



To: Public Works and Transportation Committee

Date: October 24, 2013

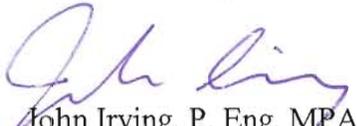
From: John Irving, P. Eng, MPA
Director, Engineering

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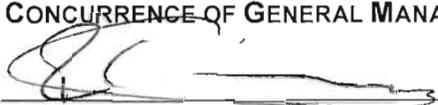
Re: Towards Carbon Neutrality: Implementation Strategy

Staff Recommendation

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



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REPORT CONCURRENCE		
ROUTED TO:	CONCURRENCE	CONCURRENCE OF GENERAL MANAGER
Corporate Communications Finance and Corporate Services	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	
REVIEWED BY STAFF REPORT / AGENDA REVIEW SUBCOMMITTEE	INITIALS: DW	APPROVED BY CAO 

Staff Report

Origin

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

Council Term Goal #8.1: *“Continued implementation and significant progress towards achieving the City’s Sustainability Framework, and associated targets”*

Background

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

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

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

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

The objectives of the Implementation Strategy are to:

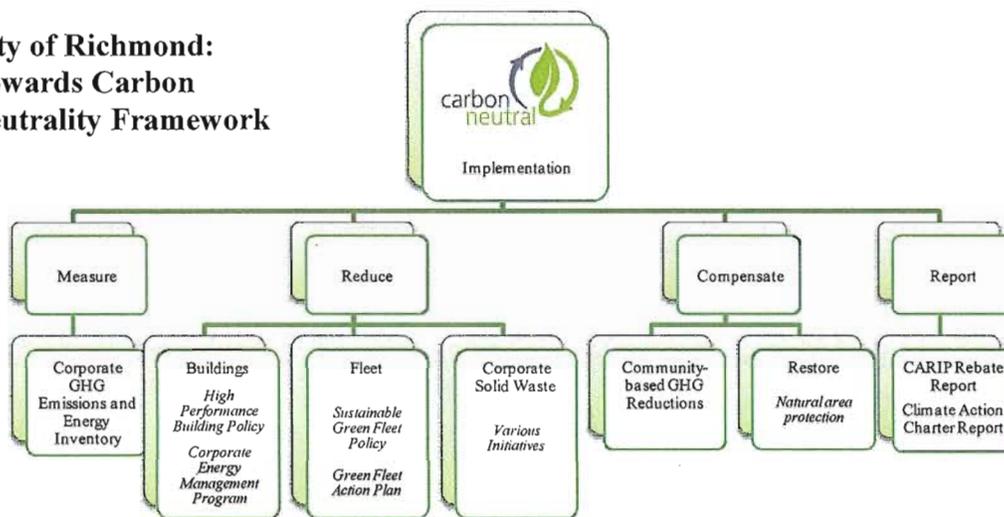
- Assess the impact of current and future emission reduction and carbon offsetting initiatives;
- Determine the amount of emissions that must be compensated to achieve annual carbon neutrality;
- Develop an effective compensation program to offset remaining emissions.

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

Analysis

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

**City of Richmond:
Towards Carbon
Neutrality Framework**

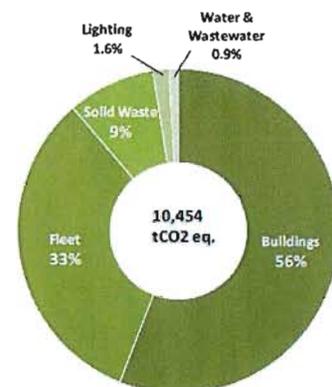


Significant progress has been made in the reduction of building and fleet energy consumption. The City’s Green Fleet Action Plan, adopted in 2013, aims to achieve a 21% reduction in GHG emissions by the year 2020. Additionally, the Energy Management Program and High Performance Building Policy are ongoing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

Richmond Current Carbon Emissions

In 2010, the City produced its first comprehensive analysis of corporate energy consumption, costs and GHG emissions. This report established the City’s baseline, based on 2007 levels, for measuring and reporting on future progress. Annually, the City emits over 10,000 tonnes of CO₂ (eq).

