



# City of Richmond

## Report to Committee

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**To:** General Purpose Committee **Date:** April 27, 2016  
**From:** John Irving, P.Eng., MPA **File:** 10-6000-01/2014-Vol  
 Director, Engineering 01  
**Re:** **Climate Action Revenue Incentive Program and Carbon Neutral Progress Report – Update**

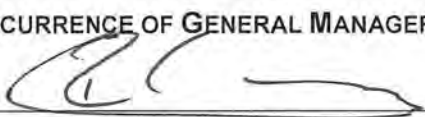
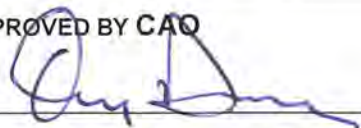
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### Staff Recommendation

1. That the 2015 Climate Change Action Charter information, identified in the Climate Action Revenue Incentive Program (CARIP) and Carbon Neutral Progress Report from the Director, Engineering dated April 27, 2016, be received for information.
2. That, in accordance with Provincial requirements, the CARIP Report and Carbon Neutral Progress Report be posted on the City's website for public access.

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

Att. 3

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

## Staff Report

### Origin

The City of Richmond is committed to maintaining carbon neutral corporate operations, first achieved in 2013. The purpose of this report is to update Council on the 2015 corporate greenhouse gas (GHG) emissions and on the City's carbon neutrality strategy and activities.

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

- 4.1. *Continued implementation of the Sustainability Framework.*
- 4.2. *Innovative projects and initiatives to advance sustainability.*

### Background

In September 2008, Council signed the BC Climate Action Charter, voluntarily committing the City to annual corporate GHG emissions reporting and to achieving carbon neutral operations. In 2013, Richmond City Council adopted the "*Towards Carbon Neutrality: Implementation Strategy*," which put in place an effective framework defined by four key steps for meeting carbon neutrality commitments: measure, reduce, compensate (or offset) and report.

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

### Analysis

Reducing corporate GHG emissions in the City's fleet vehicles and corporate buildings are key areas of focus for staff. Guided by the City's 2013 Green Fleet Action Plan and Energy Management Program for buildings and infrastructure, the City is constantly working on reducing its corporate GHG emissions footprint and energy use.

#### 2015 Corporate Carbon Emissions

The summary table below (Table 1) outlines GHG emissions associated with corporate operations in City buildings, civic infrastructure and fleet activities for 2015. The reported figures adhere to the BC Ministry of Environment's methodology, and include GHG reductions resulting from the City's purchase of renewable natural gas. The 2015 total includes GHG emissions associated with "traditional municipal services," including those that are contracted out, such as community waste collection. Reported corporate emissions in 2015 were slightly higher than the City's 2014 corporate GHG emissions value (8,189 tCO<sub>2</sub>e). This is mostly due to increased organics collection activity by municipal contractors, which is offset by greater amounts of carbon credits from community organics diversion.

Table 1: 2015 Emission Sources

	<b>Tonnes carbon dioxide equivalent</b>	<b>Quantification Method</b>
Emissions from services delivered directly by the City	6,464	Derived from actual energy consumption and associated GHG emissions from stationary sources (buildings, lighting, and pumps) and mobile sources (fleet, except construction related fuel use) used directly by the City
Emissions from contracted services delivering services on the City's behalf	1,740	The BC government standard methodology and guidance for estimated contracted emissions. Fuel usage values and Option 3 (Vehicle/Equipment Type and Hours of Usage) were used to determine the contracted emissions value.
<b>TOTAL</b>	<b>8,204</b>	

### 2015 Carbon Credits (Offsets)

Table 2 below outlines anticipated GHG offsets that the City expects to achieve for the 2015 reporting year. Offsets from diverted household organic waste contributed significantly to offsetting the City's corporate carbon footprint. As compared to 2014, the total amount of diverted organic waste from the City's community collection program increased by approximately 2,181 tonnes to 18,495 tonnes in 2015, equal to a 13.4% increase. The total diverted organics for 2015 corresponds to avoided GHG emissions of 5,667 tonnes of CO<sub>2</sub>e, which represents 67% of the City's 2015 total corporate emissions value.

The City's other 2015 GHG offsetting activity relates to the City's participation in the Vancouver Landfill Gas Capture Optimization project. The GHG emission offsets for this project are derived from the methane gas capture system at the Vancouver Landfill that was installed ahead of the BC regulations that came into effect January 1, 2016. The new BC landfill regulation mandates that landfills achieve a 75% methane gas capture rate for their site. Credits in 2015 will be the final year that credits will be able to be claimed for this project. The City's allocation has yet to be confirmed for 2015 and for this reason the 2014 allocation value was used as an estimate at this time.

Along with the offsets defined above, the City is also carrying forward surplus offsets accumulated in 2014 (5,332 tCO<sub>2</sub>e).

Table 2: Anticipated 2014 Emission Credits (Offsets)

<b>Offsets</b>	<b>Tonnes CO<sub>2</sub>e</b>	<b>Quantification Method</b>
Household Organic Waste Composting – Municipally Collected	5,677	As quantified per Option 1 GHG Reduction Projects reporting methods.
Regional Vancouver Landfill Methane Gas Capture Credits	3,199	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 2014 Reporting Year	5,332	As per BC Government reporting protocol.
<b>TOTAL</b>	<b>14,208</b>	

Based on the above figures, staff anticipate that the City will again be eligible for a “Level 3: Achievement of Carbon Neutrality” in 2015 through the Climate Action Recognition Program typically announced at the Union of British Columbia Municipalities’ annual conference. It is estimated that the City will carry forward approximately 6,004 tonnes of GHG emission offsets for use in future years.

