



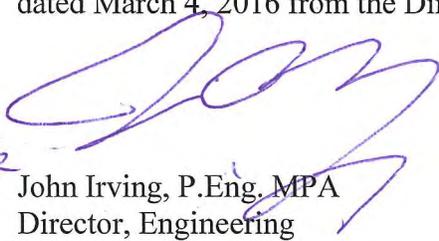
# City of Richmond

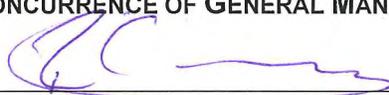
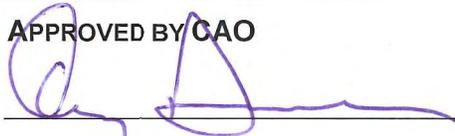
## Report to Committee

**To:** Public Works and Transportation Committee      **Date:** March 4, 2016  
**From:** John Irving, P .Eng., MPA      **File:** 10-6125-07-02/2016-  
Director, Engineering      Vol 01  
**Re:** **Paris Climate Agreement and BC Climate Leadership Plan Update**

### Staff Recommendation

That the staff report titled "Paris Climate Agreement and BC Climate Leadership Plan Update" dated March 4, 2016 from the Director, Engineering be received for information.

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

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

## Staff Report

### Origin

This report provides an update on the Paris Agreement under the United Nations Framework Convention on Climate Change (UNFCCC) and the ongoing development of federal and provincial climate plans, following up on the stated interest of Committee members in late 2015 regarding the outcomes of the Paris Climate Conference. The report closes with comments on the relevance to the City of Richmond's climate and energy initiatives.

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

*Continue advancement of the City's sustainability framework and initiatives to improve the short and long term livability of our City, and that maintain Richmond's position as a leader in sustainable programs, practices and innovations.*

*4.1. Continued implementation of the sustainability framework.*

This report supports Council's 2014-2018 Term Goal #6 Quality Infrastructure Networks:

*Continue diligence towards the development of infrastructure networks that are safe, sustainable, and address the challenges associated with aging systems, population growth, and environmental impact.*

### Background

In 2010, Council adopted targets in Richmond's Official Community Plan to reduce community greenhouse gas (GHG) emissions 33% below 2007 levels by 2020, and 80% below 2007 levels by 2050. In 2014, Richmond adopted its Community Energy and Emissions Plan (CEEP). The CEEP outlines an array of strategies and actions for the City to reduce community energy use and GHG emissions. The CEEP recognizes that the City's community emissions reduction targets will only be achieved with "Big Breakthroughs," including: zero carbon transportation systems, entailing increased transit and active transportation mode share and near-universal adoption of zero carbon vehicles (e.g. plug-in electric and fuel cell vehicles); zero carbon new buildings; and deep energy improvements to most existing buildings. The CEEP recognizes that these breakthroughs are not achievable by City leadership alone; rather, they require provincial and federal regulatory changes and funding, market innovation, and increasing carbon pricing.

### Findings of Fact

#### *Global GHG Emissions*

Global GHG emissions totalled 35,700 million tonnes (Mt) of carbon dioxide equivalent (CO<sub>2</sub>e) in 2014, and that emissions growth has slowed since 2011. Global emissions in 2015 are expected to level off or even decline slightly, due to China's recent efforts to limit its coal consumption.<sup>1</sup> Data for emissions in 2011 – the latest year for which robust global data is

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<sup>1</sup> <http://www.nature.com/news/global-greenhouse-gas-emissions-set-to-fall-in-2015-1.18965>

available – indicates that over 55% of total GHG emissions were emitted by just five countries: China (27%), United States (17%), India (5%), Russia (5%), and Japan (4%). Canada is the 37th largest country by population and the 11th largest in terms of GDP, but was the ninth largest GHG emitter in 2011, producing 2% of global emissions.

