



City of Richmond

Report to Committee

To: General Purpose Committee **Date:** April 20, 2015
From: John Irving, P.Eng., MPA **File:** 10-6000-01/2014-Vol
01
Director, Engineering
Re: **Climate Action Revenue Incentive Program (CARIP) & Carbon Neutral
Operations Update**

Staff Recommendation

1. That the staff report titled, "Climate Action Revenue Incentive Program (CARIP) & Carbon Neutral Operations Update," from the Director of Engineering, dated April 17, 2015 be forwarded to the Advisory Committee on the Environment for comment.
2. That staff report back with a long term strategy for maintaining corporate carbon neutral operations.

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

Att. 3

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

Staff Report

Origin

The emissions reporting and initiatives described in this report support the following Council Term Goals, #8 Sustainability:

- 8.1. Leadership in Sustainability: Continued implementation and significant progress towards achieving the City's Sustainability Framework and associated targets.
- 8.2. Innovative projects and initiatives to advance sustainability: Richmond's prominence as a leader in sustainability is enhanced through creative initiatives, innovative projects, and new models of business.

Analysis

The City of Richmond recently developed strong policies and programs that support the reduction of greenhouse gas (GHG) emissions and energy use associated with corporate buildings and fleet activities. Two of the key recent developments include the City's Green Fleet Action Plan, adopted in 2013, and the revised High Performance Building Policy, adopted in 2014. These two programs are examples of corporate tools that help maintain organizational focus towards reducing energy consumption and GHG emissions through increased efficiency and optimized use of resources.

2014 Corporate Carbon Emissions

The summary table below (Table 1) outlines the estimated corporate GHG emissions associated with City buildings, civic infrastructure, and fleet activities for 2014. The reported figures adhere to the BC Ministry of Environment's methodology and guidance documentation, and include GHG reductions resulting from the City's purchase of renewable natural gas. As per provincial guidelines, GHG emissions associated with fleet construction related activities and GHG emissions associated with the Richmond Olympic Oval Corporation were not included in the City's corporate emissions total for 2014. The 2014 total does include GHG emissions associated with traditional municipal services that are contracted out, such as community waste collection. Reported corporate emissions in 2014 were slightly lower than the City's final 2013 corporate GHG emissions value (8,467 tCO_{2e}).

Table 1: 2014 Emission Sources

Emission Sources	Tonnes CO _{2e}	Quantification Method
Emissions from services delivered directly by the local government	6,755	Derived from actual energy consumption and associated GHG emissions from stationary sources (buildings, lighting, and pumps) and mobile sources (fleet) used directly by the City.
Emissions from contracted services delivering municipal government responsible services	1,595	The BC government standard methodology and guidance for estimated contracted emissions, Option 3 (Vehicle/Equipment Type and Hours of Usage) was used to determine the contracted emissions value.
TOTAL	8,350	

2014 Carbon Credits (Offsets)

The summary table below (Table 2) outlines the anticipated credits (also known as offsets) that the City expects to achieve in the 2014 reporting year. As with the previous two reporting years (2012 and 2013), credits from diverted household organic waste contributed significantly to the reduction of the City's corporate carbon footprint. As compared to 2013, the total amount of diverted organic waste from the City's community collection program increased by approximately 2,075 tonnes to 16,314 tonnes in 2014. The corresponding GHG emissions reduction for the diverted community organic waste, 3,668 tonnes of CO₂e, which represents approximately 45% of the City's 2014 reported corporate emissions.

In addition to claiming organics waste diversion credits, the City will also be able to claim GHG emission credits from its participation in the optimization of the methane gas capture system at the Vancouver Landfill. Waste that originates in Richmond that is managed by Metro Vancouver translates to a corresponding offset allocation to the City of Richmond through this project. Metro Vancouver allocates the associated credits to member municipalities based on an agreed upon regional methodology. The 2014 Vancouver Landfill credit allocation report has yet to be finalized, but preliminary figures indicate that the City is expected to receive slightly fewer credits from this program than last year. Along with the achieved credits in 2014, the City will be carrying forward surplus credits it accumulated in 2013 from quantified reduction projects. It is anticipated that the carbon credit surplus (5,413 tCO₂e) will be down in the 2014 reporting year as compared to 2013, with outstanding surplus to be used as needed to achieve carbon neutrality in subsequent years.

Table 2: Anticipated 2014 Emission Credits (Offsets)

Offsets	Tonnes CO ₂ e	Quantification Method
Household Organic Waste Composting – Municipally Collected	3,668	As quantified per Option 1 GHG Reduction Projects reporting methods.
Regional Vancouver Landfill Methane Gas Capture Credits	4,300	Richmond's credit allocation or credits earned from the capture of landfill gas (methane) at the Vancouver Landfill in Delta, prior to the implementation of January 1, 2016 regulations.
Surplus GHG emission credits from 2013 Reporting Year	5,795	As per BC Government reporting protocol.
TOTAL	13,763	

The total corporate emissions and credits indicated above, with the exception of the 2013 surplus value, have not yet been finalized and are estimates based on preliminary figures; staff will report back to Council if there are significant changes to the final reported corporate emissions and/or credits due to the Province by June 2, 2015.

Carbon Neutrality

Based on the above figures, staff anticipate that the City will again be eligible for a "Level 3: Achievement of Carbon Neutrality" in 2014 through the Climate Action Recognition Program. It is estimated that the City will carry forward approximately 5,413 tonnes of carbon credits, which can be used in subsequent years if needed.

Due to the accumulated surplus that the City has achieved and the anticipated growth and success of the City's organics diversion program, it is projected that the City will be able to achieve carbon neutrality for the next two reporting years, 2015 and 2016, without purchasing or quantifying other sources of credits. After January 1, 2016, GHG emissions credits from the optimized methane gas capture system will no longer be eligible to be used to reduce the City's corporate carbon footprint, as Provincial Government regulation regarding the capture of methane gas at provincial landfills will come into effect. This anticipated reduction in achieved carbon credits will likely necessitate the need to purchase and/or quantify other sources of credits for the 2017 reporting year, in order to maintain the City's carbon neutral status.

Future Sources of Carbon Credits

In anticipation of the future need to purchase or quantify carbon credits, the City is continuing the development of the Richmond Carbon Marketplace pilot program, as well as exploring other Richmond based opportunities that reduce GHG emissions.