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



**City of Richmond
Baseline GHGs (2007)**

How Carbon Offsetting Works



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

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

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

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

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

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

Benefits of the Richmond Carbon Marketplace:

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

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

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

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

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

Overview of Richmond Carbon Marketplace Deployment Phases

<p>Phase 1 Determine the Potential for Local GHG Reduction Projects:</p> <ul style="list-style-type: none"> Launch outreach campaign, including workshops and targeted meetings, to create awareness of the City’s intent and identify potential offsets supply Launch web resources to provide background information, outlining the City’s intent, criteria for interested parties. Work with community and industry organizations (e.g. waste management, alternative fuels, etc) to develop their capacity to supply offsets 	<p>Winter 2013</p>
<p>Phase 2 Identify Potential Local GHG Reduction / Offset Projects:</p> <ul style="list-style-type: none"> Launch “Request for Community Carbon Credits (RFC3)” and press release announcing that the market is “open for business” Launch web “hub” to provide background information, outlining criteria and online “self-assessment” tool for interested parties. GHG Reduction proponents respond to the RFC3 and assessed. 	<p>Winter 2014</p>
<p>Phase 3 Assessment and Quantification of local GHG Reduction Projects:</p> <ul style="list-style-type: none"> Eligible projects from Phase I are short-listed for full GHG assessments. Selected GHG reduction projects are listed by organization on the RCM Registry. 	<p>Spring – Fall 2014</p>
<p>Phase 4 Achieving Carbon-Neutrality for the City of Richmond:</p> <ul style="list-style-type: none"> The City selects from an eligible project shortlist, Council will be engaged in this process GHG reductions/carbon credits purchased are retired to ensure no double counting Press release issued for highlighting projects The City’s achievement of Carbon Neutrality is demonstrated to the Province, if achieved 	<p>Winter 2015</p>
<p>Phase 5 Continued Growth of Richmond’s Local Low-Carbon Economy:</p> <ul style="list-style-type: none"> Buyers other than the City wishing to offset their carbon footprints select projects they wish to support from those listed on the RCM registry 	<p>Ongoing</p>

Online Registry

If Phase 1 is completed successfully and there are demonstrated offset supply opportunities, the RCM will launch on online carbon registry.

View	Date Posted	Provider	Business Type	Name	Type	Location	Available Amount	Price per Credit (CDN \$)	Buy Now
Read More	05/8/2012	Cowichan Bio-diesel Co-op (CB-DC)	Community organization and alternative fuel producer	Quantified Credits	quantified	Duncan, BC	239	\$30.00	<p>Quantity:</p> <input type="text" value="1"/> MCCs <small>(1 MCC = 0.1 tonnes CO2e)</small> <p>Offset</p>

Carbon Marketplace Registry – Sample

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

Phased Reporting to Council

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

Anticipated Offset Projects in Richmond

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

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

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

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

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

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

Financial Impact

Administration Costs

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

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

Cost of Offsets (Phase 4)

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

Conclusion

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



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Towards Carbon Neutrality



IMPLEMENTATION STRATEGY



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Executive Summary

Introduction



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

Richmond’s principles for achieving carbon neutrality:

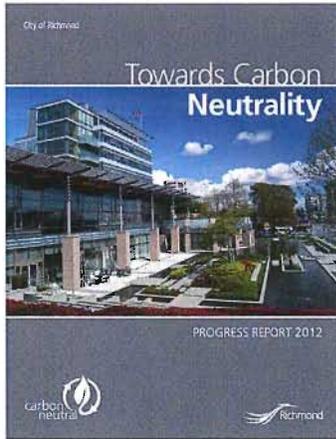
1. Focus on Sustainability
2. Invest in the Community
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4. Focus on Action, not Accounting
5. Reduce Harm and Restore

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

The objectives of the Implementation Strategy are to:

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

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



Context for Carbon Neutrality in BC

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



Figure 1: Carbon Neutrality Implementation Summary

Measure

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

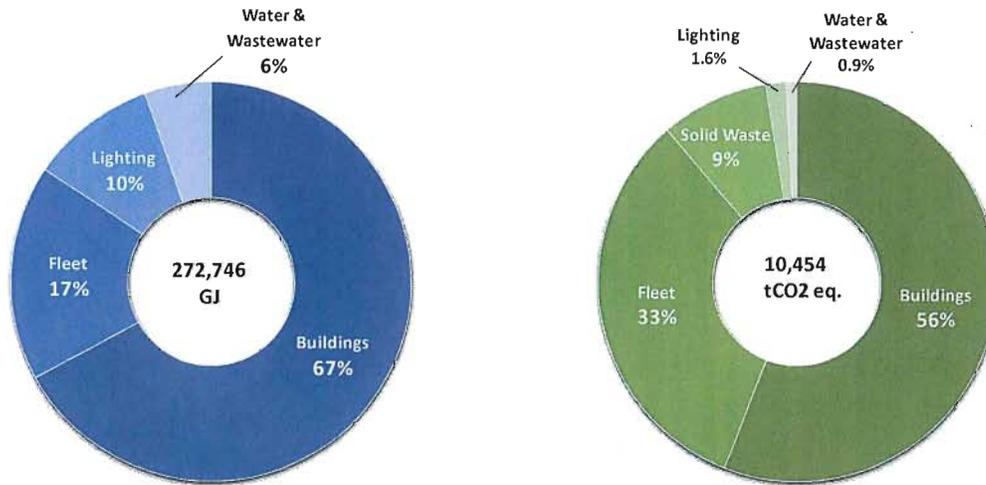


Figure 2: Richmond 2007 Corporate Energy Consumption and GHG Emissions

Reduce

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

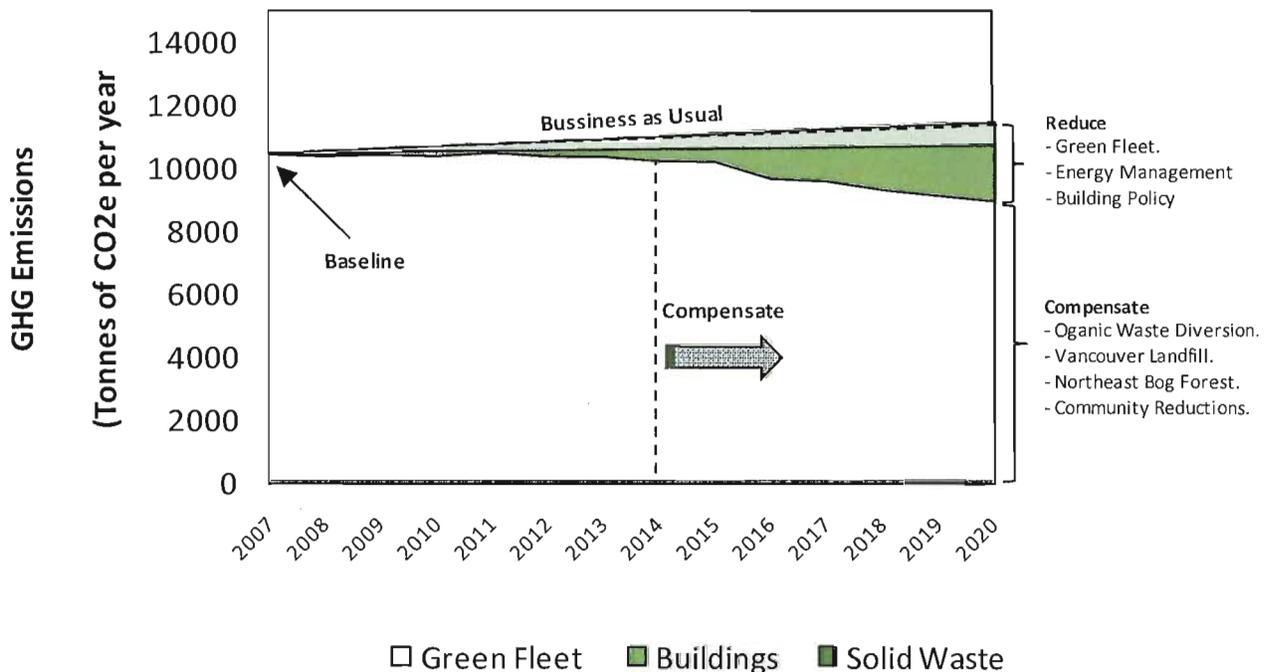


Figure 3: Corporate GHG Reduction Strategies

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

Compensate (Offset)

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

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

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

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

Notes: * Assumes emissions are reduced annually through internal building and fleet initiatives.
 ** Richmond’s portion of waste going to the Vancouver Landfill is 8%.
 *** Information obtained from Metro Vancouver.