Due to the accumulated surplus that the City has achieved and the anticipated growth of the City’s organics diversion program, it is projected that the City will be able to achieve carbon neutrality for 2016 and 2017 without other sources of offsets. However, as the estimated surplus in 2017 is expected to be small (with only a 5-10% contingency) and carbon neutral operations is a priority for the City of Richmond, staff have been working on developing GHG emission reduction offsets through eligible corporate projects (e.g. “non-traditional” services like district energy), and through purchasing verified community GHG emission offsets through the Richmond Carbon Market pilot program.

#### “Non-Traditional” Corporate GHG Emissions Reduction Projects

Three non-traditional municipal services provided by the City that are “beyond business as usual” are eligible as GHG emission offsets are listed in Table 3. Staff quantifying and verifying GHG offsets associated with each project.

Table 3: Corporate GHG Emissions Reduction Quantification Projects

		Status	Est. Annual GHG (tCO <sub>2</sub> e)
1. Sidaway Yard Concrete Recycling	Concrete and asphalt recycling to displace virgin/mined road base material	Assessment of baseline production emissions have been completed – final verification is expected to be completed in June 2016	200-300*
2. Alexandra District Energy Utility	Renewable energy transfer for community housing, displacing natural gas and electricity	Verification engineering consultant has been chosen, quantification project is in initial stages of implementation and final verification is expected to be completed in September 2016	500-700*
3. Northeast Bog	Conservation purchase and enhancement of a bog ecosystem to maintain its carbon storage capacity	Undergoing final scope of work negotiations with a carbon storage and natural ecosystem consultant – quantification project is in initial stages of implementation and final verification is expected to be completed in June 2017	Over 1,000
*Credits from corporate actions prior to 2015 will be claimed in addition to 2015 credits		<b>Total</b>	<b>1,700-2,000</b>

The GHG emission offsets associated with the Northeast Bog are being achieved through the action of conserving the land and maintaining the carbon storage capacity of the property. The carbon storage amount of the Northeast Bog compared to the scenario where the land is developed for agricultural purposes, will be quantified and is expected to result in significant GHG emission reduction credits. This quantification project is very unique, in terms of the type of ecosystem being assessed, the focus on carbon storage capacity of the Site, and the development of a carbon quantification methodology. It is believed that this work will help to inform the City and the region on the importance of conserving and enhancing this type of ecosystem.

### Richmond Carbon Market

The Council endorsed Richmond Carbon Market is a program designed to reduce GHG emissions and build community resilience by re-investing Climate Action Revenue Incentive Program funds in Richmond-based emissions reduction projects. The RCM pilot program is currently being implemented through the following phases:

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

Staff have completed Phase 1 and Phase 2 of this pilot project, and are currently working on completing Phase 3.

In November 2015, Council authorized the City to establish GHG emissions reduction agreements with select community organizations, listed in Table 4, as part of the Richmond Carbon Market pilot program. The total approved maximum funding for this Phase of the RCM pilot program was \$80,000, to be used to acquire a maximum of 3,200 tonnes of GHG emissions reduction credits. The City has been in active discussion with each of the proponents to assist them in verifying and quantifying their GHG emissions reduction projects and developing a contract template that will form the basis of the planned agreements.

Table 4: Community Projects Participating in the Richmond Carbon Marketplace

			<b>Est. GHGs</b>	<b>Funding</b>
<b>Status</b>			<b>(tCO<sub>2</sub>e)</b>	<b>(\$25/tCO<sub>2</sub>e)</b>
EcoWaste Industries	Enhanced landfill re-vegetation and carbon sequestration	Project quantification and verification is on hold as the landfill reclamation project has been altered in size and the program has been disrupted. The quantification of the associated GHG offsets will be finalized in 2017	200-400	\$10,000
Harvest Power	Non-municipal diverted organics and recycling	Initial quantification and verification has been completed. The third party report is under review. Quantification and verification is expected to be completed by Fall 2016	1,500-2,000	\$50,000
Pacific Gateway Hotels	Building energy efficiency retrofits	The City is reviewing energy use data to finalize the quantification and verification, to be completed this year.	200	\$5,000
RDH Building Engineering	Building energy renewal and retrofits in Richmond	RDH is in discussions with multi-residential building owners in Richmond, who are in need of energy upgrades. RDH is encouraging owners to consider energy efficiency at the same time to save on money and reduce GHG emissions.	500-600	\$15,000
<b>Total</b>			<b>2,400-3,200</b>	<b>\$80,000</b>

The funding for the pilot program, allocated from the Provincial Climate Action Revenue Incentive Program grant, was previously approved in the 2014 operating budget process and remains in place to fulfill the completion of funding agreements. The execution of the funding agreements with the above listed proponents is dependent on the completion of the projects and submission of all necessary documentation. It is expected that this will be completed in late 2016 to early 2017. Once the community projects are completed, it is envisioned that the City will recognize the pilot program participants for their commitment to sustainability and community GHG emission reductions. Staff believe the Richmond Carbon Market is a viable tool for encouraging community-based carbon offset. Staff intend to continue issuing calls for proposals of offset projects as a key strategy for increasing awareness over time and growing the list of active projects in the program.