The Richmond Carbon Marketplace (RCM) pilot program was envisioned as a means to reduce greenhouse gas (GHG) emissions and build community resilience, by investing in City of Richmond organizations through the purchase of carbon reduction credits for completing GHG emissions reducing projects. The Richmond Carbon Marketplace pilot program was previously approved by Council, and is being implemented in a phased approach:

- Phase 1: Determine the Potential for Local GHG Reduction Projects (through outreach)
- Phase 2: Identify Potential Local GHG Reduction / Offset Projects
- 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

Staff have completed Phase 1, and are currently working on Phase 2 of the pilot project with the further development of the program's basis and the completion of an expression of interest. During Phase 1, staff vetted this pilot program through the Economic Advisory Committee, and directly contacted select organizations/businesses in the community including BC Non-Profit Housing Association, Harvest Power, Ecowaste, Lafarge, Lehigh Cement, and Concert Properties to gauge interest and opportunity. In general, this potential pilot program was well received by the Economic Advisory Committee, and the organizations contacted were interested in participating, if feasible. In addition some initial market research was undertaken to estimate the GHG emissions of the various business sectors in the City. The analysis indicated that some of the highest GHG emissions producing sectors in the City include: Food Manufacturing, Chemical Manufacturing, Merchant Wholesalers, Food and Beverage Stores, and Personal Laundry Services. Some of these sectors will be contacted directly, once an expression of interest has been completed, to identify partnership opportunities.

In addition to RCM, the City is exploring other means to purchase and/or quantify carbon credits from alternate sources, such as land conservation and urban re-forestation. If proven to be economically feasible, these alternative sources will be quantified and used to offset the City's corporate carbon footprint in future years.

Staff will report back by year end with a long term strategy and plan to generate further carbon credits.

Financial Impact

None.

Conclusion

The City of Richmond continues to meet its commitments as a signatory of the BC Climate Action Charter and is working towards Council’s objective to maintain its carbon neutral status through investing in community projects. This commitment includes the mandatory public reporting of GHG emissions from corporate operations and carbon reduction initiatives that the City is undertaking. The City’s 2014 Climate Action Charter related reports (Attachments 1-3) will be posted on the City’s website to facilitate public access once finalized. For the 2014 reporting year, pending validation of staff’s analysis, it is anticipated that the City will be recognized for carbon neutrality by the joint Provincial – UBCM Green Communities Committee and will have carry over carbon offsets for the 2015 reporting year.



Levi Higgs
Corporate Energy Manager, Sustainability and District Energy
(604-244-1239)

LH:lh

- | | | |
|----|---|----------------|
| 1. | Carbon Emissions Provincial Reporting Worksheet - 2014 | REDMS# 4554608 |
| 2. | Climate Action Revenue Incentive Public Report for 2014 | REDMS# 4529509 |
| 3. | Contracted Emissions Estimates (Hired Equipment and Cascade) – 2014 | REDMS# 4539823 |

You MUST fill this in for the 2014 reporting year.

CLIMATE ACTION REVENUE INCENTIVE PROGRAM (CARIP) PUBLIC REPORT

For Reporting Year =

2014

Prior to completing this section, please ensure that you are familiar with the "Becoming Carbon Neutral guidebook" available on the BC

[BC Climate Action Toolkit Website](#)

Carbon Neutral Progress Reporting

Is this your Final or Interim CARIP Report for 2014 ?	Interim
Emissions/Offsets	Tonnes CO2e Enter Values in White Boxes
Annual corporate emissions using SMARTTool or equivalent inventory tool	8,350
<i>Emissions from services delivered directly by the local government</i>	6,755
<i>Emissions from contracted services</i>	1595
Less:	
GHG reductions being claimed for this reporting year from Option 1 - GHG reduction project	3668
<i>Energy Efficient Building Retrofits and Fuel Switching</i>	
<i>Solar Thermal</i>	
<i>Household Organic Waste Composting</i>	3668
<i>Low Emissions Vehicles</i>	
Less:	
GHG reductions being claimed for this reporting year from Option 2 - GHG reduction projects	
<i>Please list all Option 2 Projects Implemented (insert title of the projects(s) as per project plan template. If you have more than two Option 2 projects you can add more lines at the bottom of this sheet)</i>	
	10095
<i>Option 2 Project: Vancouver Landfill</i>	4300
<i>Option 2 2013 Carbon Credit surplus</i>	5795
<i>Sum of Other Option 2 Projects: (if you have added projects below)</i>	0
Less:	
Offsets purchased for this reporting year (Option 3). Please identify your offset provider in the offset provider information section below.	0
Balance of corporate emissions for this reporting year. <i>(If the corporate emissions balance is zero, your local government is carbon neutral for this reporting year)</i>	-5413

Climate Action Revenue Incentive Program (CARIP) Public Report

Climate Action Revenue Incentive (CARIP) Public Report for YEAR 2014

City of Richmond

Metro Vancouver



Report Submitted by

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The City of Richmond has completed the 2014 Climate Action Revenue Incentive Program (CARIP) Public Report as required by the Province of BC. The CARIP report summarizes actions taken in 2014 and proposed for 2015 to reduce corporate and community-wide energy consumption and greenhouse gas emissions (GHG), as well as general sustainability related initiatives.

March 5, 2015

General Information

Name of Local Government	City of Richmond
Member of Regional District (RD)	Metro Vancouver
Regional Growth Strategy (RGS) in region	Yes
Population	207,000

Table of Contents

- 1. GENERAL REPORT INFORMATION.....3
- 2. BROAD PLANNING3
 - 2.1. Community Actions.....4
- 3. BUILDINGS.....5
 - 3.1. Corporate Actions6
 - 3.2. Community Actions.....8
- 4. ENERGY GENERATION 10
 - 4.1. Corporate Actions 11
 - 4.2. Community Actions..... 13
- 5. GREENSPACE..... 15
 - 5.1. Community Actions..... 15
- 6. SOLID WASTE..... 18
 - 6.1. Corporate Actions 19
 - 6.2. Community Actions20
- 7. TRANSPORTATION 23
 - 7.1. Corporate Actions 23
 - 7.2. Community Actions..... 27
- 8. WATER AND WASTEWATER..... 30
 - 8.1. Corporate Actions 31
 - 8.2. Community actions..... 33
- 9. OTHER CLIMATE ACTIONS..... 36
 - 9.1. Community Actions 37
- 10. INNOVATION 37
 - 10.1. Corporate/Community Actions..... 37
- 11. CONCLUSION..... 38

1. GENERAL REPORT INFORMATION

This 2014 Climate Action Revenue Incentive Program (CARIP) Public Report documents the actions that the City of Richmond has taken corporately and in the community to support the reduction of greenhouse gas (GHG) emissions and energy use, as well as other sustainability related initiatives. The actions are separated into seven main categories; Broad Planning, Buildings, Energy Generation, Greenspace, Solid Waste, Transportation and Water and Wastewater. There are also is Other Climate Actions and Innovation categories, which the City has inputted action items. The categories are further divided into corporate and community related actions, with six required reporting areas.

