on energy efficiency and renewable energy.

By 2020, it is estimated that through energy management, capital project development, and energy efficiency and renewable energy projects for City buildings, energy use could be reduced by 54 terajoules, or almost 20 percent of 2007 total corporate energy consumption. These same reductions could also provide almost 2,000 tonnes of GHG emissions reductions, or approximately 55 percent of the 2020 reduction target set by the Sustainability Framework.





Chapter 4: Compensate

The City pursues emission reduction projects that provide a reasonable payback on investment. The City also considers projects that have high demonstration value as a means to showcase new technologies to residents and stakeholders. Due to the City's scale of operations, achieving neutrality through reduction projects is a multidecadal initiative. Obtaining carbon neutrality means that investments must be made to offset or compensate for remaining emissions.

How Carbon Offsetting Works

Annual Process for Offsetting Carbon Emissions



One carbon offset = One tonne of greenhouse gas emission reductions.

Carbon neutrality is achieved when the amount of such investments equals the level of unavoidable GHG emitted corporately (internally). Most work has been done on developing methodologies for purchasing external offsets through a third party supplier. In general, this approach means that the money used to purchase the offsets leave their local community to contribute to projects in other areas. Conversely, the City's Carbon Responsible Strategy focuses on making investments in the local community. Whith this approach, the City is able to:

- Keep local tax dollars within Richmond.
- Reduce local GHG emissions.
- Reduce costs by leveraging existing initiatives.
- Contribute to other important local community benefits and services.

The Climate Action Secretariat's Carbon Neutral Framework offers three options for local governments to achieve carbon neutrality. Depending on the amount of corporate emissions a local government needs to balance in any given year, it may choose to use one or more of the three options outlined below.

Option 1: Invest in a "GCC Supported Project

Allows local governments to invest locally while also ensuring that the projects are credible and result in measurable GHG reductions. The GCC has identified four types of emission reduction projects (energy efficient building retrofits / fuel switching, solar hot water, household organic waste composting, and low emission vehicles) that local governments could undertake and has provided simplified formulas to assist in measuring GHG reductions from these projects.

Option 2: Invest in Alternate Community GHG reduction Projects

Recognizes that local governments will have additional ideas (beyond Option 1 for measurable emission reduction projects that could be undertaken outside their corporate emissions boundary.

Option 3: Purchase Offsets from a Credible Provider

Is a simple and cost effective way for most local governments to offsets their corporate emissions.

Figure 7: Comparison of the Three Options for Achieving Carbon Neutrality (Tonnes of CO2e)

	Option 1: GCC-supported Project	Option 2: Alternative Project	Option 3: Purchase		
Ease of implementation	 Requires some effort. Project profiles already developed by the GCC. Project has to be implemented and self- certified. 	 Requires considerable effort and third party assistance. Project profiles have to be developed by local government or project proponent. Project has to be implemented and third party verified. 	Simple.		
Cost	 Varied cost, depending on project. Minimal validation and certification costs, as they have been largely pre-established by the GCC. 	 Varied cost, depending on project. Local government or project proponent required to pay for costs to develop, implement and verify the project. 	 Least cost. Purchase tonnes at market rate (which will vary depending on the provider and standard that they use). 		
Reduction in local/regional GHG emissions	Community emissions reduced.	Community emissions reduced.	 Uncertain impact on community emissions unless offset provider invests locally or regionally; however, climate change is not geographically bound so investments in credible offsets still reduce overall GHG emissions. 		
Co-benefits	 Investment in local green economy, raises local awareness; fosters local/regional; technological innovation; supports the creation of green jobs. 	 Investment in local green economy, raises local awareness; fosters local/regional technological innovation; supports the creation of green jobs. 	 Investment in British Columbia; fosters broader technological innovation; reduced GHG emissions; cost effective. 		

Source: Green Communities Committee, 2011.

Implementing Option 1 and 2 projects will balance most of the City's corporate emissions. Although offset purchases may still be required to become fully carbon neutral, there are additional benefits associated with Options 1 and 2. These projects provide the opportunity to invest in local projects that have broader community benefits, such as supporting green jobs and technological innovation, conserving energy, reducing operating costs, enhancing community sustainability, and raising public awareness regarding climate change.