### Public Reporting

Another tool to build community awareness regarding the importance of GHG emissions reduction is through public reporting. The City will complete the mandatory public reporting on the City's website (Climate Action Charter related reports Attachments 1-3), as well as look for other ways to promote and inform the community of the City's actions. Once the Richmond Carbon Market projects have been completed and executed agreements are in place, staff will promote this unique program in the business community to encourage greater awareness and focus on overall community GHG emissions reductions.

### **Financial Impact**

None at this time.

### **Conclusion**

The City of Richmond continues to show leadership amongst BC municipalities as a signatory of the BC Climate Action Charter through its innovative programs to achieve carbon neutrality with corporate and local investments. City staff will continue to work towards Council's objective of maintaining the City of Richmond's carbon neutral status in the long term and support corporate and community-based GHG emission reduction projects. Through the continued strategic implementation of the *Towards Carbon Neutrality – Implementation Strategy*, the City is well positioned to maximize corporate and community benefits of transitioning towards a low carbon community.



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LH:lh

- Att. 1: Carbon Emissions Provincial Reporting Worksheet - 2015
- Att. 2: Climate Action Revenue Incentive Public Report - 2015
- Att. 3: Contracted Emissions Estimates (Hired Equipment and Cascade) - 2015



## 2015 Carbon Neutral Progress Report



Emissions/Offsets	Tonnes CO2e
<b>Annual City of Richmond corporate emissions (as per Provincial reporting protocol)</b>	<b>8,204</b>
<i>Emissions from services delivered directly by the local government</i>	6,464
<i>Emissions from contracted services</i>	1,740
<b>Less:</b> GHG reductions being claimed for this reporting year from Option 1 - GHG reduction project	<b>5,677</b>
<i>Household Organic Waste Composting</i>	5,677
<i>Solar Thermal</i>	
<i>Energy Efficient Building Retrofits and Fuel Switching</i>	
<i>Low Emissions Vehicles</i>	
<i>Forest Conservation</i>	
<b>Less:</b> GHG reductions being claimed for this reporting year from Option 2 - GHG reduction projects	<b>8,531</b>
<i>Option 2 Project A – Metro Vancouver, Vancouver Landfill Gas Capture Optimization Project - Allocation</i>	3,199*
<i>Option 2 Project B – Surplus Carbon Credits from 2014 Reporting Year</i>	5,332
<b>Less:</b> <i>Offsets purchased for this reporting year (Option 3). Please identify your offset provider in the offset provider information section below.</i>	n/a
<b>Total GHG emissions reductions claimed for 2015</b>	<b>14,208</b>
<b>Balance of corporate emissions for this reporting year.</b> <i>(If the corporate emissions balance is zero or negative, your local government is carbon neutral for this reporting year)</i>	<b>-6,004</b>

\*Credit allocation amount has not been finalized, 2014 value used as an estimate

**Climate Action Revenue Incentive Program (CARIP) Public Report**  
**Climate Action Revenue Incentive (CARIP)**  
**Public Report for YEAR 2015**

City of Richmond

Metro Vancouver



**Report Submitted by**

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The City of Richmond has completed the 2015 Climate Action Revenue Incentive Program (CARIP) Public Report as required by the Province of BC. The CARIP report summarizes actions taken in 2015 and proposed for 2016 to reduce corporate and community-wide energy consumption and greenhouse gas emissions (GHG), as well as general sustainability related initiatives.

**April 27, 2016**

**General Information**

<b>Name of Local Government</b>	City of Richmond
<b>Member of Regional District (RD)</b>	Metro Vancouver
<b>Regional Growth Strategy (RGS) in region</b>	Yes
<b>Population</b>	214,000



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## 1. GENERAL REPORT INFORMATION

This 2015 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 eight main categories; Broad Planning, Buildings and Lighting, Energy Generation, Greenspace, Solid Waste, Transportation, Water and Wastewater, and Climate Adaptation. There are also is an Innovation category, which the City has inputted action items. The categories are further divided into corporate and community related actions, with general climate action questions at the beginning of each category.

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 2016.

## 2. BROAD PLANNING

Broad planning refers to high level planning that sets the stage for GHG emissions reductions, including plans such as Official Community Plans, Integrated Community Sustainability Plans, Climate Action Plans or Community Energy Emissions Plans. Land use planning that focuses on Smart Growth principles (compact, complete, connected, centred). Broad Planning plays an especially important role in energy and GHG reduction. Summarized below are the City of Richmond’s responses to the Provincial inquiries regarding broad planning issues, and summary of initiatives conducted in 2015 and planned in 2016.

General Climate Action Questions	
Does your local government set aside funds in a climate reserve fund or something similar?	Yes
Does your local government have a corporate GHG reduction plan?	Yes
What is your current GHG reduction target (s) as identified in your OCP or RGS?	GHG reduction targets of 33% by 2020, and 80% by 2050, below 2007 levels. Reduce energy use by 10%.
Has your local government used the Community Energy and Emissions Inventory (CEEI) to measure progress?	Yes
Which of the following does your local government use to guide climate action implementation? <ul style="list-style-type: none"> <li>• Energy and Emissions Plan</li> <li>• Integrated Community Sustainability Plan</li> <li>• Community-Wide Action Plan</li> </ul>	Yes Yes Yes



## 2.1. Community Actions

<b>Community-Wide Actions Taken in 2015</b>	
	Official Community Plan (OCP) amendment was completed, which revised the policy to improve townhouse energy efficiency and incorporate more renewable energy systems in new developments
	The City worked closely with Translink in developing the Southwest Area Transport Plan, which defines Richmond's long-term transportation network goals and priorities.
	Continued to implement the OCP and City Centre Area Plan (CCAP) directives, which directs the majority of Richmond's urban growth to the City Centre and near major transit stations.
	Continued to ensure new developments within the City Centre Area were "District Energy Utility (DEU) Ready" for future connection to a district energy system, as per the City by-law.

