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COUNCIL DATE: **April 2, 2012**

REGULAR COUNCIL

TO: **Mayor & Council**

DATE: **March 15, 2012**

FROM: **Sustainability Manager**

FILE: **0512-02**

SUBJECT: **EnergyShift Update: Progress Report on the Development of a Community Energy and Emissions Plan and on the Implementation of the Corporate Emissions Action Plan**

RECOMMENDATION

The City Manager's Department recommends that Council receive this report as information.

INTENT

The purpose of this report is to provide an update on the progress of development of a Community Energy and Emissions Plan (CEEP) and on the implementation of the recommendations of the Corporate Emissions Action Plan (CEAP) that was adopted by Council in October 2010.

BACKGROUND

Community Energy and Emissions

In 1998, the City of Surrey became a member of the Partners for Climate Protection Program (PCP) of the Federation of Canadian Municipalities (FCM), a national program that brings Canadian municipal governments together to reduce the local production of greenhouse gas (GHG) emissions and to advance sustainable community development.

In 2007, the City of Surrey joined the Province of British Columbia's Climate Action Charter, committing to "creating complete, compact, more energy efficient rural and urban communities" and to becoming carbon neutral with respect to its operations by 2012.

In September 2008, Council approved the recommendations of Corporate Report No. R175;2008, titled "Surrey Sustainability Charter", thereby approving the Surrey Sustainability Charter as the overarching policy document for the City. The Charter includes under Action EN 11, a commitment to developing a climate change action plan as follows:

1. Develop strategies and take action to achieve the goals of the BC's Climate Action Charter; and

2. Expedite the completion of the five milestones in the Partners for Climate Protection process, including an inventory of corporate greenhouse gases (GHGs) and setting targets and timelines for GHG reductions.

On December 7, 2010 Council considered Corporate Report No. R251;2010, titled “Application for Funding from the FCM Green Municipal Fund for the Development of a Community Energy and Emissions Plan” and approved the funding application and the development of a Community Energy and Emissions Plan (CEEP). The CEEP will include a vision, goals and actions to achieve the stated targets for GHG emission reductions currently outlined in the Surrey Official Community Plan. These targets were included in the OCP in May 2010 to meet the provincial requirements of Bill 27, the *Local Government (Green Communities) Statutes Amendment Act*, and are as follows:

- A 33% per capita GHG reduction by 2020, excluding agriculture and industry; and
- An 80% per capita GHG reduction by 2050, excluding agriculture and industry.

On June 23, 2011, Council received Corporate Report No. R119;2011, titled “Community Energy & Emissions Plan Update and Launch of the EnergyShift Brand”. By adopting the recommendations of this report, Council approved Terms of Reference for developing the Community Energy and Emissions Plan (CEEP). Council also endorsed the “EnergyShift” meta-brand for Surrey energy-related initiatives and for the “Community EnergyShift” sub-brand to engage the public and stakeholders in the development of the CEEP. ENERGYShift focuses efforts in three areas as follows:

- community action;
- corporate operations; and
- clean tech business.

The City was successful in securing \$225,000 from the Federation of Canadian Municipalities and BC Hydro to use toward the development of the CEEP and related work on climate change adaptation.

The CEEP development process was launched during Surrey’s 2011 Canada Day celebrations. In addition to fun, interactive activities such as the bicycle blender, the Sustainability Office invited citizens to share their personal “energy hero” stories and contribute ideas on how the City can further support the community to reduce energy use and GHG emissions.

The CEEP is intended to be a 25-year planning framework that will establish energy and emissions-related priorities for the community. To achieve the GHG reduction targets as referenced in the City’s OCP, the preparation of the CEEP will need to involve rigorous energy modeling based on alternate policy pathways. The findings from this process will inform the drafting of policy tools that support desired energy outcomes, including a viable rapid transit network, building retrofit opportunities, and district energy.

Corporate Energy and Emissions

On October 14, 2010 Council considered Corporate Report No. R214;2010, titled “City of Surrey Corporate GHG Emissions Action Plan”, and approved the City’s Corporate Emissions Action Plan (CEAP). The CEAP defines opportunities to reduce energy consumption and GHG emissions

from the City's corporate operations. Greening corporate operations is critical to demonstrating leadership in and leveraging investments to support the clean energy sector. Actions identified in the CEAP support green procurement, new green buildings, energy retrofits across the City's infrastructure, green vehicles and alternative fuels, which in turn enable clean tech business investment and clean energy solutions for the community.