Richmond Carbon Marketplace

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

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

Phase 1: Determining the Potential for Local GHG Reduction Projects

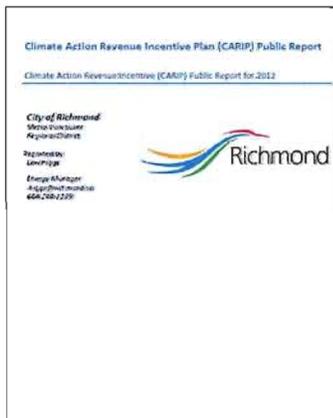
Phase 2: Identify Potential Local GHG Reduction / Offset Projects:

Phase 3: Assessment and Quantification of Local GHG Reduction Projects

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

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

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



Report

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



Chapter 1: Introduction

Introduction

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

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

Richmond’s principles for achieving carbon neutrality:

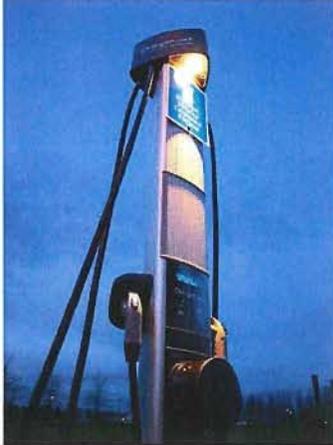
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The purpose of the City of Richmond Towards Carbon Neutrality: Implementation Strategy is to formalize past emission reduction initiatives and develop an effective carbon offsetting program based on these principles, that will allow the City to reach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

The objectives of the Implementation Strategy are to:

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

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



Background

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

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

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

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

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

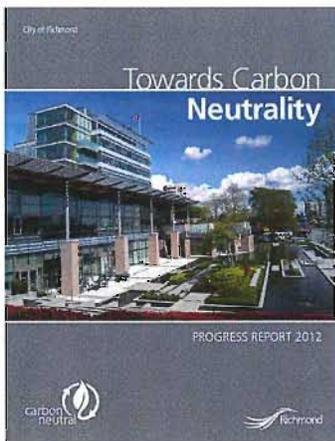
The City's carbon neutral and other climate change targets have been embedded within the City's Sustainability Framework. The Sustainability Framework recognizes that for sustainability to be achieved, action must be taken to address climate change as well as other key priorities. Accordingly, because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

Provincial Carbon Neutral's Framework

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

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

Measure	<ul style="list-style-type: none"> Identify local government operations that fall within corporate boundaries. Determine a tool for measuring emissions. Measure corporate emissions annually.
Reduce	<ul style="list-style-type: none"> Implement GHG reduction project within corporate emissions boundaries, e.g., by improving energy efficiency in government buildings or switching to cleaner fuels for vehicle fleets.
Balance/Offset	<ul style="list-style-type: none"> Invest in GCC-supported community emission reduction projects (Option 1). Invest in alternate community emission reduction projects (Option 2). Purchase offsets (Option 2).
Report	<ul style="list-style-type: none"> Complete a project specific report for community emission reduction projects. Complete the annual CARIP report. Make all the information available publicly.