### Paris Agreement

On December 12, 2015, 195 countries reached consensus on the terms of the Paris Agreement under the UN Framework Convention on Climate Change (UNFCCC). The first global agreement to reduce greenhouse gas emissions, the Paris Agreement, aims to hold the global average temperature to “well below two degrees Celsius above pre-industrial levels, and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change.”<sup>2</sup>

To achieve this goal, each Party to the Agreement shall set its own emission reduction targets – referred to as Intended Nationally Determined Contributions (INDCs). By the conclusion of the Paris conference, 188 countries had formally submitted INDCs to the UNFCCC. Before the Paris conference began, it was already known that the INDCs submitted could only be expected to limit the global average temperature increase to 2.7°C to 3.7°C, far above the 1.5°C to 2.0°C maximum target. However, the Paris Agreement is designed to facilitate the “ratcheting up” of commitments over time. Under the agreement, each Party is required to monitor and report their emissions, to review and renew their INDC every five years (commencing in 2023), and to ensure that no future national plan is less ambitious than existing ones, creating “a firm floor and foundation for higher ambition.”<sup>3</sup>

The Paris Agreement shall be opened for signatures (i.e. statements of intent by Parties to ratify the agreement) on April 22, 2016 (Earth Day). In order to enter into force, the Agreement requires formal ratification by at least 55 countries contributing at least 55% of global GHG emissions. This is currently anticipated to occur in 2018.

### *Canada GHG Emissions*

In 2013, the latest year for which complete emissions data is available, Canada emitted 726 Mt CO<sub>2</sub>e of which British Columbia emitted 9% of total emissions. As of 2013, Canada’s greenhouse gas emissions were 18% above 1990 levels, the base year for the Kyoto Protocol, and 3% below 2005 levels, the base year for Canada’s targets under the Copenhagen Accord and the new Paris Agreement.

### Canada Climate Change Policy

Canada’s INDC under the Paris Agreement, announced in May 2015, sets a target of reducing the country’s GHG emissions by 30% below 2005 levels by 2030. The new federal government did not change the INDC prior to the Paris conference, noting the lack of time available and the importance of setting an achievable INDC. Canada previously set a greenhouse gas reduction

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<sup>2</sup> *Paris Agreement*, Article 2: <http://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf>

<sup>3</sup> <http://newsroom.unfccc.int/unfccc-newsroom/finale-cop21/>

target of 17% below 2005 GHG emission levels by 2030 under the 2009 Copenhagen Accord, but no federal plan to achieve this target was developed. Canada also set an emission reduction target of 6% below 1990 GHG emission levels by 2008-2012, under the Kyoto Protocol, but formally withdrew from the treaty in 2011.

The new federal government committed to working with the provinces to establish a “pan-Canadian framework on climate change” within 90 days of the Paris Agreement, and met with provincial and territorial First Ministers in Vancouver on March 3, 2016. The federal government states that this “clean growth framework” under development “will be science-based and will build on actions the provinces and territories have already taken”, and will aim to ensure that provincial climate strategies collectively achieve Canada’s INDC.<sup>4</sup>

### BC Climate Action Plan (2008) and BC GHG emissions: 2007-2011

In 2007, the provincial government passed the Greenhouse Gas Reduction Targets Act, committing BC to reduce emissions 33% below 2007 levels by 2020, and 80% below 2007 levels by 2050. In 2008, the province released a Climate Action Plan which outlined an array of climate action commitments, and set an additional interim GHG reduction target of 6% below 2007 levels by 2012. This plan led to the introduction of the revenue-neutral carbon tax, carbon neutral provincial operations, the Climate Action Accord for Local Governments, and a range of funding programs (e.g. electric vehicle charging and vehicle rebates). The province’s carbon tax been recognized as a best practice by the OECD and the World Bank.<sup>5</sup>

In 2014, the province’s climate action progress report noted that BC’s GHG emissions have “remained relatively stable during the economic recovery rather than resuming their prior growth path,” indicating that “policies, behaviour change, and efficiency are having an impact.”<sup>6</sup> The Pembina Institute notes that BC’s “per-capita fossil fuel consumption has dropped relative to the rest of Canada” even as BC’s economy has “outperformed the Canadian average.”