This report encompasses a majority of the action items that the City is involved in to support GHG and energy reduction, but does not cover all sustainability related initiatives that the City conducts or supports. The report represents a “snapshot” of City activities over the past year, and proposed actions for 2015.

2. BROAD PLANNING

Broad Planning refers to the high level, strategic planning that sets the stage for GHG reductions. Land use planning that focuses on Smart Growth principles (compact, complete, connected and centred) plays an especially important role in energy and GHG reduction. Below are the City of Richmond’s responses to Provincial inquiries regarding planning best practices, and summary of initiatives conducted in 2014 and/or planned in 2015.

Since initially establishing OCP targets, policies, and actions for the reduction of greenhouse gas (GHG) emissions, as required by the Local Government Act, has your local government updated those targets, policies and actions?	No
Does your local government use the Community Energy and Emissions Inventory (CEEI) to measure progress?	Yes
Has your local government established Development Permit Areas (DPAs) for climate action (i.e. energy conservation, water conservation and/or GHG emission reduction)?	No

2.1. Community Actions

Feasibility Studies, Research, Analysis	Actions taken in 2014
	Actions proposed for 2015
	<ul style="list-style-type: none"> • When the City reviews the City Centre Area Plan (CCAP) building height requirements, in association with YVR's Airport Zoning Regulations (AZR), consideration will be given to maximizing energy efficiency through increased density. • Review the possibility of requiring electrical vehicle charging stations at non-residential locations throughout the City.
Plans, Policies, Regulations	Actions taken in 2014
	<ul style="list-style-type: none"> • Adopted the Hamilton Area Plan which promotes compact, sustainable, and energy efficient communities • Added policies that require townhouses to be more energy efficient (achieve 82 or higher on Energuide rating system) and to include the potential to integrate renewable energy systems (e.g. solar thermal ready).
	Actions proposed in 2015
	<ul style="list-style-type: none"> • Revise the Steveston Area Plan and include measures that promote a more compact, sustainable, energy efficient, and pedestrian friendly built environment. • Revise arterial road and coach house policies to encourage more energy efficient buildings and more compact communities.
Policy Implementation	Actions taken in 2014
	<ul style="list-style-type: none"> • Continued to implement the OCP and City Centre Area Plan (CCAP) which directs the majority of Richmond's urban growth to the City Centre and near major transit stations. • Continued to advance District Energy Utility ready and connected development in the Alexandria neighbourhood of the West Cambie Area. • Continue to implement CCAP requirement that all rezoning applications with development over 2,000 m2 meet at a minimum LEED silver standards.
	Actions proposed in 2015
	<ul style="list-style-type: none"> • Continue to implement OCP and CCAP policies as new development applications are processed. • Prepare and implement a policy to establish higher a minimum energy standard for the City Centre.

Community Education, Engagement	Actions taken in 2014
	<ul style="list-style-type: none"> • Met regularly with Richmond’s Small Home Builders and Urban Development Institute when preparing new community building related sustainability initiatives.
	Actions proposed in 2015
	<ul style="list-style-type: none"> • Continue to meet with Richmond’s Small Home Builders and Urban Development Institute when preparing new community building related sustainability initiatives.
Committees, Staffing	Actions taken in 2014
	<ul style="list-style-type: none"> • Policy Planning Department staff reviewed and updated the OCP and various Area Plans; also, they are the staff liaison to Richmond’s Advisory Committee on the Environment.
	Actions proposed in 2015
	<ul style="list-style-type: none"> • Policy Planning Department staff will periodically, review and update the OCP and various Area Plans, and will continue to be the staff liaison to Richmond’s Advisory Committee on the Environment.
Funding	Actions taken in 2014
	<ul style="list-style-type: none"> • Municipal Operational Funding • Worked with Sustainability staff to identify grant opportunities to encourage community sustainability initiatives, and received funding for the further development of a community energy assessment modeling tool.
	Actions proposed in 2015
	<ul style="list-style-type: none"> • Municipal Operational Funding • Continue to work with Sustainability staff to identify grant opportunities to encourage community sustainability initiatives.

3. BUILDINGS

Low-carbon buildings use the minimum amount of energy needed to provide comfort and safety for their inhabitants, and tap into renewable energy sources for heating, cooling and power. These buildings can save money, especially viewed over the long term. Below is the City of Richmond’s response to the Provincial inquiry regarding building best practices, and summary of initiatives conducted in 2014 and/or planned in 2015.

Does your local government have green building/construction policies, plans or programs?	Yes
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3.1. Corporate Actions

Physical Improvements, Construction	Actions taken in 2014
	<ul style="list-style-type: none"> Completed major equipment replacement and upgrade at Richmond Ice Centre. Completed lighting retrofits at Minoru Tennis courts. Replaced gas fired roof-top units with efficient electric heat pumps, at South Arm Community Centre. Replaced and upgraded building automation systems at West Richmond and South Arm Community Centres.
	Actions proposed in 2015
	<ul style="list-style-type: none"> Complete energy efficiency upgrades at Watermania Aquatic Centre, Steveston Community Centre, and other recreational facilities.
Feasibility Studies, Research, Analysis	Actions taken in 2014
	<ul style="list-style-type: none"> Completed lighting audits at the Richmond Courthouse and Britannia Shipyards. Completed energy conservation assessments at four separate recreational facilities, to determine energy management capital projects for 2015.
	Actions proposed in 2015
	<ul style="list-style-type: none"> Complete the energy conservation measures study for the heat recovery optimization project at Watermania aquatic centre. Complete 5-7 energy assessments at City facilities to establish potential capital projects for 2016.
Plans, Policies, Regulations	Actions taken in 2014
	<ul style="list-style-type: none"> Adopted the revised City's Corporate High Performance Building Policy, which include new targets for energy efficiency and sustainable corporate buildings. Further developed separate policy initiatives related to the City's Corporate High Performance Building Policy, including the Sustainable Operations and Maintenance Guideline, Lighting Standards Guideline, and Building Automation System Integration Guideline.
	Actions proposed in 2015
	<ul style="list-style-type: none"> Complete the City's Corporate Sustainable Operations and Maintenance Guideline, Lighting Standards Guideline, and Building Automation System Integration Guideline.