<b>Community-Wide Actions Proposed for 2016</b>	
	Update development permit guidelines to require electrical vehicle charging stations at multi-family residential and non-residential locations throughout the City.
	Revise arterial road and coach house policies to encourage more energy efficient buildings and more compact communities.
	Continue to implement OCP and CCAP policies as new development applications are processed.
	Continue to meet with Richmond's Small Home Builders and Urban Development Institute when preparing new community building related sustainability initiatives.
	Revise the Steveston Area Plan and include measures that promote a more compact, sustainable, energy efficient, and pedestrian friendly built environment
	Continue to follow City by-law requirements and implement "DEU" ready development in the City Centre and West Cambie neighborhood areas

## 2.2. Corporate Actions

<b>Corporate Actions Taken in 2015</b>	
	Continued to implement the corporate High Performance Building Sustainability Policy. This policy sets targets for the construction of energy efficient new corporate buildings and sets in place processes to ensure that energy and resources are used efficiently in existing buildings.
	Continued to implement action items from the City's Green Fleet Action Plan, to reduce GHG emissions associated with the City's vehicle and equipment use.
	Completed the internal Corporate Building, Equipment, Monitoring, and Integration Requirements document, which sets out guidelines for equipment energy efficiency, energy and GHG emissions monitoring requirements, and the integration of buildings and equipment into the City's network. This document will help streamline building and equipment operation.

<b>Corporate Actions Proposed for 2016</b>	
	Continue to implement the corporate High Performance Building Sustainability Policy.
	Continue to implement action items from the City's Green Fleet Action Plan
	Continue to implement Corporate Building, Equipment, Monitoring, and Integration Requirements

### 3. BUILDINGS AND LIGHTING

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 when calculated over the long term. This category also includes reductions realized from energy efficient street lights and lights in parks or other public spaces. Below are the City of Richmond's responses to the Provincial inquiries regarding building and lighting initiatives conducted in 2015 and planned in 2016.

<b>General Climate Action Questions</b>	
Does your local government have green building/construction policies, plans or programs?	Yes

#### 3.1. Community Actions

<b>Community-Wide Actions Taken in 2015</b>	
	Continued to implement building and district energy policies. Secured commitments from new development in the City Centre to achieve LEED Silver, and townhome developments city-wide to build to EnerGuide 82 standard.
	Participated in Provincial Energy Efficiency Working Group, to inform draft "Stretch Code" energy efficiency standard for new developments.
	Implemented the following EnergySave Richmond suite of programs. <ul style="list-style-type: none"> <li>• Building Energy Challenge, a friendly competition to save energy use over the course of the year, engaged 5.6 million square feet of property.</li> <li>• Richmond Carbon Marketplace pilot program, which supports community based GHG emissions reduction projects through facilitation and funding</li> <li>• Smart Thermostat Pilot Program involved 150 participants, providing a \$125 rebate on a smart thermostat.</li> </ul>
	Coordinated with regional local governments and utilities on benchmarking and disclosure policy development.
	Identified opportunities to remove barriers to renewable energy and energy efficiency as part of development regulations and permitting processes.



### Community-Wide Actions Proposed for 2016

Develop revised electric vehicle charging infrastructure policy for new developments for City of Richmond Council's consideration.
Develop energy efficiency policy for new developments for City Council consideration
Explore the implementation of a benchmarking and disclosure policy, in coordination with the Province, utilities, and other local governments.
Continue to implement EnergySave Richmond suite of programs. <ul style="list-style-type: none"><li>• Host Year 2 of Building Energy Challenge.</li><li>• Evaluate case to expand Smart Thermostat Program.</li><li>• Host Climate Smart program for businesses.</li><li>• Implement water and energy saving programs for businesses and residences.</li><li>• Develop energy program for multifamily condominiums, coordinating with other regional local governments and utility stakeholders.</li><li>• Consider expansion of the Richmond Carbon Marketplace pilot program.</li></ul>
Implement renewed development regulations and/or permitting processes to better accommodate renewable energy and energy efficiency.

### 3.2. Corporate Actions

#### Corporate Actions Taken in 2015

Completed energy efficiency upgrades at Watermania Aquatic Centre, Steveston Community Centre, and other corporate recreational facilities that will reduce energy use by approximately 1.8 GWh, and GHG emissions by over 300 tonnes of CO <sub>2</sub> e (equal to removing 90 Richmond cars off of the roads)
Completed the upgrade and replacement of less energy efficient street lighting with more energy efficient LED street lighting fixtures at Mang and Chatterton Roads, and Miller and Garden City Roads)
Initiated a pilot project with BC Hydro to replace less energy efficient leased street lighting with more efficient LED street lighting fixtures. This pilot project will help lead to further upgrades of City of Richmond leased street lights to LED
Completed the upgrade of the mechanical building automation system at City Hall to help improve overall occupant comfort and equipment scheduling and monitoring



#### Corporate Actions Proposed for 2016

	Complete energy efficiency upgrades at various City facilities and Fire Halls, as per the 2016 capital Energy Management Program work plan
	Complete the upgrade of the building automation systems at Thompson Community Centre, Gateway Theatre, and Library Cultural Centre to improve overall occupant comfort and improve equipment scheduling and monitoring
	Complete Phase 1 of the City of Richmond street lighting conversion project, with the replacement of approximately 950 less energy efficient street light fixtures with new more efficient LED technology
	Initiate the internal Energy Statement reporting functionality to further engage City staff in corporate energy reduction initiatives.
	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.