According to both the Provincial and Federal Governments, (whose emission inventory numbers differ), BC’s total GHG emissions declined significantly between 2008 and 2011. Using its own data available in 2014, the province announced that once 1.013 MT CO<sub>2</sub>e of offsets from the forestry sector were included, BC achieved its interim target of a 6% emissions reduction below 2007 levels by 2012.<sup>7</sup> Since then however, both the Federal Government and the Province Government have indicated that BC’s emissions are trending upwards again. BC’s emission inventory indicate that emissions in 2013 were only 2.8% below 2007 levels,<sup>8</sup> while according to the latest federal government data, BC’s GHG emissions may be approaching 2007 levels once more.<sup>9</sup>

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<sup>4</sup> <http://pm.gc.ca/eng/news/2016/02/10/prime-minister-meet-indigenous-leaders-and-host-first-ministers-meeting>

<sup>5</sup> <http://www.pembina.org/blog/climate-action-supports-a-diverse-bc-economy>

<sup>6</sup> *Climate Action in BC: 2014 Progress Report*.

<sup>7</sup> *Climate Action in BC: 2014 Progress Report*.

<sup>8</sup> BC. *Summary of B.C. Greenhouse Gas Emissions: 1990-2013*. Spreadsheet.

<http://www2.gov.bc.ca/gov/content/environment/climate-change/reports-data/provincial-ghg-inventory-report-bc-spir>. Accessed February 1, 2016.

<sup>9</sup> Canada. *National Inventory Report 1990-2013: Greenhouse Gas Sources and Sinks in Canada. Part 3, Table A1-20*. [http://unfccc.int/national\\_reports/annex\\_i\\_ghg\\_inventories/national\\_inventories\\_submissions/items/8812.php](http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/8812.php)

In May 2015, the province announced the formation of a Climate Leadership Team, tasked with providing recommendations to inform the province's development of a new Climate Leadership Plan. This Team's recommendations were released in December 2015. The province has noted that it will consider these recommendations, and that it intends to release a final version of the Climate Leadership Plan in March 2016.

In September 2015, Council directed that a letter be sent to the Province, outlining important elements that should be included in the Climate Leadership Plan, and in December 2015, Council endorsed the Call for Action on Energy and Climate in the Building Sector. The January 20, 2016 email to Council from Minister Polak notes that the province will be attending "each of BC's local government association meetings over the coming months" to discuss the Climate Leadership Plan. Staff shall update Council when details of these meetings are announced.

In response to Council's letter, the City received an email from BC Environment Minister Mary Polak on January 20, 2016 requesting information on the City's future plans for climate action in order to inform "the federal process to develop a pan-Canadian framework for combatting climate change." Staff shall update Council when information on meeting dates becomes available.

#### City of Richmond Climate Action

Richmond's 2014 Community Energy and Emissions Plan (CEEP) set out emission reduction measures organized around five themes:

- Neighbourhoods and Buildings
- Mobility and Access
- Resilient Economy
- Sustainable Infrastructure and Resources
- Climate Change Leadership

The *Community Energy and Emissions Plan 2015 Update*, presented to the Public Works and Transportation Committee on November 18, 2015, highlights key achievements under the CEEP that have been made since the plan was adopted. Overall, the City has actively implemented energy efficiency and emission reduction measures through a range of corporate initiatives including:

- **District Energy:** The expansion of the Alexandra District Energy Utility and the launching of the Oval Village District Energy Utility, both of which will increase energy security, provide cost-competitive energy, and reduce emissions for connected buildings;
- **Energy Programs for Existing Buildings:** The launch of the innovative "EnergySave Richmond" suite of programs to achieve community-wide reductions, including the Smart Thermostats Pilot Program, Building Energy Challenge, and Richmond Carbon Marketplace, and promoting utility Power Smart energy efficiency programs; The integration of energy and emissions considerations into the Hamilton Area Plan, setting a precedent for other area plans;
- **Car Sharing:** Facilitating the introduction and expansion of car sharing in Richmond;