The City has established a target of reducing its corporate GHG emissions by 20% by 2020, and has identified 13 actions to reduce emissions in the areas of buildings, fleets and infrastructure, and with respect to leadership and public engagement.

The City was recently commended by FCM for having completed milestones 1, 2 and 3 of the Partners for Climate Protection program for corporate emissions, namely:

1. Creating a GHG inventory and forecast;
2. Setting an emissions target; and
3. Developing a local action plan.

Milestones 4 and 5 consist of implementing the local action plan, and monitoring progress and reporting results. Staff will work to obtain FCM recognition of these milestones in 2012.

DISCUSSION

Community Energy and Emissions Plan (CEEP)

Following the CEEP launch in July 2011, a Community Energy and Emission Profile was undertaken to provide greater insight into the City's historic and current energy use and associated emissions. The analysis showed 2007 community emissions of CO₂e at 5.1 tonnes per capita, with 62% of these emissions from transportation, 35% from buildings, and 3% from waste.

With a 2007 baseline established, an analysis was undertaken regarding the extent to which existing policies would fulfill the GHG reduction target of a 33% per capita reduction by 2020. This analysis shows a significant gap between projected emissions based on "current plans" compared with targets. Workshops with stakeholders and staff last fall began to explore opportunities for shrinking this gap. The CEEP process is currently shaping two alternative energy futures based on different land use, transportation, energy supply, buildings, and waste policies. The impact of these future energy scenarios will be evaluated based on their greenhouse gas impact, as well as priorities such as energy savings, economic development, transit supportiveness, and community walkability.

Surrey businesses and residents spend over \$1 billion dollars, or \$2,300 per capita on energy per year. Given rising fuel prices, spending is projected to double to over \$2 billion dollars by 2020, with per capita expenditures rising to \$3,600 per year. The vast majority of this spending leaves the community. With rising electricity and oil costs, these expenditures – along with the economic vulnerability of many people – will dramatically increase with time. The conservation, efficiency and renewable energy strategies being explored in the CEEP aim to reduce the need for energy and to keep a larger portion of energy expenditures in the community, supporting the local economy.

EnergyShift Panel and Open House

On February 2, 2012, the City hosted an EnergyShift Panel and Open House to update participants on the CEEP development process and to better understand public priorities and sensitivities when it comes to reducing GHG emissions. The expert panel, which was moderated by CBC's Mark Forsythe and included:

- Nancy Olewiler, Director, School of Public Policy, SFU and Translink Board Chair;
- Penny Priddy, community activist and Surrey Board of Trade Social Policy Committee;
- Nimal Rajapakse, Dean, Faculty of Applied Science, SFU; and
- Gordon Price, Director, City Program, SFU

assisted in building public understanding on the issues, challenged the audience to look at energy in new ways, and debated the issues and opportunities. Over 110 people attended the event, held at Enver Creek Secondary School.

A final draft CEEP Plan is expected to be completed by mid-2012, based on input from the public and stakeholders, including input and alignment with other important planning processes such as the Official Community Plan, transportation plans and the Surrey Sustainability Charter.

Corporate Emissions Action Plan (CEAP)

The following sections summarize the progress that has been made to date on Surrey's corporate energy and emissions performance relative to the recommendations in the CEAP. Attachment A documents the actions that were completed in 2011 related to the implementation of the recommendations of the CEAP. It also documents the priority actions on which resources and effort will be focused in 2012.

2010 Corporate Emissions

In 2010, the City of Surrey's corporate GHG emissions were 15,336 t CO₂e (tonnes of carbon dioxide equivalent), with 47% of these emissions coming from fleet vehicles, 41% from natural gas, and 12% from electricity. Total energy use was 472,942 GJ, at a total cost of \$10,096,966 to the City. Emission contributions by area are shown in Figure 1.