#### 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 2015 and planned in 2016.

General Climate Action Questions	
Is your local government currently developing or constructing new district energy projects?	Yes
Is your local government currently developing or constructing a new renewable energy system?	Yes
Is your local government operating a district energy centre?	Yes
Is your local government operating a renewable energy system?	Yes
Is your local government connected to a district energy system that is operated by another energy provider?	Yes
Are you aware of the integrated resource recovery (IRR) guidance page on the BC Climate Action Toolkit?	Yes



## 4.1. Community Actions

<b>Community-Wide Actions Taken in 2015</b>	
	Completed Phase 3 of the Alexandra District Energy Utility (ADEU), which included expansion of the energy centre to add a second geo-exchange field, associated equipment, and 1,150 m of distribution piping. A total of 1,200 residential units and 30,000 ft <sup>2</sup> non-residential space are now connected to this ADEU system.
	Constructed Phase 1 of the Oval Village District Energy Utility (OVDEU), in partnership with a private utility. Phase 1 consisted of two interim energy centres and 550 m of distribution piping. Two developments with a total of 505 units and 571,000 ft <sup>2</sup> of building gross floor area were connected to the OVDEU system.
	Supported the completion of a feasibility study of the effluent heat recovery potential for Lulu Island Wastewater Treatment Plant and the potential for connecting this energy source to a City Centre District Energy system.
	Issued a request for an expression of interest (RFEOI) to find a partner to design, finance, build and operate City Centre North District Energy Utility (CCNDEU).

<b>Community-Wide Actions Proposed for 2016</b>	
	Implement Phase 4 expansion of the ADEU. This consists of a satellite energy plant to service the demands of a new 200,000 ft <sup>2</sup> commercial development, and the connection of two more residential buildings (additional 400,000 ft <sup>2</sup> ). The satellite energy plant will use high efficient air source heat pumps to provide heating and cooling energy.
	Continue OVDEU Phase 1 construction in partnership with private utility partner. Install additional distribution piping and connect four new developments with a total of 884,000 ft <sup>2</sup> of building gross floor area. Phase 2 of this project will include implementation of sewer heat recovery technology as an energy source for the DEU.
	Complete extension test and feasibility study to expand the current OVDEU service area from 5million ft <sup>2</sup> to 20million ft <sup>2</sup>
	Select a district energy utility operations partner for the CCNDEU, complete a due diligence review, and execute a partnership agreement to design, finance, build and operate CCNDEU

## 4.2. Corporate Actions

<b>Corporate Actions Taken in 2015</b>	
	Completed the detailed design for the new Fire Hall No.3 to connect to the City's Alexandra District Energy utility centre
	Secured external grant funding to complete a solar photovoltaic system/renewable energy feasibility study for the new Minoru Complex
	Secured funding for the installation of a solar photovoltaic array at City Hall, to displace electricity and reduced peak demand load

### Corporate Actions Proposed for 2016

	Complete a feasibility study on the installation of solar photovoltaic array at the new Minoru Complex
	Continue to target renewable energy integration, a key component of the City's High Performance Building Policy, during design development for new corporate facilities.
	Install solar photovoltaic array at City Hall to offset electrical demand.
	Complete the connection of the new Fire Hall No.3 to the corporate Alexandra District Energy Utility Centre, which provides heating and cooling to residential and commercial customers in the area through a renewable geexchange system.

## 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 2015 and planned in 2016.

### General Climate Action Questions

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

#### Community-Wide Actions Taken in 2015

	Continued mapping of key invasive species locations in the Community, including the installation of signage aimed at reducing the spread of knotweed.
	Adopted the Ecological Network Management Strategy. A first of a kind ecological strategy with ecological protection, enhancement and connectivity of all natural lands, throughout the city, regardless of ownership.
	Planted 1,067 trees on City streets and parks, as per the City's Tree Management Plan
	Continued to partner with the Province of BC to detect new invasive species, develop rapid response plans, and conduct coordinated response efforts.



<b>Community-Wide Actions Proposed for 2016</b>	
	Adopt an Invasive Species Action Plan
	Implement the partnership agreement with Metro Vancouver for the Go Green program aimed at backyard naturalization as a component of the newly adopted Ecological Network Management Strategy.
	Continue to plant new trees on City streets and parks, and update the Urban Forest Management Strategy.
	Promote the Bridgeport Industrial Park/Bath Slough Pollinator Pasture, through Richmond Doors Open event, with tours, information booths and interpretive opportunities for learning more about the importance of native pollinators and their habitat in the City.

## 5.2. Corporate Actions

<b>Corporate-Wide Actions Taken in 2015</b>	
	Conducted a hydrogeological study of the Garden City Lands site, and modelled the implications of the potential proposed park and local agricultural development. This study work included identifying ways that the bog ecosystem of the site could be enhanced, and will inform the Garden City Lands Water and Ecological Resource Management Strategy
	Continued Parrot feather control trials with geotextile on City property
	Designed and planted of pollinator pasture in Bridgeport Industrial Park through a collaboration with Public Art. This ecological enhancement project encompasses community involvement, native pollinator habitat and interpretive pollinator features in Bridgeport Industrial Park located along Bath Slough.