Policy Implementation	Actions taken in 2014
	<ul style="list-style-type: none"> Continued to work towards achieving key targets of the City's High Performance Building Policy, during design development for planned new Minoru Park facilities, with focus on energy efficiency, reduced resource use, and environmental sustainability.
	Actions proposed in 2015
	<ul style="list-style-type: none"> Continue to work towards achieving key targets in the City's High Performance Building Policy for new and existing facilities, with focus on energy efficiency, reduced resource use, and environmental sustainability.
Employee Training, Awareness	Actions taken in 2014
	<ul style="list-style-type: none"> Completed Year 3 of a workplace conservation awareness program, that looks to promote corporate and community energy efficiency and sustainability in general through engagement and education.
	Actions proposed in 2015
	<ul style="list-style-type: none"> Complete Year 4 of a workplace conservation awareness program.
Committees, Staffing	Actions taken in 2014
	<ul style="list-style-type: none"> Approximately 1.5 full time staff are directly involved in Corporate Energy Management activities, and increasing corporate energy efficiency in City buildings. Participated in BC Hydro Corporate Energy Manager forums as part of Power Smart program.
	Actions proposed in 2015
	<ul style="list-style-type: none"> No anticipated change to staffing levels. Continue to participate in BC Hydro Corporate Energy Manager forums as part of Power Smart program.
Funding	Actions taken in 2014
	<ul style="list-style-type: none"> Municipal Revolving Enterprise Funding – for capital projects Municipal Operational Funding External Incentives Grant Funding
	Actions proposed in 2015
	<ul style="list-style-type: none"> Municipal Revolving Enterprise Funding – for capital projects Municipal Operational Funding External Incentives Grant Funding

3.2. Community Actions

Physical Improvements, Construction	Actions taken in 2014
	<ul style="list-style-type: none"> Completed connections for approximately 800 residential units to the Alexandra District Energy Utility (DEU) renewable energy centre, to provide heating and cooling.
	Actions proposed in 2015
	<ul style="list-style-type: none"> Complete development work for Phase 3 of the Alexandra DEU, to allow for further residential and commercial connections to the renewable energy centre. Evaluate the extent of building energy improvements taken by commercial, institutional and multifamily building participants in the City's Building Energy Challenge program.
Feasibility Studies, Research, Analysis	Actions taken in 2014
	<ul style="list-style-type: none"> Facilitated the completion of Phase 1 of Multi-Unit Residential Building Deep Retrofit study, to identify significant energy upgrade opportunities in multi-unit building types.
	Actions proposed in 2015
	<ul style="list-style-type: none"> Assess the potential for energy performance requirements to be instituted for new developments at the time of a rezoning application, and/or other municipal triggers.
Plans, Policies, Regulations	Actions taken in 2014
	<ul style="list-style-type: none"> Adopted the Community Energy and Emissions Plan. Amended the OCP to increase townhouse energy efficiency and renewable energy integration opportunities by requiring that townhouse rezoning achieve EnerGuide 82. Executed agreement with utility partner and develop implementation plan for the design, construction, financing, and operation of the Oval Village DEU.
	Actions proposed in 2015
	<ul style="list-style-type: none"> Continue to further develop and implement action items identified in the Community Energy and Emissions Plan.

Policy Implementation	Actions taken in 2014
	<ul style="list-style-type: none"> • Continued to enforce Solar Ready requirements for new single family residential buildings, which ensure new homes can accommodate future solar thermal installations. • Continued to implement DEU ready development in the Alexandra and City Centre neighbourhoods. • Secured commitments from new development in the City Centre to achieve LEED Silver, and townhome developments city-wide to build to EnerGuide 82 standard.
	Actions proposed in 2015
	<ul style="list-style-type: none"> • Continue to implement building energy policies. • Continue to implement District Energy Utility (DEU) ready development in the Alexandra and City Centre neighbourhoods.
Community Education and Engagement	Actions taken in 2014
	<ul style="list-style-type: none"> • Launched the Building Energy Challenge, a program to support increased energy efficiency in commercial, institutional and multifamily buildings through incentives for energy management training, “energy coaching” services, and support for building energy benchmarking. • Conducted an outreach program to promote home and building energy upgrades and energy utility incentive programs, through the implementation of the Community Energy Save Richmond initiative.
	Actions proposed in 2015
	<ul style="list-style-type: none"> • Continue to implement the Building Energy Challenge program. • Continue to promote energy incentive programs as part of the Community Energy Save Richmond initiative. • Explore the potential to implement an energy saving/incentive program for multifamily residential buildings.
Committees, Staffing	Actions taken in 2014
	<ul style="list-style-type: none"> • Approximately two full time staff are directly involved in Community Energy Management and facilitating community energy efficiency improvements. • Participated in BC Hydro Community Energy Manager forums as part of Sustainable Community program.

Committees, Staffing	Actions proposed in 2015
	<ul style="list-style-type: none"> • No change expected to City Community Energy Management staffing levels. • Continue to participate in BC Hydro Community Energy Manager forums as part of Sustainable Community program.
Funding	Actions taken in 2014
	<ul style="list-style-type: none"> • Municipal Operational Funding • Carbon Tax Rebate Funding • External Incentives Funding • Funding for Building Energy Challenge secured from BC Hydro Sustainable Communities Program “Implementation Offer” and through Fortis BC.
	Actions proposed in 2015
	<ul style="list-style-type: none"> • Municipal Operational Funding • Carbon Tax Rebate Funding • External Incentives Funding • Apply for BC Hydro implementation offer, and other funding sources to further support Community Energy Management initiatives in 2015

4. ENERGY GENERATION

A transition to renewable or low-emission energy sources for heating, cooling and power supports large, long-term GHG emissions reductions. Renewable energy including waste heat recovery, geo-exchange, micro hydroelectric, solar thermal and solar photovoltaic, heat pumps, tidal, wave, and wind energy can be implemented at different scales, e.g. in individual homes, or integrated across neighbourhoods through district energy or co-generation systems. Below are the City of Richmond’s responses to the Provincial inquiries regarding energy generation, and summary of initiatives conducted in 2014 and/or planned in 2015.