Figure 1: Service Area
(% of total emissions)

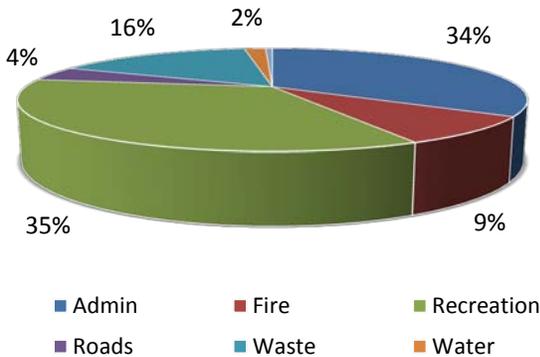
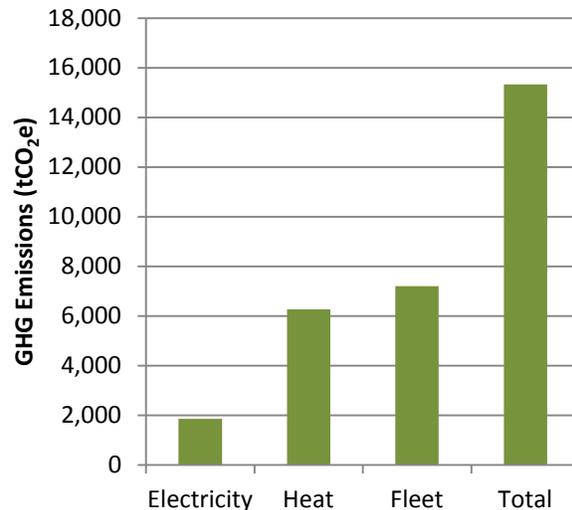


Figure 2: Surrey Corporate GHG Emissions (2010)



Total emissions in 2010 decreased from 16,413 t in 2009 to 15,336 t of CO₂e in 2010. There was a 6% reduction in GHG emissions for City operations, while fleet emissions and electricity usage experienced modest increases over the baseline (see Figure 2).

Quantification of GHG emissions will continue to be refined over time. As an example, the City will begin tracking emissions associated with employee travel for work purposes in 2012.

A number of initiatives are underway in the City to reduce corporate emissions; these projects are expected to have a positive effect on the City's energy and emissions performance.

Carbon Neutrality

Achieving “carbon neutrality” involves measuring GHG emissions from corporate operations and then either eliminating these emissions and/or developing projects that offset these emissions, and/or purchasing offsets for the emissions. Surrey's Corporate Emissions Action Plan has established as a target the City achieving carbon neutrality.

UBCM and the Province's Climate Action Secretariat have been working with local governments to develop a “Becoming Carbon Neutral Guidebook” to facilitate decision making for municipalities.

Based on consultations and extensive interaction with local governments in the Lower Mainland, issues regarding the offsetting process were identified by Metro Vancouver's Regional Engineers Advisory Committee (REAC) Climate Protection Sub-Committee. These issues have been communicated to the Ministry of Community, Sport & Cultural Development by REAC. Principally, what municipalities are requesting is the opportunity to use their carbon offset payments to fund projects within their respective jurisdictions that will measurably reduce GHG emissions.

The City of Surrey remains committed to achieving the targets stipulated in the BC Climate Action Accord, including the commitment to be carbon neutral with respect to operations. The

Province acknowledges the City's efforts in making progress towards carbon neutrality and staff is monitoring emerging approaches for application in Surrey.

SUSTAINABILITY CONSIDERATIONS

All City Departments continue to pursue sustainability initiatives that further the goals of the Surrey Sustainability Charter. The Community Energy and Emissions Plan and the Corporate Emissions Action Plan address several of the Actions identified in the Sustainability Charter, as follows:

- EC 8: Energy Security
- EC 16: Increased Transit and Transportation to Support a Sustainable Economy
- EN 1: Energy Efficiency
- EN 2: Waste Reduction
- EN 3: Vehicle Fleet Programs
- EN 4: Employee Trip Reduction Program
- EN 5: Green Procurement Policies and Practices
- EN 9: Sustainable Land Use Planning and Development Practices
- EN 10: Integrated Community Energy Master Plans
- EN11: Surrey's Commitment to the Climate Change Action Plan

CONCLUSION

Surrey's "EnergyShift" framework is being operationalized through the development of the Community Energy and Emissions Plan (CEEP) and the implementation of the Corporate Emissions Action Plan (CEAP).

The CEEP will result in progressive policies to realize significant energy reductions in the community over time. Localized, green, and efficient energy systems have the potential to keep significantly more spending within the local economy.