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

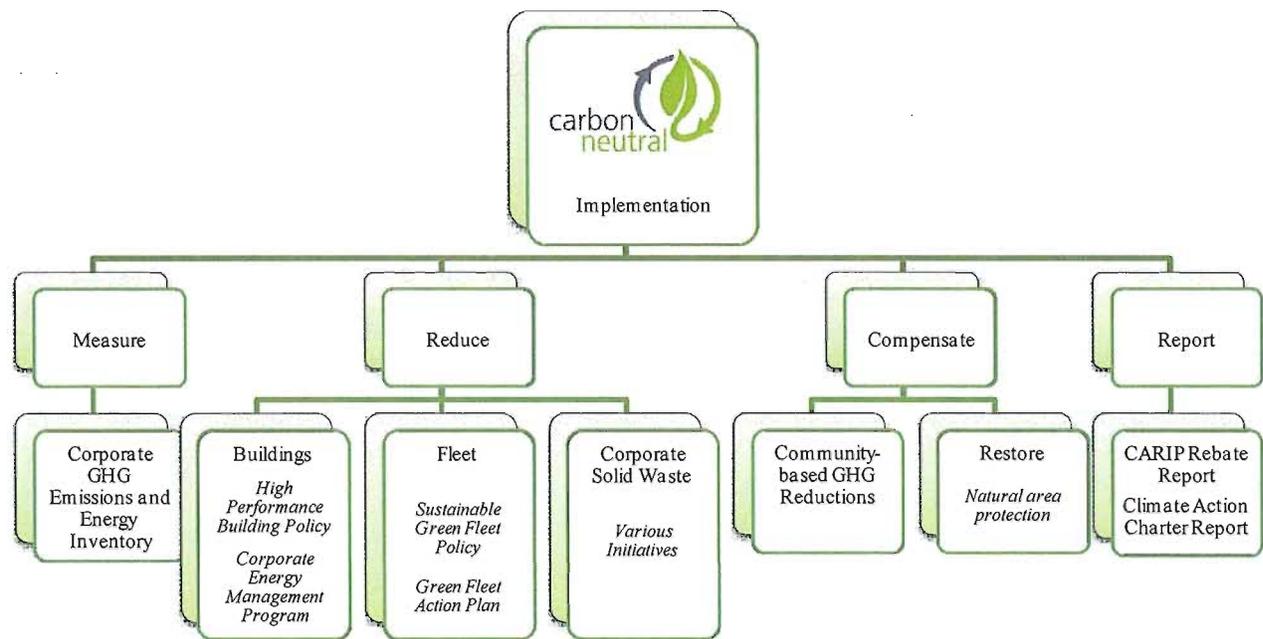


Figure 4: Carbon Neutrality Implementation Framework

Chapter 2: Measure

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

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

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

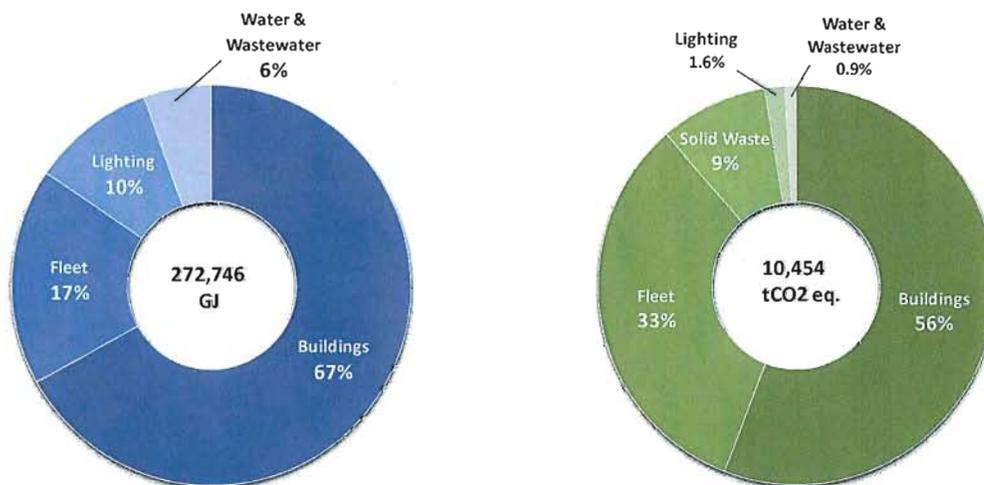


Figure 5: Richmond 2007 Corporate Energy Consumption and GHG Emissions

Chapter 3: Reduce