Has your local government undertaken district energy projects in 2014?	Yes
Has your local government undertaken renewable energy projects 2014?	Yes
Are you aware of the integrated resource recovery (IRR) guidance page on the BC Climate Action Toolkit?	Yes

4.1. Corporate Actions

Physical Improvements, Construction	Actions taken in 2014
	<ul style="list-style-type: none"> • Completed the installation of a heat recovery system at the main City of Richmond ice arena, to pre-heat ice re-surfacer flood water, which will help to reduce natural gas use by approximately 20%. • Completed the optimization work for the solar thermal hot water system at South Arm Pool, to improve the overall efficiency and system operation, and reduce natural gas use.
	Actions proposed in 2015
	<ul style="list-style-type: none"> • Complete the planned heat recovery optimization work at Watermania, to reduce natural gas use and improve the energy use efficiency of the system. • Connect the City's new Fire Hall No.3 development with the Alexandra renewable energy centre for heating and cooling purposes.
Feasibility Studies, Research, Analysis	Actions taken in 2014
	<ul style="list-style-type: none"> • Undertook an energy strategy and options evaluation study for the planned new aquatic and institutional facilities in the Minoru Precinct area.
	Actions proposed in 2015
	<ul style="list-style-type: none"> • Complete feasibility studies for the new Fire Hall No.1 and Minoru Complex building, which will assess further measures to reduce energy use, and incorporate renewable energy systems into the buildings.
Plans, Policies, Regulations	Actions taken in 2014
	<ul style="list-style-type: none"> • Adopted the City's Corporate High Performance Building Policy, which includes a target for corporate buildings to be built to "net zero" energy standards by 2030.
	Actions proposed in 2015
	<ul style="list-style-type: none"> • Continue to implement corporate policy initiatives that increase renewable energy integration at corporate facilities.
Policy Implementation	Actions taken in 2014
	<ul style="list-style-type: none"> • Continued to target renewable energy integration, a key component of the City's High Performance Building Policy, during development design for planned new Minoru Park facilities.
	Actions proposed in 2015
	<ul style="list-style-type: none"> • Continue to target renewable energy integration, a key component of the City's High Performance Building Policy, during design development for new corporate facilities.

Employee Training, Awareness	Actions taken in 2014
	<ul style="list-style-type: none"> • Completed Year 3 of a workplace conservation awareness program, that looks to promote corporate and community energy efficiency and sustainability in general through engagement and education.
	Actions proposed in 2015
	<ul style="list-style-type: none"> • Complete Year 4 of a workplace conservation awareness program.
Committees, Staffing	Actions taken in 2014
	<ul style="list-style-type: none"> • Approximately 2.0 full time staff are directly involved in Corporate Energy generation activities, and increasing corporate renewable energy systems in the City. • Participated in BC Hydro Corporate Energy Manager forums as part of Power Smart program.
	Actions proposed in 2015
	<ul style="list-style-type: none"> • No anticipated change to staffing levels. • Continue to participate in BC Hydro Corporate Energy Manager forums as part of Power Smart program.
Funding	Actions taken in 2014
	<ul style="list-style-type: none"> • Municipal Revolving Enterprise Funding – for capital projects • Municipal Operational Funding • External Incentives • Grant Funding
	Actions proposed in 2015
	<ul style="list-style-type: none"> • Municipal Revolving Enterprise Funding – for capital projects • Municipal Operational Funding • External Incentives • Grant Funding

4.2. Community Actions

Physical Improvements, Construction	Actions taken in 2014
	<ul style="list-style-type: none"> Completed connections and servicing to a third building for heating and cooling purposes from the existing renewable energy Alexandra DEU. This new connection increases the total number of residential units being serviced by the DEU to 800 covering 750,000 ft² of floor area.
	Actions proposed in 2015
	<ul style="list-style-type: none"> Implement Phase 1 of Oval Village DEU, which will include construction of interim energy centres, installing distribution piping system and energy transfer stations at new developments, and the connecting of approximately 1.0 million ft² of floor area to the new district energy system. Implement Phase 3 of the Alexandra DEU that will connect a further 1.63 million ft² of residential and commercial floor area for heating and cooling purposes to the renewable energy system. Phase 3 includes expanding the existing energy centre and increasing geo-exchange capacity; extending the distribution piping system; and installing energy transfer stations in developments.
Feasibility Studies, Research, Analysis	Actions taken in 2014
	<ul style="list-style-type: none"> Supported the pre-feasibility study of effluent heat recovery potential for Lulu Island Wastewater Treatment Plant. Completed a pre-feasibility study of the potential for a district energy node with renewable energy as part of the new Minoru Civic Precinct aquatic centre and community facilities.
	Actions proposed in 2015
	<ul style="list-style-type: none"> Explore the potential development of a City Centre North District Energy centre.
Plans, Policies, Regulations	Actions taken in 2014
	<ul style="list-style-type: none"> Completed the incorporation of the municipally owned Lulu Island Energy Company corporation, which will manage community district energy systems on behalf of the City of Richmond. Executed agreement with a utility partner and developed the implementation plan for the design, construction, financing, and operation of the Oval Village DEU. Continued to implement DEU ready development in the City Centre Area.
	Actions proposed in 2015
	<ul style="list-style-type: none"> Continue to implement DEU ready development in the City Centre and West Cambie neighbourhood areas.

Policy Implementation	Actions taken in 2014
	<ul style="list-style-type: none"> Established a service area bylaw for Oval Village DEU, mandating connection of new developments in the service area.
	Actions proposed in 2015
	<ul style="list-style-type: none"> Continue to secure commitments that new buildings in City Centre and West Cambie are district energy utility ready.
Community Education and Engagement	Actions taken in 2014
	<ul style="list-style-type: none"> Led tours of the City's district energy system for community members and elected officials. Engaged and communicated with DEU customers and developers concerning DEU developments and initiatives
	Actions proposed in 2015
	<ul style="list-style-type: none"> Continue DEU customer and public engagement.
Committees, Staffing	Actions taken in 2014
	<ul style="list-style-type: none"> Participated in BC Hydro Community Energy Manager forums as part of Sustainable Community program. Worked with Metro Vancouver on the development of renewable energy generation from Gilbert Sewer Main Approximately 2.25 full time staff were directly involved in Community Energy generation activities, and increasing District Energy capacity in the City.
	Actions proposed in 2015
	<ul style="list-style-type: none"> Participated in BC Hydro Community Energy Manager forums as part of Sustainable Community program. Full time staff involved in community energy generation activities will increase from 2.25 to 4.25.

Funding	Actions taken in 2014
	<ul style="list-style-type: none"> Continued to implement DEU infrastructure and developments using dedicated DEU operating funds and capital program, financed through ratepayer funds.
	Actions proposed in 2015
	<ul style="list-style-type: none"> Apply for Federal/Provincial grant funding to support Alexandra and Oval Village DEU implementation. Continued partnership with the BC Hydro Sustainable Community program.

5. GREENSPACE

Greenspace refers to parks and greenways, boulevards, community forests, urban agriculture, riparian areas, gardens, recreation/school sites, and other green spaces, such as remediated brownfield/contaminated sites. Greenspaces support climate change mitigation (reducing emissions by absorbing and sequestering GHG) and adaptation (providing shade, cooling, deflecting strong wind, and improving air quality). Below are the City of Richmond responses to the Provincial inquiry regarding “greenspace” management in the City, and summary of community initiatives conducted in 2014 and/or planned in 2015.