The CEAP is guiding policy development and actions to reduce GHG emissions across civic buildings, fleet and infrastructure and engagement with others. Actions that have been implemented to date are having a positive effect on the City's GHG emissions. Further actions that are planned for 2012 will build upon these successes.

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Corporate Emissions Action Plan Actions	General Description of 2011 Activities	Anticipated Energy Saved / Emissions Reduction	2012 Priority Activities
Building Actions LEAD: Facilities Division, Planning & Buildings Dept.			
Action-1 Ensure high energy performance of new facilities	<ul style="list-style-type: none"> • New City Hall: The New City Hall, designed in 2011, targets LEED Gold certification and includes a geothermal heating and cooling system. • Animal Care Facility: The Surrey Animal Care facility, designed in 2011, targets LEED certification and includes a geothermal heating and cooling system. • City Centre Library: City Centre Library was completed and opened, targeting LEED Silver Certification. • Fire Hall # 14: Fire Hall # 14 construction was completed, with building systems designed for energy efficiency. A solar hot water preheat system was installed as part of this project. 	<p>New City Hall:</p> <ul style="list-style-type: none"> • Anticipated savings of 1000 GJ of gas annually • Anticipated savings of 140,000 kWh annually 	<ul style="list-style-type: none"> • Performance Standards: Continue to ensure our facilities designs are examples of our leadership on high energy performance. Evaluate capital cost and operating energy and carbon savings with ASHRAE 90.1 and LEED performance measure being used to ensure we go "beyond building code". • New Aquatic Facilities: Design of two aquatic complexes and additions to several recreation centres are scheduled in 2012.
Action-2 Conduct audit and retrofit activities in City facilities	<p>Energy Retrofits: Past audits resulted in the completion of several retrofits in 2010 and 2011. The following are a list of major retrofit projects that were initiated for energy savings with short term payback:</p> <ul style="list-style-type: none"> • South Surrey Indoor Pool: Replacement of boiler and installation of a dehumidification system with heat recovery. • Newton Wave Pool: Replacement of air handling systems and installation of a dehumidification system with heat recovery. • RCMP Headquarters: Replacement of boiler and chillers with high efficiency units. • Surrey Sports & Leisure Complex: installation of heat recovery systems to take advantage of waste heat from the arena refrigeration system and heat recovery from warm pool air prior to exhausting air outside. 	<ul style="list-style-type: none"> • Anticipated 7,900 GJ gas • Anticipated 12,000 GJ gas • Anticipated 178,000 kwh electricity and 760 GJ gas • Anticipated 18,200 GJ gas savings 	<ul style="list-style-type: none"> • Energy Audits: The Facilities Division has entered into a contract with a vendor (AMERESCO) to complete building audits and energy audits of all 120 City buildings. The audits will be completed in 2012 with numerous options for energy reduction expected.

Corporate Emissions Action Plan Actions	General Description of 2011 Activities	Anticipated Energy Saved / Emissions Reduction	2012 Priority Activities
<p>Action-3 Include alternative energy evaluation in replacement, renovation, and maintenance activities</p>	<ul style="list-style-type: none"> • City Hall Chillers: All equipment replacement has included the highest efficiency equipment as per evaluation by City mechanical engineering consultants. The replacement of aging chillers in City Hall was a major renovation that resulted in significant savings. 	<ul style="list-style-type: none"> • City Hall chillers - Anticipated savings 220,000 kwh electricity 	<ul style="list-style-type: none"> • Ongoing Evaluation: Continue to evaluate replacements, renovations and maintenance with consideration for energy and emissions savings.
<p>Action-4 Develop ongoing energy management activities</p>	<ul style="list-style-type: none"> • Energy Monitoring System: The City installed a Pulse Energy monitoring system for electricity and gas metering at Surrey Sports & Leisure Complex. The system established some baseline data prior to the construction of the heat recovery systems. After completion of commissioning the new mechanical systems in late 2011, the City will be able to monitor changes in energy consumption in detail to measure the impact of the upgrades and heat recovery. • Grants: The City worked closely with BC Hydro to get grants for the following projects: <ul style="list-style-type: none"> ○ Funded energy study for New City Hall project design ○ Funded energy study for City Centre Library design ○ Provided grant for lighting upgrades at various facilities • Solar Energy: Accessed grant for the installation of solar preheat for hot water at Fire Hall # 14 from NRCan and BCSEA Solar BC 		<ul style="list-style-type: none"> • Control Systems: Encouraging the development of energy monitoring solutions by the vendor of our existing DDC control systems. The current systems have the capability to monitor energy use without more capital investment. The software development for collection of the data and reporting is under way but not complete. • Funding: Continue to work with BC Hydro and others to pursue funding opportunities.
Fleet Actions		LEAD: Operations Division, Engineering Dept.	
<p>Action-5 Continue implementation of green fleet management activities</p>	<ul style="list-style-type: none"> • Fleet Energy Modelling: The City is currently developing a clean energy systems modeling tool in partnership with SFU's School of Mechatronics. The tool will help to better assess the benefit of low carbon alternatives to gas and diesel municipal fleet vehicles from a triple bottom-line perspective. In addition, the City is exploring different idling reduction technologies and is planning for Green Fleet storage/charging at City Hall. • Fleet Excellence: In 2011, the City achieved the E3 Gold Rating for our sustainable fleet management practices, and is striving to be the first fleet in Canada to achieve the highest level 'platinum' rating. 		<ul style="list-style-type: none"> • Carpool Program: Planning for a staff carpool program that will utilize the City's fleet of electric and other green vehicles will move forward in 2012.