<b>Corporate-Wide Actions Proposed for 2016</b>	
	Complete a carbon and hydrological assessment of the City's Northeast Bog conservation area
	Complete the development of the Garden City Lands Water and Ecological Resource Management Strategy including recommendations for construction and management practices and long-term monitoring of the bog ecosystem.
	Continue to detect and respond to invasive species encroachment on City property effectively

## 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 2015 and planned in 2016.

<b>General Climate Action Questions</b>	
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. Community Actions

<b>Community-Wide Actions Taken in 2015</b>	
	Expanded food scraps collection from just single family residential, to 489 multi-family housing sites with approximately 26,295 units. Collected and diverted 18,495 tonnes of organic materials in 2015.
	Enhanced Richmond Recycling Depot signage and made site improvements to increase awareness of how and where to recycle materials, and introduced traffic counters to measure public use in July 2015. The total traffic count from July to December 2015 was 68,474 visits.
	Delivered 32 workshops with 599 community participants on waste reduction, recycling and avoiding food wastage.
	Hosted 400 information sessions as part of the implementation of food scraps recycling for 489 multi-family complexes
	Made recycling stations available at over 40 community events and achieved more than 80% waste diversion at Ships to Shore, Salmon Festival, World Festival and Maritime Festival.

<b>Community-Wide Actions Proposed for 2016</b>	
	Accept an expanded range of materials for recycling in public spaces and enhance the recycling container replacement and maintenance program.
	Explore options for expanded Recycling Depot service (i.e. Eco Centre).
	Introduce a bylaw to require 70% waste diversion from the demolition of single-family and duplex homes.
	Implement a bi-weekly garbage cart collection program for single-family homes and townhomes to encourage greater waste diversion.
	Increase awareness of the expanded range of materials accepted in the Blue Box and Blue Cart recycling programs, including proper recycling practices under the MMBC partnership, to reduce contamination and increase recycling levels.



## 6.2. Corporate Actions

Corporate Actions Taken in 2015	
	Expanded in-house recycling under the City's WeRecycle program to include organics collection and expanded the range of materials accepted for recycling.
	Implemented enhanced communication strategy to increase awareness and encourage greater participation in corporate waste diversion.
	Assisted with the introduction of the Corporate Sustainable Event, 7-Step Quick Guide Toolkit and website

Corporate Actions Proposed for 2016	
	Conduct corporate site and visual audits of the garbage and recycling stations to ensure that staff are disposing of materials in the correct receptacles
	Host a corporate sustainable event solutions conference to raise awareness and educate organizers of different tactics they could implement to make their event more sustainable
	Continue promoting the corporate WeRecycle program, to encourage staff to increase corporate waste diversion

## 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 2015 and planned in 2016.

General Climate Action Questions	
Does your local government have policies, plans or programs to support: <ul style="list-style-type: none"> <li>• Walking</li> <li>• Cycling</li> <li>• Transit Use</li> <li>• Electric Vehicle Use</li> <li>• Other: car-sharing, carpooling</li> </ul>	Yes Yes Yes Yes Yes
Does your local government have a transportation demand management (TDM) strategy (e.g. to reduce single-vehicle occupancy trips, increase travel options, provide incentives to encourage individuals to modify travel behavior)?	Yes
Does your local government have policies, plans or programs to support local food production (thus reducing transportation emissions)?	Yes



## 7.1. Community Actions

<b>Community-Wide Actions Taken in 2015</b>	
	<p>Completed multiple projects to improve transit, biking, and pedestrian accessibility including</p> <ul style="list-style-type: none"> <li>• Constructing a bikeway/multi-use path connection in Blundell Park as part of the development of the Crosstown local street bikeway.</li> <li>• Substantially completed the widening of Westminster Highway between Nelson Road and McMillan Way(1.3 km), which includes an off-street multi-use path.</li> <li>• Upgrading 21 bus stops to become accessible,</li> <li>• Installing two new transit shelters</li> <li>• Upgrading eight arterial road crosswalks to include overhead downward lighting, pedestrian-actuated flashing beacons and verbal wayfinding message</li> <li>• Upgrading 16 signalized intersections to include accessible pedestrian signal features</li> </ul>
	Continued development of TransLink's Southwest Area Transport Plan encompassing Richmond, South Delta and Tsawwassen First Nation.
	Staged 15 <sup>th</sup> annual "Island City, by Bike" tour for the community to encourage cycling as a mode of transportation.
	Expanded reserved on-street parking spaces for car-share vehicles.
	Initiated partnership with TransLink to identify and encourage alternative travel modes to decrease single occupant vehicles trips to/from business parks and industrial areas in Richmond

<b>Community-Wide Actions Proposed for 2016</b>	
	<p>As part of the approved Transportation Capital Budget, the following improvements and enhancements are planned to be completed in 2016:</p> <ul style="list-style-type: none"> <li>• Eight new special crosswalks and six new pedestrian signals (including four pedestrian signals that are part of existing or planned bike routes)</li> <li>• Three pedestrian walkways and two multi-use pathways for both cyclists and pedestrians</li> <li>• Initiation of two roadway improvement projects (No. 2 Road south of Steveston Highway and Lansdowne Road between Minoru Blvd and Alderbridge Way) that will each include a multi-use pathway</li> <li>• Install new transit shelters</li> </ul>
	Develop streetscape options for key streets in Steveston Village that accommodate active transportation in support of Official Community Plan goals and objectives with respect to mobility and access.
	Continue development of TransLink's Southwest Area Transport Plan.
	Stage 16 <sup>th</sup> annual "Island City, by Bike" tour for the community to encourage cycling as a mode of transportation.
	Continue to support education and encouragement programs for cycling and walking (e.g., Bike to Work/School Week, cycling education courses for students and adults, Walk Richmond program).