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

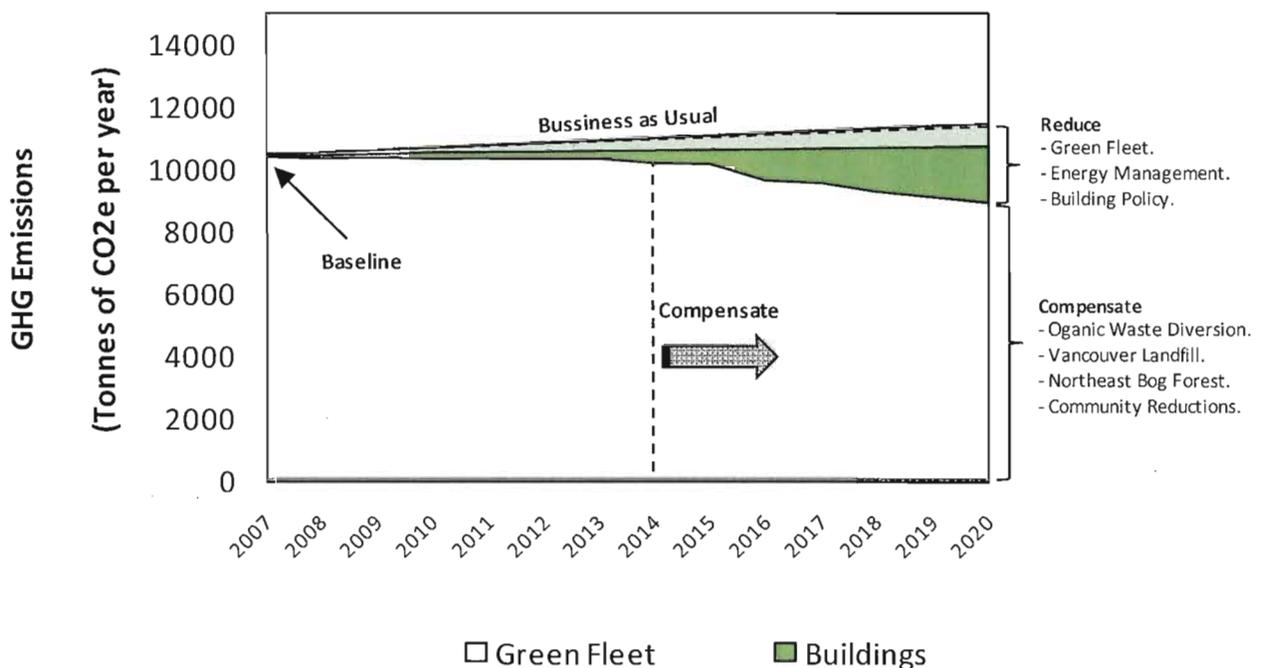


Figure 6: Summary of Corporate GHG Reduction Strategies



Fleet – Green Fleet Action Plan

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

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

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

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

Solid Waste

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

Key initiatives include:

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

¹ Municipal Collaboration for Sustainable Purchasing

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

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

Buildings

Corporate Energy Management Program

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

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



High Performance Building Policy

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

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

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

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

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

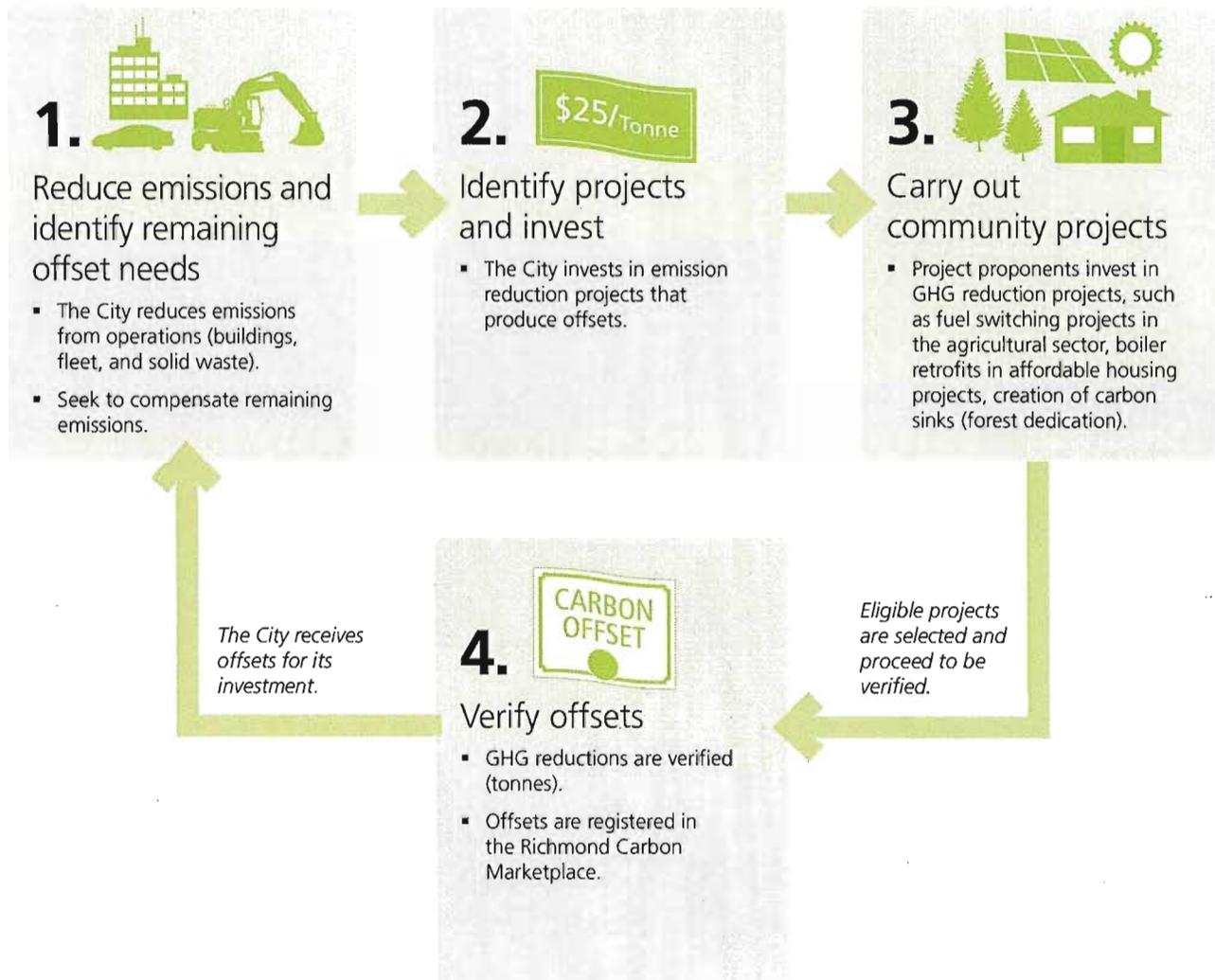


Chapter 4: Compensate

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

How Carbon Offsetting Works

Annual Process for Offsetting Carbon Emissions



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

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

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

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

Option 1: Invest in a "GCC Supported Project

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

Option 2: Invest in Alternate Community GHG reduction Projects

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

Option 3: Purchase Offsets from a Credible Provider

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

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

	Option 1: GCC-supported Project	Option 2: Alternative Project	Option 3: Purchase
Ease of implementation	<ul style="list-style-type: none"> Requires some effort. Project profiles already developed by the GCC. Project has to be implemented and self-certified. 	<ul style="list-style-type: none"> Requires considerable effort and third party assistance. Project profiles have to be developed by local government or project proponent. Project has to be implemented and third party verified. 	<ul style="list-style-type: none"> Simple.
Cost	<ul style="list-style-type: none"> Varied cost, depending on project. Minimal validation and certification costs, as they have been largely pre-established by the GCC. 	<ul style="list-style-type: none"> Varied cost, depending on project. Local government or project proponent required to pay for costs to develop, implement and verify the project. 	<ul style="list-style-type: none"> Least cost. Purchase tonnes at market rate (which will vary depending on the provider and standard that they use).
Reduction in local/regional GHG emissions	<ul style="list-style-type: none"> Community emissions reduced. 	<ul style="list-style-type: none"> Community emissions reduced. 	<ul style="list-style-type: none"> Uncertain impact on community emissions unless offset provider invests locally or regionally; however, climate change is not geographically bound so investments in credible offsets still reduce overall GHG emissions.
Co-benefits	<ul style="list-style-type: none"> Investment in local green economy, raises local awareness; fosters local/regional technological innovation; supports the creation of green jobs. 	<ul style="list-style-type: none"> Investment in local green economy, raises local awareness; fosters local/regional technological innovation; supports the creation of green jobs. 	<ul style="list-style-type: none"> Investment in British Columbia; fosters broader technological innovation; reduced GHG emissions; cost effective.

Source: Green Communities Committee, 2011.

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

Current and Anticipated Offsets

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

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

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

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

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

*** Information obtained from Metro Vancouver.

Northeast Bog

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

Solid Waste Strategic Program

The City's curbside organics collection program has been successful in diverting increasing quantities of organic waste (yard trimmings and food scraps) from landfill. The Provincial Green Communities Committee (GCC) has developed a framework to allow municipalities to calculate GHG reductions attributable to organics diversion from community sources. The resulting carbon credits can be used towards Municipal Carbon Neutrality goals under the Climate Action Charter framework. Between 2007 and 2012 more than 58,000 tonnes of organic waste above the 2007 baseline were diverted from the landfill, resulting in 3,157 tonnes of CO₂e avoided.

In 2011, the City adopted a Solid Waste Strategic Program under the City's Sustainability Framework, which includes a community-wide waste diversion target of 70% by 2015; as a result, the amount of carbon credits generated is expected to increase in the coming years.