Current and Anticipated Offsets

Since 2012 the City has also successfully been using offsets obtained through organic waste diversion from single family residences and anticipates future offsets from the methane capture project at Vancouver's Landfill in Delta. The table shows the estimated emissions that must be compensated in the upcoming years to reach carbon neutrality.

Table 3: Estimated Emissions that Must Be Compensated to Reach Carbon Neutrality (Tonnes of CO2e)

	2013*	2014*	2015*	2016*	2017*	2018*	2019*	2020*
Total Corporate Emissions	10,275	10,256	10,255	9,694	9,615	9,337	9,161	8,985
Option 1			C. Stere					
Organic Waste Diversion**	683	703	751	800	851	902	954	1,007
Option 2								
NE Bog Forest		100	100	100	100	100	100	100
Vancouver Landfill***	1,094	TBD	TBD	TBD	-		-	-
Option 3								
Purchased Offsets	-	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Remaining Emissions	8,498	9,453	9,374	8,794	8,664	8,335	8,107	7,878

Notes: * Assumes emissions are reduced annually through internal building and fleet initiatives.

** Richmond's portion of waste going to the Vancouver Landfill is 8%.

*** Information obtained from Metro Vancouver.

Northeast Bog

In 2011, the City purchased the last remaining parcel of the Northeast Bog Forest to protect the land for its habitat value and for public enjoyment. The protected land was also purchased to act as a carbon sink. Carbon offsets that are realized using this approach provide low annual offset yield but long term value in that they provide ongoing annual offsets, unlike many 'one off' projects. Offsets from this project will be evaluated in 2014.

Solid Waste Strategic Program

The City's curbside organics collection program has been successful in diverting increasing quantities of organic waste (yard trimmings and food scraps) from landfill. The Provincial Green Communities Committee (GCC) has developed a framework to allow municipalities to calculate GHG reductions attributable to organics diversion from community sources. The resulting carbon credits can be used towards Municipal Carbon Neutrality goals under the Climate Action Charter framework. Between 2007 and 2012 more than 58,000 tonnes of organic waste above the 2007 baseline were diverted from the landfill, resulting in 3,157 tonnes of CO2e avoided. In 2011, the City adopted a Solid Waste Strategic Program under the City's Sustainability Framework, which includes a community-wide waste diversion target of 70% by 2015; as a result, the amount of carbon credits generated is expected to increase in the coming years.

Vancouver Land Fill

The City of Vancouver owns and operates the Vancouver landfill in Delta, including a landfill gas (LFG) collection system which captures and destroys a portion of the methane produced by the landfill. Recent upgrades to the LFG Collection System by Vancouver will capture additional volumes of methane, which are eligible to be converted into carbon offset credits.

A significant fraction of Metro Vancouver's share of the waste in the Vancouver Landfill originated from its member municipalities' curbside collection programs. As such, member municipalities are expected to receive a share of any related carbon offsets accruing to Metro Vancouver. In 2012, waste from Richmond represented 8% of the total waste managed by Metro Vancouver (e.g. excluding Vancouver and Delta's Waste). Richmond is expected to receive carbon credits equivalent to 1,094 tonnes of CO2e as a result. The amount of credits to be received by the City for the years 2013-2015 has yet to be defined, but is expected to be significantly higher than those received in 2012.

Community-based Reductions

The City recognizes the benefits of investing in community based GHG reduction projects (GCC Options 1 and 2) rather than purchasing offsets from an external market providers. Several efforts have been done by the City to invest in community projects and compensate for corporate emissions; however a more comprehensive framework is required to be able to achieve carbon neutrality.