- **Active Transportation:** Expanding and improving Richmond’s network of bicycle routes on major and local roads as well as off-street facilities like the Railway Greenway and the Middle Arm Greenway;
- **Transit System Investments:** Continually upgrading bus stops to provide accessibility, transit shelters and benches throughout the city, to help Richmond’s community travel more comfortably and safely;
- **Pedestrian Environment Improvements:** Expanding pedestrian infrastructure, including recent walkways on Minoru Boulevard and Shell Road East as well as implementing eight new special crosswalks and three pedestrian signals to enhance safety;
- **Solid Waste Diversion:** Implementing new waste diversion programs, including expanded Blue Box and Blue Cart programs, and the multifamily Green Cart program, to reduce emissions from the waste sector and achieve the City’s waste diversion goal of 70% by 2015. The City achieved the 70% target in 2014, one year in advance of the 2015 target date. Council has also directed that future single-family home demolitions must achieve at least 70% waste diversion.

The City also leads by example when it comes to the City’s operations, including:

- **Green Fleet:** Adopting the Green Fleet Action Plan in 2013 and the Sustainable High Performance Building Policy in 2014;
- **Carbon Neutrality:** Achieving carbon neutral corporate operations from 2013 to 2015.
- **Green Buildings:** Recently adopting an update High Performance Building Policy and building the City’s three new fire halls, City Centre Community Centre and the Minoru Complex to achieve the LEED Gold standard.
- **Energy Efficiency:** Saving over 38.0 GWh of energy (equal to the annual energy consumption of 950 Richmond single-family homes), through increased efficiency in the City’s corporate operations, providing approximately \$1,800,000 in total operational costs and reducing GHG emissions by 6,000 t CO<sub>2</sub>e (equivalent to 1,850 Richmond cars).

Finally, the City continues to advocate for action by senior levels of government, including providing input on key directions needed in the BC Climate Leadership Plan to help local governments meet their community energy and emissions targets.

#### *City of Richmond GHG emissions*

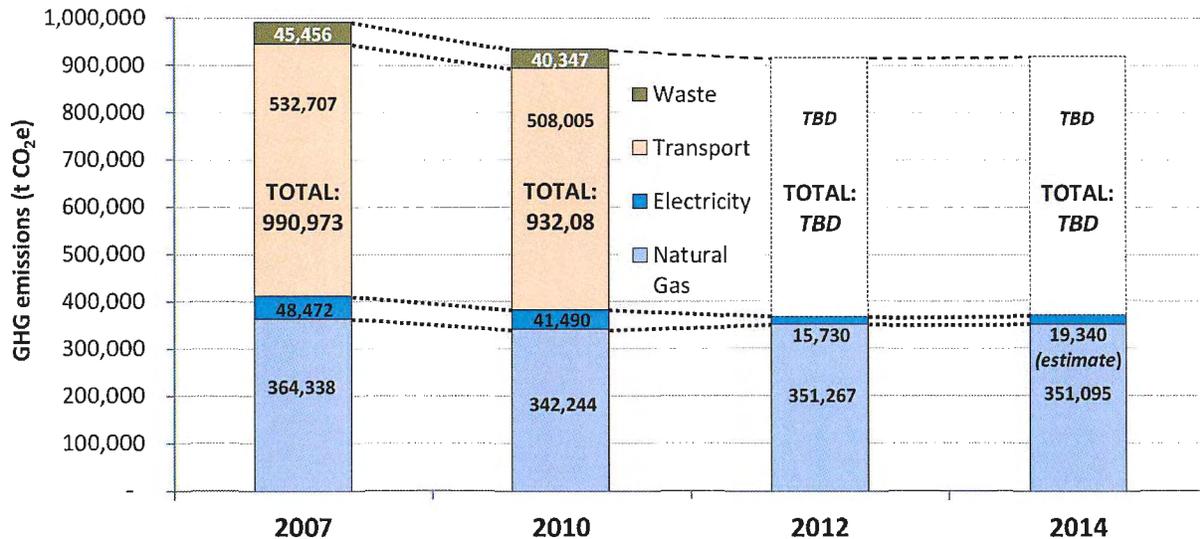
The province prepares the Community Energy and Emissions Inventory (CEEI) for local governments. The latest complete inventory is for the year 2010.<sup>10</sup> Based on the latest information received from CEEI, emissions in 2010 were 933,085 t CO<sub>2</sub>e (i.e. 0.93 MT CO<sub>2</sub>e), a 6% decline from the 2007 estimate of 990,973 t CO<sub>2</sub>e.<sup>11</sup> The province and BC Hydro have also