<p>Action-6 Establish an alternative vehicle pilot program</p>	<ul style="list-style-type: none">• Alternative Energy Vehicles: 2011 saw the procurement of the City's first 100% OEM (Original Equipment Manufacturing) electric vehicle - a Nissan Leaf - and the city's first electric vehicle conversion truck - a Ford Ranger. The City also acquired four hydrogen fuel trucks, and three zero-emission hydrogen fuel-cell passenger vehicles. In addition, the City procured a Compressed Natural Gas (CNG) refuse collection vehicle for the curbside organics collection pilot.• Hydrogen Fuel: Within the City, there are two fully operational hydrogen fuelling stations, including one at the City Works Yard.• EV Charging Infrastructure: In 2011, the City installed the first publically accessible (and free) Electric Vehicle (EV) charging station at City Hall. This is a Level II commercial charging station.	<ul style="list-style-type: none">• Procurement: In 2012, the City will continue to move forward with alternative fuel vehicle procurement, with the aim of acquiring up to five new 100% electric vehicles.• The City will pilot the Nissan Leaf, which is 100 per cent electric and produces zero emissions, to assess performance and analyze data including cost savings, environmental impact and effectiveness.• The City's new contract for residential waste collection has been awarded to BFI and starts in 2012; residential waste will be collected using new state-of-the-art automated Compressed Natural Gas (CNG) trucks, which emit 23 per cent less carbon emissions and 90 per cent less air particulates, compared to traditional diesel trucks.
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Infrastructure Actions		LEAD: Various Depts.
<p>Action-7 Investigate potential for alternative energy demonstration</p>	<ul style="list-style-type: none"> • Clean Energy Demonstrations: 27 clean energy demonstration projects have been identified for study or implementation. The projects span power generation, power conservation, the creation of a clean energy hub, and clean energy vehicles. • Energy Feasibility Assessments: Completed studies have explored the feasibility of distributed electrical generation, district energy, micro-hydro and pico-hydro (the latter being hydroelectric power generation under 5kW), heat recovery from sanitary sewers, policy to support electric car-ready residential buildings, and the creation of an accelerator centre with PowerTech to support the development of the clean energy sector. • Other Programs: In addition, a number of pilot and demonstration projects have been initiated including: a green wall on the Semiahmoo Library; testing of hydrogen fuel cell and electric fleet vehicles; the use of compressed natural gas (CNG) waste collection vehicles; and the achievement of E3 Fleet Gold Rating for efforts to reduce the City's fleet emissions. <ul style="list-style-type: none"> • Ongoing Feasibility Assessment: 2012 will see the continuation of feasibility studies for the 27 projects, and the implementation of projects that have been deemed viable. Further studies to be initiated include biomass for combined heat and power. • New Energy Systems: The City of Surrey will continue to work on a number of projects in 2012 that are scheduled to be online in 2013 or 2014, including the bio-fuel production plant in and the geexchange district energy system for the new City Hall. 	
<p>Action-8 Evaluate and implement street-lighting alternatives</p>	<ul style="list-style-type: none"> • LED Lights: The City has installed 320 traffic signals equipped with LED signal heads since 2002. Engineering Department has conducted studies on the cost/benefit of implementing LED street lighting and adaptive LED roadway lighting in place of high pressure sodium (HPS) cobra heads. The City is now testing different LED streetlight brands; currently down to final four brands. 	<ul style="list-style-type: none"> • Savings: LED signal heads is saving approx. 70% electricity per year in comparison to incandescent bulbs. First results show that the energy saving of LED lights are approx. 50% in comparison with the incandescent bulbs. • Ongoing Implementation: Will be recommending the installation of new LED streetlight poles based on final testing of brands. Will be doing pilot projects with new LED streetlight poles and proceeding with retrofits where it is financially viable. Developers will be required to install new LED lights in NCP Grandview Heights #2.
<p>Action-9 Implement user control lighting and artificial turf for major sports fields</p>	<ul style="list-style-type: none"> • User-controlled Lighting Systems: Four new user-controlled lighting systems installed in 2011: two systems at Tamanawis Park, one at North Surrey Community Park and one at Newton Athletic Park. There is one new artificial turf field at Tamanawis Park. • Lighting Systems: Two new lighting systems and one new artificial turf field planned for 2012. 	