Does your local government have urban forest policies, plans or programs?	Yes
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5.1. Community Actions

Physical Improvements, Construction	Actions taken in 2014
	<ul style="list-style-type: none"> Completed the 5 km long new pedestrian and biking Railway. Planted 1,120 new trees in City street right-of-ways and in parks. Constructed a new playground structure at Terra Nova Rural Park using sustainable materials that were sourced almost exclusively locally.
	Actions proposed in 2015
	<ul style="list-style-type: none"> Develop 11.5 acres of new neighbourhood parks in the City Centre and Alexandra Neighbourhood, bringing park services to within walking distance of residents in these rapidly redeveloping high and medium density neighbourhoods. Plant approximately 1,265 new trees in City street right-of-ways and in parks.

Feasibility Studies, Research, Analysis	Actions taken in 2014
	<ul style="list-style-type: none"> • Completed mapping and inventory of invasive knotweed on City dike • Initiated a physical treatment pilot project to research effective control methods for parrotfeather (M. Aquaticum) in City watercourses • Initiated the inventory and mapping of riparian and aquatic invasive plants species
	Actions proposed in 2015
Plans, Policies, Regulations	Actions taken in 2014
	<ul style="list-style-type: none"> • Continued work on the update and expansion of the Urban Forest Management Plan. • City endorsed the Garden City Lands Legacy Landscape Plan, which includes plans for a 136 acre park. The plan also features conservation of 70 acres of bog and the allotment of 50 acres to showcase sustainable agricultural practices. • Initiated the development of a City wide Invasive Species Action Plan • Adopted the Ecological Network Management Strategy (Phase 1), which lays out a framework to guide the management of the City's ecological assets • Adopted the Bath Slough Revitalization Initiative, a pilot project of the Ecological Network Management Strategy.
	Actions proposed in 2015
	<ul style="list-style-type: none"> • Adopt and implement the Urban Forest Management Plan • Adopt and implement City wide Invasive Species Action Plan • Adopt and implement Ecological Network Management Strategy (Phase 2).

Policy Implementation	Actions taken in 2014
	<ul style="list-style-type: none"> • Acquired three private properties to add to the City’s park land as per the OCP including 2 properties adjacent to Sturgeon Bank and 1 property that will be developed into a greenway connection and ecological corridor.
	Actions proposed in 2015
	<ul style="list-style-type: none"> • Continue ongoing park land acquisition to meet the park provision standards of the OCP.
Community Education and Engagement	Actions taken in 2014
	<ul style="list-style-type: none"> • Facilitated an Earth Day tree planting event with corporate and community volunteers. • Launched the Terra Nova Nature Preschool which employs a place-based approach to education that promotes respect for the environment, teaches ecological literacy, and develops environmental stewardship. • Developed and delivered school and public environmental awareness programs, primarily at the Richmond Nature Park and Terra Nova Rural Park. • Facilitated invasive species removal and environmental stewardship activities in City parks, in collaboration with Community Centres and Youth volunteers • Collaborated with the Richmond Wavers Guild to create baskets and art project from harvested invasive plants.
	Actions proposed in 2015
	<ul style="list-style-type: none"> • Continue to deliver Earth Day tree planting event and expand to include invasive species removal with corporate and community volunteers. • Review and update of the Parks Departments community stewardship program – Partners For Beautification based on consultant review and recommendations that we anticipate will refocus the program towards greater environmental stewardship education. • Expand urban agriculture programs that encourage local, small scale, sustainable agricultural initiatives, including the expansion of the community garden program, incubator farm program and the establishment of a sustainable agriculture laboratory farm. • Plan and facilitate invasive species removal and environmental stewardship activities in City parks, in collaboration with Community Centres and Youth volunteers • Continue collaboration with the Richmond Wavers Guild to create baskets and art project from harvested invasive plants

Committees, Staffing	Actions taken in 2014
	<ul style="list-style-type: none"> • Approximately 2.5 full time equivalent Parks staff work on Community Greenspace initiatives and outreach programs.
	Actions proposed in 2015
	<ul style="list-style-type: none"> • No anticipated change to staffing levels.
Funding	Actions taken in 2014
	<ul style="list-style-type: none"> • Municipal Operational Funding • Municipal Capital Project Funding • The City received \$449,000 in funding in 2014 for the Railway Greenway from the Provincial Bike BC Program.
	Actions proposed in 2015
	<ul style="list-style-type: none"> • Municipal Operational Funding • Municipal Capital Project Funding • The City will receive \$472,899 in funding in 2015 for the Railway Greenway from TransLink. • \$150,000 dedicated fund to manage invasive plants species on City land.

6. SOLID WASTE

Reducing, reusing, recycling, recovering and managing the disposal of the residual solid waste minimizes environmental impacts and supports sustainable environmental management, greenhouse gas reductions, and improved air and water quality. Below are the City of Richmond responses to the Provincial inquiries regarding solid waste management in the City, and summary of initiatives conducted in 2014 and/or planned in 2015.

Does your local government have construction and demolition waste reduction policies, plans or programs?	No
Does your local government have organics reduction/diversion policies, plans or programs?	Yes

6.1. Corporate Actions

Physical Improvements, Construction	Actions taken in 2014
	<ul style="list-style-type: none"> Continued to provide recycling services for City events.
	Actions proposed in 2015
	<ul style="list-style-type: none"> Expand in-house recycling at all City Facilities including organics collection. Continue recycling and waste services for City events.
Feasibility Studies, Research, Analysis	Actions taken in 2014
	<ul style="list-style-type: none"> Conducted in-house waste audits of City facilities.
	Actions proposed in 2015
	<ul style="list-style-type: none"> Review the potential to complete more detailed waste audits at select facilities to implement further corporate waste reduction/diversion initiatives.
Plans, Policies, Regulations	Actions taken in 2014
	<ul style="list-style-type: none"> Council adopted the Management of Waste and Recycling Materials from City Facilities Demolition and Construction Activities Policy, with the objective to achieve a diversion rate of 80% by weight for the demolition of City facilities, houses, new facility construction, and major facility renovations.
	Actions proposed in 2015
	<ul style="list-style-type: none"> Help develop a sustainable sport and event tool kit for community events, which will allow event planners in the Community to more easily access waste and recycling services and reduce the environmental impact of events in general.
Policy Implementation	Actions taken in 2014
	Actions proposed in 2015
	<ul style="list-style-type: none"> Implement action items associated with the Management of Waste and Recycling Materials from City Facilities Demolition and Construction Activities Policy.
Employee Training, Awareness	Actions taken in 2014
	<ul style="list-style-type: none"> Delivered a waste reduction lunch time workshop for City staff, with support from the Recycling Council of BC.
	Actions proposed in 2015
	<ul style="list-style-type: none"> Further educate and inform City staff on the Corporate related waste reduction/diversion initiatives on-going at City facilities.