Richmond Carbon Marketplace

The Richmond Carbon Marketplace (RCM) will be a community-based carbon exchange initiative managed by the City and supported by Cowichan Energy Alternatives Society (CEA), the developer of the Community Carbon Marketplace tool. The program will enable the City, and businesses and individuals at a future date, to meet carbon-neutral objectives by purchasing carbon offsets from local projects that reduce greenhouse gas (GHG) emissions and build community resilience. By directing offsetting dollars back to the communities where they originate and by monetizing locally-generated carbon offsets, the RCM will create additional value for greenhouse gas reduction initiatives and a multiplier effect that supports community-based initiatives, green jobs growth and the ongoing development of the local low-carbon economy.

Benefits:

- Local control over carbon offsetting dollars, how and where these funds are used.
- Creates a mechanism for investing public and private sector carbon offsetting dollars into local energy and emissions reductions strategies and infrastructure.
- Provides access to the carbon market for community organizations and small businesses.
- Provides a new revenue stream that supports valuable community services, local job creation, development and growth of the local low-carbon economy.
- A community-based carbon exchange system that is accountable and accessible.

For 2014, the City will be pursuing the program on a pilot basis and will report back to Council and the public on program effectiveness and make recommendations for program continuance and refinements based on the outcomes of the pilot. The five steps required to grow Richmond's low-carbon economy and to achieve carbon neutrality through the RCM are outlined below.

Phase 1: Determining the Potential for Local GHG Reduction Projects

The objective of Phase 1 is to determine the potential for quantifiable, local GHG reduction projects that are eligible to be applied to achieve carbon-neutrality for the City as per applicable GCC guidelines and/or international protocols. It also sends the message that sustainable business practices such as the use of renewable energies that shift Richmond to a healthier, green economy will be rewarded as they help the City to achieve carbon-neutrality and serve to reduce the overall GHG emissions of the community as a whole.

In this way, Phase 1 provides the outreach necessary to make local non-profits and businesses aware that previous barriers to their accessing the BC carbon market such as prohibitive cost, poor understanding of the market and how it may benefit them, and lack of sufficient scale to access the existing BC carbon market, are no longer applicable in the City of Richmond. Phase 1 includes the following steps:

- 1. Launch outreach campaign, including workshops and targeted meetings, to create awareness of the City's intent and identify potential offsets supply.
- 2. Launch web resources to provide background information, outlining the City's intent, criteria for interested parties".
- Work with community and industry organizations (e.g. waste management, alternative fuels, etc) to develop their capacity to supply offsets.

Phase 2: Identify Potential Local GHG Reduction / Offset Projects

- 1. Launch "Request for Community Carbon Credits (RFC3)" and press release announcing that the market is "open for business".
- 2. Launch web "hub" to provide background information, outlining criteria and online "self-assessment" tool for interested parties.
- 3. GHG Reduction proponents respond to the RFC3 and assessed.

Phase 3: Assessment and Quantification of Local GHG Reduction Projects

- 1. Eligible projects from Phase I are short-listed for full GHG assessments.
- 2. Selected GHG reduction projects are listed by organization on the RCM Registry.

Phase 4: Achieving Carbon-Neutrality for the City of Richmond

- 1. The City selects from an eligible project shortlist, Council will be engaged in this process.
- 2. GHG reductions/carbon credits purchased are retired to ensure no double counting.
- 3. Press release issued for highlighting projects.
- 4. The City's achievement of Carbon Neutrality is demonstrated to the Province, if achieved.

Phase 5: Continued Growth of Richmond's Local Low-Carbon Economy

1. Buyers other than the City wishing to offset their carbon footprints select projects they wish to support from those listed on the RCM registry.

Once launched, carbon neutrality may take time to come to fruition and as the program awareness grows, more and more offsets are anticipated to be generated. Figure 8 shows a possible scenario where carbon neutrality could be achieved by 2020, or possibly sooner.



Figure 8: Proposed Community Based Compensation Strategy



Restore

The City of Richmond recognizes that it is insufficient to solely rely on investments to reduce GHG emissions – actions also need to be taken to re-instate healthy conditions that prevent issues (such as climate change) from occurring in the first place. A key contributing factor to climate change is the imbalance of the carbon cycle where more carbon is being released into the atmosphere than that which is being absorbed and/or stored in Earth via healthy natural systems.