## 7.2. Corporate Actions

Corporate Actions Taken in 2015	
	Continued the City's vehicle replacement program to replace older, less fuel-efficient vehicles with newer, more fuel-efficient vehicles and with best in class fuel efficiency, where possible. In 2015, 46 units were replaced and 13 more units were ordered for 2016.
	Enhanced the corporate fleet driver training program to include emphasis on fuel efficient driving techniques and anti-idling
	Continued other operational improvements as described in the Green Fleet Action Plan, including reducing growth and downsizing the Fleet, incorporation of more electric and hybrid vehicles where possible, and right sizing of existing and new assets. The Green Fleet Action Plan target is to reduce the City's overall Fleet emissions by 20% in 2020 from 2011 levels.
	Completed analysis and review of City Employee Carpool Program, including best practices research and options for expansion to include other sustainable modes (transit, cycling, walking).
	Undertook a compressed natural gas (CNG) study to establish the feasibility of CNG as a potential alternative fuel for reducing GHG emissions. Results indicated that the City's fleet does not travel sufficient distances to make this financially viable at this time.

Corporate Actions Proposed for 2016	
	Continue replacing older less efficient City fleet vehicles with newer, more fuel-efficient vehicles, where possible.
	Complete a GPS tracking pilot project involving 60 vehicles to evaluate routing efficiency and reduce Fleet vehicle trip times
	Update City Employee Carpool Program based on results of the 2015 analysis and raise awareness of any improvements to the Program to encourage greater use.
	Complete an analysis of converting some medium and light duty trucks to propane, which has been indicated to potentially reduce emissions in the vehicles by 26%.
	Continue to support use of alternative modes of transportation for work related travel, including cycling, providing transit passes for work trips, and carpooling.

## 8. WATER AND WASTEWATER

Managing and reducing water consumption and wastewater is an important aspect of developing a sustainable built environment that supports healthy communities, protects ecological integrity, and reduces greenhouse gas emissions. Below are the City of Richmond responses to the Provincial inquiry regarding water and wastewater management in the City, and summary of initiatives conducted in 2015 and planned in 2016.

General Climate Action Questions	
Does your local government have water conservation policies, plans or programs?	Yes



## 8.1. Community Actions

<b>Community-Wide Actions Taken in 2015</b>	
	Installed 1,500 water meters at single-family residences (approximately 88% of single-family homes in the City of Richmond are now metered)
	Issued 902 toilet rebates to homeowners that replaced old toilets with a low-flush toilet to reduce residential water use. The total incentive paid to homeowners through this program in 2015 was \$90,200.
	Partnered with BC Hydro to provide a clothes washer rebate program to reduce home water use and electricity. In 2015, 294 rebates have been issued to homeowners who replace their less efficient (water and electricity) washer for a new efficient model at a total cost of \$20,200 to the City resulting in an estimated annual savings in water and energy of 1,655,600 liters per year and 53,800 kilowatt hours per year, respectively.
	Installed meters for 141 existing multi-family residential complexes (comprising 8,585 dwelling units) through the volunteer water meter program. It is mandatory for new multi-family residences to have a water meter. A total of 40% of multi-family units in Richmond now have a water meter.
	Provided 150 free water saving kits to Richmond households that included a low-flow showerhead, kitchen and bathroom tap aerators and a pop-flush device for toilets.

<b>Community-Wide Actions Proposed for 2016</b>	
	Continue the single family and multi-family water meter installation programs
	Continue the toilet rebate program (\$100,000 in funding for 2016)
	Continue offering the water saving kits and free leak audits to homeowners with a newly installed water meter.
	Continue to participate in the clothes washer rebate joint program in May/June and October/November with BC Hydro in 2016.
	Continue the City's Rain Barrel Program and promote the use of rain water for gardening and irrigation purposes.

## 8.2. Corporate Actions

<b>Corporate Actions Taken in 2015</b>	
	Continued to participate in the Metro Vancouver Municipal Water Conservation Coordinator Committee. The meetings revolve around networking with other municipalities and discussing initiatives, progresses, updates in policies and results through group communication.
	Conducted a corporate water wise workshop, with over 30 staff attending the information session
	Installed some of the recommended conservation measures at ten water audited buildings, such as; replace constant flush urinals, turn down flush cycle times, replace old toilets with low flush toilets and install aerators
	Installed bottle water re-filling stations at the Works Yard



<b>Corporate Actions Proposed for 2016</b>	
	Continue to take part in the Metro Vancouver Municipal Water Conservation Coordinator Committee.
	Continue to follow the City's landscaping best practices, which emphasize planting grasses and plants at corporate facilities that require little or no irrigation water.
	Install further bottle water re-filling stations at various corporate facilities

## 9. CLIMATE ADAPTION

For local governments, adaptation to a changing climate can take the form of changes in policy, management, technology and behaviour that minimize negative impacts or exploit opportunities. It can involve both "hard" and "soft" solutions, including: changes in infrastructure engineering, planning, zoning, bylaws and public education. Below are the City of Richmond responses to the Provincial inquiries regarding climate change adaption, and summary of initiatives conducted in 2015 and planned in 2016.