Committees, Staffing	Actions taken in 2014
	<ul style="list-style-type: none"> • Environmental Programs staff consists of the following personnel; Manager of Environmental Programs (1), Supervisor of litter collection staff (1), litter collection employees (12), and sanitation and recycling administration employees (3).
	Actions proposed in 2015
	<ul style="list-style-type: none"> • Staffing levels are anticipated to be maintained in 2015.
Funding	Actions taken in 2014
	<ul style="list-style-type: none"> • Municipal Operational Funding
	Actions proposed in 2015
	<ul style="list-style-type: none"> • Municipal Operational Funding

6.2. Community Actions

Physical Improvements, Construction	Actions taken in 2014
	<ul style="list-style-type: none"> • Expanded Recycling Depot services to include Styrofoam, plastic bags and overwrap through partnership with MMBC, and added used books, batteries, and cell phones as accepted material at the Recycling Depot. • Expanded the blue box and blue cart recycling programs to include a broader range of materials accepted under partnership with MMBC (additional plastics and containers). • Continued significant litter collection program at City parks, bus stops and other City properties.
	Actions proposed in 2015
	<ul style="list-style-type: none"> • Consider expanding items accepted at the Depot to accept small amounts of clean wood waste. • Accept an expanded range of materials for recycling in public spaces and enhance the container replacement and maintenance program. • Maintain a “litter-free” City by servicing 4,500 City litter and recycling containers in the community weekly.

Feasibility Studies, Research, Analysis	Actions taken in 2014
	<ul style="list-style-type: none"> • Conducted a pilot project with the small building industry that assessed different methods of recycling materials from single-family home demolitions. • Completed a 15 month food scraps pilot program involving more than 5,800 apartments and condo units. • Launched the garbage cart pilot program to test service level options for garbage collection using carts. • Participated with MMBC on a waste audit of residential and streetscape waste.
	Actions proposed in 2015
	<ul style="list-style-type: none"> • Explore options for expanded Recycling Depot service (i.e. Eco Centre).
Plans, Policies, Regulations	Actions taken in 2014
	Actions proposed in 2015
	<ul style="list-style-type: none"> • Report to Council regarding instituting carts for garbage service and altering levels of service (bi-weekly), to increase recycling and waste diversion. • Report to Council on a proposed policy approach for enhanced recycling of demolition waste from single-family residential demolitions.
Policy Implementation	Actions taken in 2014
	<ul style="list-style-type: none"> • Continued to work towards achieving the City's goal of diverting 80% of the community waste from the landfill by 2020.
	Actions proposed in 2015
	<ul style="list-style-type: none"> • Expand green cart collection to multi-family complexes. • Help develop a sustainable sport and event tool kit for community events.

Community Education and Engagement	Actions taken in 2014
	<ul style="list-style-type: none"> • Delivered 9 workshops with 122 participants on waste reduction, recycling and avoiding food wastage. • Achieved a 97.5% diversion rate for waste generated at the 2014 REaDY summit. • Organized DreamRider theatrical/educational shows, including Zero Heroes and Clean Up your act at 18 elementary schools, reaching 2,749 students. • Addressed over 15,400 customer service enquiries from residents concerning garbage and recycling collection services.
	Actions proposed in 2015
	<ul style="list-style-type: none"> • Communicate Richmond’s goal of becoming a Recycling Smart City and achieve 80% waste reduction goal by 2020. • Conduct lobby presentations for multi-family green cart implementation at each complex. • Continue annual reporting to community regarding waste reduction and diversion progress. • Continue public engagement through workshops and deliver 20 theatrical/educational shows at schools. • Support the 5th annual REaDY summit.
Committees, Staffing	Actions taken in 2014
	<ul style="list-style-type: none"> • Initiated review of the Green Ambassadors and Partners for Beautification programs. • Green Ambassadors contributed nearly 2,500 hours to help promote recycling at community events. • Environmental Programs staff consists of the following personnel; Manager of Environmental Programs (1), Supervisor of litter collection staff (1), litter collection employees (12), and sanitation and recycling administration employees (3).
	Actions proposed in 2015
	<ul style="list-style-type: none"> • Complete review and improve Green Ambassador and Partners for Beautification programs. • Staffing levels are anticipated to be maintained in 2015.

Funding	Actions taken in 2014
	<ul style="list-style-type: none"> • Municipal Operational Funding. • Received funding from MMBC for the expansion of the containers recycling program.
	Actions proposed in 2015
	<ul style="list-style-type: none"> • Municipal Operational Funding. • Continue to receive funding for the MMBC program.

7. TRANSPORTATION

Transportation actions that increase transportation system efficiency, emphasize the movement of people and goods, and give priority to more efficient modes, e.g. walking, cycling, ridesharing, and public transit, can contribute to reductions in greenhouse gas emissions and more livable communities. Below are the City of Richmond responses to the Provincial inquiries regarding transportation system management in the City, and summary of initiatives conducted in 2014 and/or planned in 2015.

Does your local government have policies, plans or programs to support alternative modes and technologies of transportation (e.g. walking, cycling, transit, electric vehicles)	Yes
Does your local government have a transportation demand management (TDM) strategy?	Yes
Does your local government have policies, plans or programs to support local food production (thus reducing transportation emissions)?	Yes

7.1. Corporate Actions

Physical Improvements, Construction	Actions taken in 2014
	<ul style="list-style-type: none"> • Replaced 67 fleet units in 2014 with more fuel efficient vehicles and increased the number of carpool spaces available to staff.
	Actions proposed in 2015
	<ul style="list-style-type: none"> • Continue with vehicle replacements for over 30 vehicles with more fuel efficient hybrid/electric/eco boost engines.