To support the rebalancing necessary for long-term climate stability, the City of Richmond is investing in the preservation of its natural local ecosystems. Most recently, the City purchased the last remaining parcel of the Northeast Bog Forest. Bogs and wetlands are some of the most effective ecosystems for absorbing and retaining carbon. The City's purchase will help ensure that these productive lands are protected and can continue to sequester carbon.

The Northeast Bog Forest is currently being considered for carbon storage quantification / verification under Option 2 recognition by the GCC, which could offset between 20 and 200 tonnes of CO2e of corporate emissions annually.

Chapter 5: Report

The fourth step to achieving carbon neutrality under the Carbon Neutral Framework is to publicly report on total corporate GHG emissions produced and how the local government has become carbon neutral by purchasing offsets (Option 3) and / or using measurable GHG reductions from Option 1 or Option 2 projects. The City of Richmond has been preparing various reports on its GHG emission actions since 2007. The City is currently developing a system for streamlining reporting, providing one-stop approach for meeting reporting requirements to meet various commitments (i.e., Provincial Climate Action Charter, Carbon Tax Rebate Requirements, Mexico Pact).

The City's carbon neutral action reports will help the City communicate the effectiveness of its corporate actions and investments, and support future planning and action implementation to reduce GHG emission reductions and advance overall sustainability in the City of Richmond.

Climate Action Revenue Incentive Program (CARIP)

Local governments who signed the Climate Action Charter are required to report on their progress towards carbon neutrality starting in 2013 (reporting on outcomes for fiscal year 2012). Local governments demonstrating a "net zero" balance of carbon emissions on an annual basis will be able to claim carbon neutrality for the purposes of the Climate Action Charter for that reporting year (i.e., 2012).

The City of Richmond has completed the 2012 Climate Action Revenue Incentive Program (CARIP) Final Public Report, as required by the Province of BC. The CARIP Final Public Report summarizes actions taken in 2012 and proposed for 2013 to reduce corporate and community-wide energy consumption and greenhouse gas emissions.

The report finalizes the Interim Report previously posted March 8, 2013. It includes the completed Carbon Neutral Progress Reporting section, which reports the City's progress towards meeting its BC Climate Action Charter commitment to carbon neutral corporate operations.

Carbonn Cities Climate Registry (Mexico City Pact)

By signing The Mexico City Pact in 2010, the City of Richmond agreed to enter their climate actions at the carbonn Cities Climate Registry (cCCR) and to submit their official documentation as a part of a regular reporting system on their greenhouse gas reduction commitments, on the performance of their GHG emissions and their portfolio of mitigation and adaptation actions through the online infrastructure of Carbonn.





The cCCR is a mechanism for cities and local governments that ensures transparency and accountability of local climate action through a commitment of regular reporting.

Internal Reporting

To ensure energy is managed effectively in buildings and by fleet users, regular reports are generated to communicate up to date energy consumption. This will allow managers to more effectively implement management practices that reduce energy consumption.

Chapter 6: Conclusion

The City of Richmond is well on its way to achieving carbon neutrality. In 2012, Richmond City Council adopted the "Towards Carbon Neutrality Strategy" to define how the City would achieve this goal. A key focus of the City's progress to-date has been on ensuring that achieving carbon neutrality is done in a manner that reduces GHG emissions while at the same time, reinvests in the community. While a strong start was made, further work is needed to develop an effective compensation framework focused on direct actions that reduce GHG emissions and provide value to the community.

The City aims to achieve carbon-neutrality by catalyzing and growing a Richmond-based low-carbon economy by developing the Richmond Carbon Marketplace. The Richmond Carbon Marketplace (RCM) will be a community-based carbon exchange initiative that will enable the City, businesses and individuals to meet carbon-neutral objectives by purchasing carbon offsets from local projects that reduce greenhouse gas (GHG) emissions and build community resilience.

Over the next year, the City will continue to measure its corporate GHG emissions, reduce existing emissions (both corporately and in the community) and continue developing an effective compensation framework that will allow the city to achieve carbon neutrality while reinvesting back in the community and achieving multiple benefits.