<b>General Climate Action Questions</b>	
Are you familiar with the Plan2Adapt guidance located on the Climate Action Toolkit Website?	Yes
Are you familiar with "Preparing for Climate Change - An Implementation Guide for Local Governments in BC"?	Yes
Have you visited the climate change adaptation guidance page on the BC Climate Action Toolkit?	Yes

### 9.1. Community Actions

<b>Community-Wide Actions Taken in 2015</b>	
	Began implementing Phase 2 of the Dike Master Plan, which includes improvements to the North West Dike and the Middle Arm Dike west of No. 6 Road.
	Raised numerous dikes, to elevations between 4.0m and 4.7 m geodetic, which is higher than the current Provincial flood protection standard, and will help to protect the City from medium and long term sea level rise.
	Received approval from the Province to begin surveying and investigating the construction of a dike on Steveston Island. The investigation is required to further develop the feasibility, impact and cost assessment associated with building the Steveston Island Dike recommended in the Lulu Island Dike Master Plan- Phase 1.
	Continued implementing the 2008-2031 Richmond Flood Protection Strategy



### Community-Wide Actions Proposed for 2016

Update Council on the progress of the Dike Master Plan- Phase 2.
Complete initial investigations of potential dike construction on Steveston Island, conduct further investigation as needed.
Continue implementing the 2008-2031 Richmond Flood Protection Strategy

## 10. INNOVATION

This section is intended to give the opportunity to describe any energy and GHG emission reduction activities that have been undertaken over the past year(s) that your local government is particularly proud of and would like to share with other local governments. Below is summary of the innovated initiative that the City is currently supporting.

### Community-Wide Actions Taken in 2015

Plan is being implemented to upgrade of all City-owned traffic signals to include accessible pedestrian signal (APS) features by 2020. The program was initiated in 2011 and signals are retrofitted at a rate of approximately 15 per year to meet the 2020 completion target. To the City's knowledge, Richmond is the only municipality in Canada to commit to equipping all special crosswalks and signals with APS as opposed to selected sites based on demand/requests.
The City executed a 30 year concession agreement with the private utility partner and started implementation to design, finance, build, and operate Oval Village DEU. Within the agreement, private utility partner will design, finance, build and operate the OVDEU, while Lulu Island Energy Company (fully owned City corporation) will own the utility, and the City Council will be the utility regulator and setting the customer rates.
The City coordinated and delivered an interactive elementary school water education program aimed at teaching students about the importance of water conservation, called Project WET.

## 11. CONCLUSION

This report highlights a wide range of initiatives that the City is undertaking to continue to advance sustainability corporately and in the community, with focus on reducing greenhouse gas emissions, and energy and resource use. This report does not encompass all of the sustainability related initiatives and actions that the City is involved in, but simply provides a "snapshot" of some of the key areas and work that the City has completed and is planning on completing. These efforts help to position the City as a leader in our region and beyond. The City has set aggressive sustainability targets on a range of fronts, including for greenhouse gas emissions reduction and waste diversion. The City will continue to pursue best practices and innovation to achieve its sustainability related goals, which are recognized as critical to Richmond's Vision of "being the most appealing, liveable and well-managed community in Canada".

## CARIP/Carbon Neutral Progress Report Reporting Year 2015

### 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 &amp; District Energy Direct 604-244-1239 <a href="mailto:lhiggs@richmond.ca">lhiggs@richmond.ca</a></p>
RATIONALE
<p>An estimation methodology for hired equipment contractor emissions is being utilized for 2015 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"> <li>1. Cascades Recovery Inc. and BFI provide recycling depot container collection and recycling services</li> <li>2. Sierra Waste Services provide residential solid waste and recycling services;</li> <li>3. Progressive Waste Solutions provides waste and recycling collection services at City facilities.</li> <li>4. Individual Hired Equipment.</li> </ol> <p>Contractor emissions associated with the delivery of traditional municipal services by Sierra Waste Services and Progressive Waste Solutions have been included in our mobile fleet emissions reporting spreadsheet, as fuel usage and vehicle type information was provided for 2015. Contractor emissions associated with the delivery of services by Cascades Recovery and Hired Equipment were estimated by from total kilometers and hours driven, respectively.</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"> <li>1. Hired equipment records sorted to exclude out of scope contracts;</li> <li>2. City equipment operating records assessed to determine average consumption factors in litres per charge hour or kilometers driven for each equipment family;</li> <li>3. Consumption factors used to estimated fuel consumption for contractor or hired equipment;</li> <li>4. BC GHG emissions factors applied to calculate GHG emissions.</li> </ol>

<b>CONTRACTED EMISSIONS</b>	
<b>Option 3: Vehicle/Equipment Type and Kilometers or Hours of Usage</b>	
<b>Traditional Service Area</b>	<b>Estimated Annual GHGs (tonnes)</b>
<b>Drinking, Storm and Wastewater</b>	<b>92.1</b>
<b>Solid Waste Collection, Transportation and Diversion</b>	<b>9.42</b>
<b>Roads and Traffic Operations</b>	<b>172.5</b>
<b>Parks, Recreation, Arts, and Cultural Services</b>	<b>9.12</b>
<b>Corporate Operations</b>	<b>77.1</b>
<b>Total</b>	<b>360.2</b>