Leadership & Engagement Actions		LEAD: Sustainability Office, City Manager's Dept.
<p>Action-10 Establish a procurement policy that considers energy and GHG emissions</p>	<ul style="list-style-type: none"> • Clean Energy Demonstration Projects: Using the label "Clean Energy Demonstration Projects", the City is moving ahead with a number of alternative energy projects for vehicles, infrastructure, and buildings. Formalising these practices is a priority for 2012. • Municipal Collaboration for Sustainable Purchasing: The City of Surrey is participating in the Municipal Collaboration for Sustainable Purchasing with other communities across Canada. The project is being managed by Reeve Consulting, a known sustainable procurement specialist. Benchmarking was completed to better understand areas of interest and opportunities. A Draft Sustainable Purchasing Action Plan was submitted and will be reviewed in 2012. 	<ul style="list-style-type: none"> • Implementation: Internal staff engagement will be carried out to review items identified in the action plan. • Ideas Competition: The City aims to host the "ENERGYShift Ideas Competition" which will engage suppliers, vendors, researchers and the general public to propose clean energy solutions for the City. Proposed solutions may be helpful to include in future procurement policies.
<p>Action-11 Encourage energy conservation behaviours in the workplace</p>	<ul style="list-style-type: none"> • Workplace Conservation Awareness Program for Staff: Twelve (12) City facilities are participating in the Workplace Conservation Awareness Program, a funded BC Hydro program. Melanie Houlden, Chief Librarian, is leading the eight (8) participating libraries, and Alison Dewey, Aquatic Programmer, is leading staff from the four (4) participating pool facilities. Activities to date include benchmarking employees' current energy use behaviours (see Appendix A for sample of related communication materials) and developing a strategic plan for supporting behaviour change. 	<ul style="list-style-type: none"> • Implementation: Next program phases throughout 2012 will include the development of toolkits and communications, as well as the implementation of events and initiatives to reduce energy consumption. Energy use metrics will be compared to previous year.
<p>Action-12 Consider expanding energy and emissions monitoring and reporting</p>	<ul style="list-style-type: none"> • Innovative Energy Reporting & Management System: A new system to automate Surrey's inventory of energy use and corporate GHG emissions is being explored as part of the City's integrated financial management system project. It has the capacity to feature more efficient and accurate statistics on energy and fuel consumption and spending and supply. Reporting would be automated and enhance energy management capabilities of staff and departments. 	<ul style="list-style-type: none"> • Implementation: Sustainability Office will be working with the new financial system development team in 2012 to explore, design and trial the energy and emissions reporting functionality.
<p>Action-13 Continue to dedicate CARIP rebate to sustainability related activities.</p>	<ul style="list-style-type: none"> • Sustainability Fund: A "Sustainability Fund" has been established to receive the Climate Action Rebate Incentive Program (CARIP) funds that the City submits for annually, as part of the BC Climate Action Charter commitments. 	<ul style="list-style-type: none"> • Carbon Neutrality: The City will be developing a strategy for achieving carbon neutrality. Upon completion, the Sustainability Fund may be helpful in supporting projects that deliver emission reductions.