Vancouver Land Fill

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

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

Community-based Reductions

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

Richmond Carbon Marketplace

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

Benefits:

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

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

Phase 1: Determining the Potential for Local GHG Reduction Projects

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

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

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

Phase 2: Identify Potential Local GHG Reduction / Offset Projects

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

Phase 3: Assessment and Quantification of Local GHG Reduction Projects

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

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

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

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

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

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

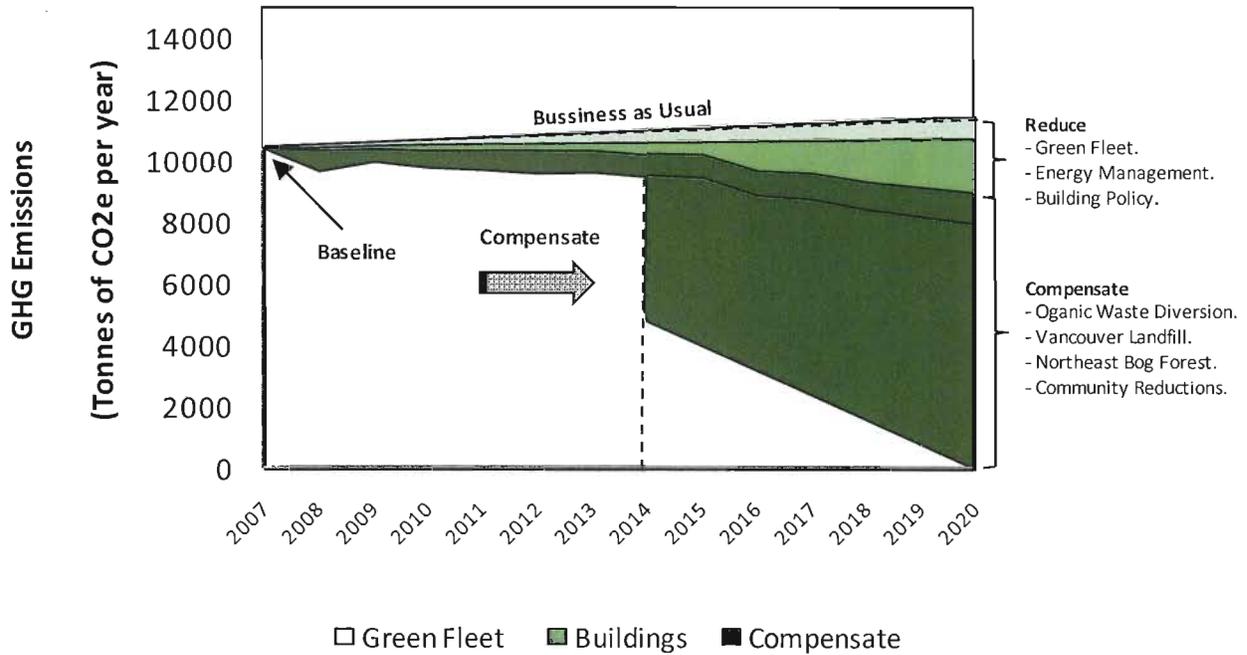


Figure 8: Proposed Community Based Compensation Strategy



Restore

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

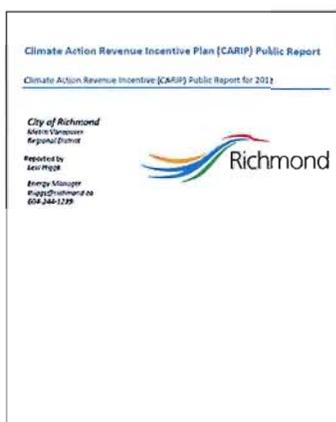
To support the rebalancing necessary for long-term climate stability, the City of Richmond is investing in the preservation of its natural local ecosystems. Most recently, the City purchased the last remaining parcel of the Northeast Bog Forest. Bogs and wetlands are some of the most effective ecosystems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

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

Chapter 5: Report

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

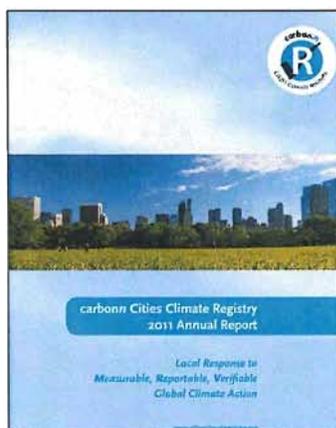
The City's carbon neutral action reports will help the City communicate the effectiveness of its corporate actions and investments, and support future planning and action implementation to reduce GHG emission reductions and advance overall sustainability in the City of Richmond.



Climate Action Revenue Incentive Program (CARIP)

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

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



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

Carbonn Cities Climate Registry (Mexico City Pact)

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

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

Internal Reporting

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

Chapter 6: Conclusion

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

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

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