Feasibility Studies, Research, Analysis	Actions taken in 2014
	<ul style="list-style-type: none"> • Initiated review of City Employee Carpool Program, by undertaking best practices research, with the objective of assessing feasibility of expanding the program to other sustainable travel modes (i.e., transit, cycling, walking). • Implemented a new Fleet asset management system to track and schedule maintenance, log data, and better track Fleet assets. • Developed a pilot project that involves installing GPS monitoring systems in Fleet assets that will enable reduced fuel consumption and more efficient vehicle use. • Compiled Fleet usage and emissions data for Silver-level rating E3 (Energy Environment Excellence) Fleet Certification base lines.
	Actions proposed in 2015
	<ul style="list-style-type: none"> • Complete review and update City Employee Carpool Program based on results of research and analysis. • Undertake the E3 Fleet Certification Audit.
Plans, Policies, Regulations	Actions taken in 2014
	<ul style="list-style-type: none"> • Continued existing initiatives that encourage the use of alternative modes of transportation for commuting to and from work and corporate travel, such as sponsorship and promotion of Bike to Work week, use of corporate bike fleet, and promotion of transit fare tickets and passes for work travel. • Implemented action items identified in the Green Fleet Action Plan designed to achieve a reduction of 20% in Fleet emissions by 2020, which includes; reducing Fleet growth and downsizing vehicles, further right sizing of existing vehicles, upgrades in Fleet asset efficiency and reduced emissions through replacements, improved maintenance scheduling, and anti-idling initiatives.
	Actions proposed in 2015
	<ul style="list-style-type: none"> • Continue to support greater use and expansion of the City employee carpool program including the upgrade of carpool vehicles that are up for replacement with fuel efficient mini-vans where appropriate/feasible to accommodate waitlisted carpool participants. • Continue to support use of alternative modes of transportation for work related travel and other corporate initiatives. • Continue with implementation of action items identified in the Green Fleet Action Plan including the expansion of the Fleet Management software to include emissions data, a replacement scoring model, and maintenance and repairs schedules.

Policy Implementation	Actions taken in 2014
	<ul style="list-style-type: none"> • Increased employee participation in Bike to Work Week versus 2013. • Installed anti-skid surface in City Hall parkade along access to/from secure bike room, to enhance bike to work safety. • Supplied bike repair kit (e.g., tubes, chain oil, cables, lights) in bike room at City Hall to further support corporate bike to work participation.
	Actions proposed in 2015
	<ul style="list-style-type: none"> • Work with TravelSmart (TransLink Transportation Demand Management –TDM Program) to identify opportunities to expand corporate TDM programs. • Implement the GPS pilot project for select Fleet Vehicles.
Employee Training, Awareness	Actions taken in 2014
	<ul style="list-style-type: none"> • Continued use of City Intranet site to promote Bike to Work Week and other sustainable transportation initiatives. • Undertook various vehicle/equipment training for 60 employees including fuel efficiency driver’s training as part of the core essential safety training program. • Achieved 40% reduction in vehicle accidents over the prior year through driver training services
	Actions proposed in 2015
	<ul style="list-style-type: none"> • Continue use of City Intranet site to promote Bike to Work Week and other sustainable transportation initiatives. • Raise awareness of any improvements to the City Employee Carpool Program, pending the outcome of the completed review. • Present anti-idling and fuel efficient driver techniques to a further 30% of pertinent staff • Revise training materials to include driver related improvements that will contribute toward City’s Green Fleet Action Plan goals and E3 Fleet Certification. • Create an electronic library of Fleet training materials as well as a tracking method for fleet training, operator certifications/renewals and accident record.

Committees, Staffing	Actions taken in 2014
	<ul style="list-style-type: none"> • Corporate related Transportation Staff consists of the following personnel; Director of Transportation (1), Manager of Transportation Planning (1), Transportation Planner (1), Coordinator of Customer Service (1), and Coordinator of Fitness and Wellness Services (1). • Fleet operations staff consists of the following personnel: Manager of Fleet Operations (1), Fleet Supervisors (2), Fleet Training Officer (1) and Fleet employees (47). • The City participates in a Regional Fleet Managers Group, and regularly attends meetings to gain information concerning emerging trends in best practices management
	Actions proposed in 2015
	<ul style="list-style-type: none"> • Staffing levels are anticipated to be maintained in 2015.
Funding	Actions taken in 2014
	<ul style="list-style-type: none"> • Municipal Operational Funding • Corporate subsidy of City Employee Carpool Program • Various departmental operating budgets (e.g., for purchase of transit fares)
	Actions proposed in 2015
	<ul style="list-style-type: none"> • Municipal Operational Funding • Pending outcome of review of City Employee Carpool Program, there may be a potential increase to level of subsidy for the program and/or provision of funding to support other sustainable travel modes. • Establish a performance-based procurement process for contracted hired equipment and trucking services.

CARIP/Carbon Neutral Progress Report Reporting Year 2014

Supporting Documentation Contracted Emissions Template

LOCAL GOVERNMENT
<p>City of Richmond 6911 No. 3 Road Richmond, BC V6Y 2C1</p>
PROJECT DESIGNATE
<p>Levi Higgs, Corporate Energy Manager, Sustainability & District Energy Direct 604-244-1239 lhiggs@richmond.ca</p>
RATIONALE
<p>An estimation methodology for hired equipment contractor emissions is being utilized for 2014 since actual emissions for some contracts over \$25,000 have not provided fuel usage values.</p> <p>The City has identified four main contract areas that deliver traditional municipal services:</p> <ol style="list-style-type: none"> 1. Cascades Recovery Inc. and BFI provide recycling depot container collection and recycling services 2. Sierra Waste Services provide residential solid waste and recycling services; 3. BFI Canada Waste Management provides waste and recycling collection services at City facilities. 4. Individual Hired Equipment. <p>Contractor emissions associated with the delivery of traditional municipal services by Sierra Waste Services and BFI Canada Waste Management have been included in our mobile fleet emissions reporting spreadsheet, as fuel usage and vehicle type information was provided for 2014. Contractor emissions associated with the delivery of services by Cascades Recovery and Hired Equipment were estimated by from total hours driven.</p> <p>The hired equipment contracted emissions, with the exception of equipment used outside of the defined traditional service boundaries or for construction rather than maintenance activities, is listed in the table below by traditional service area.</p> <p>Option 3 is the estimation methodology used:</p> <ol style="list-style-type: none"> 1. Hired equipment records sorted to exclude out of scope contracts; 2. City equipment operating records assessed to determine average consumption factors in litres per hour or kilometers driven for each equipment family; 3. Consumption factors used to estimated fuel consumption for hired equipment; 4. Environment Canada emissions factors applied to calculate GHG emissions.

CONTRACTED EMISSIONS	
Option 3: Vehicle/Equipment Type and Kilometers or Hours of Usage	
Traditional Service Area	Estimated Annual GHGs (tonnes)
Drinking, Storm and Wastewater	192
Solid Waste Collection, Transportation and Diversion	3.0
Roads and Traffic Operations	55
Parks, Recreation, Arts, and Cultural Services	60
Corporate Operations	2.0
Fire Protection	—
Total	312