<sup>10</sup> Provincial staff report that limited staff resources and continuing difficulties in apportioning accurate estimates for transportation sector emissions have delayed the release of complete emission inventories for 2012 and 2014. Building sector emissions totals provided by CEEI to Richmond staff for the years 2007 and 2010 differ slightly from the latest public release of CEEI data. Data received from CEEI January 2016.

<sup>11</sup> As such, the City of Richmond achieved the province’s interim 2012 target without the use of offsets.

provided staff with 2012 and 2014 data for total Richmond electricity and natural gas consumption only (i.e. the buildings sector),<sup>12</sup> which indicate that the combined emissions for this sector have remained relatively constant over the past half-decade.

**Figure 1: Estimated total community GHG emissions<sup>13</sup> for the City of Richmond 2007-2012, per CEEI data available as of January 5, 2016.**



Between 2007 and 2014, BC Statistics estimates Richmond’s population to have increased by 14%. During this time, however, natural gas consumption has actually declined by 4% (a 13% decrease on a per capita basis), while electricity consumption only increased by 1% (a 9% per capita decline). The City’s policies compact urban development policies, combined with the numerous energy programs including district energy, are influencing this result. Total community GHG emissions from natural gas also declined by 4% during this time, while GHG emissions from electricity use declined by a remarkable 60% (because of higher use of zero-emission electricity generation sources during this time).<sup>14</sup> The City’s success in diverting community solid waste from landfills appears to have played a significant role in declining waste sector emissions, which were down 9% (16% on a per capita basis) between 2007 and 2010.

Finally, city staff are reviewing transportation sector emissions, as staff believe the actual decline in transportation sector emissions in 2010 was greater than indicated in provincial reporting.

<sup>12</sup> Excluding large industry. Data provided by CEEI to Richmond staff in December 2015 and January 2016, and by BC Hydro in January 2016.

<sup>13</sup> Excluding large industry.

<sup>14</sup> BC Hydro plans to increase the GHG-intensity of its electricity in 2016 and 2017, as the province mandates that no more than 93% of electricity demand be met with zero-GHG electricity. If BC Hydro achieves its targets, Richmond’s total GHG emissions would increase by approximately 13,000 t CO<sub>2</sub>e, assuming electricity consumption equalled that in 2014. Source: BC Hydro 2014 Annual Report, p.17

## *Implications for the City of Richmond*

According to the *Fifth Assessment Report* of the Intergovernmental Panel on Climate Change (IPCC), over the coming century Richmond will experience shifts to local temperature, precipitation patterns and sea level that exceed what has been experienced to date, even if the Paris Agreement fully succeeds in its objectives. Data from the multiple climate model simulations cited by the IPCC<sup>15</sup> suggest that the Metro Vancouver area will warm slightly more than the global average, such that local average temperatures in 2100 would be either ~3°C or ~5°C higher than in pre-industrial times (i.e. ~2°C or ~4°C higher than the present day). A continued shift towards wetter winters and longer dryer summers, together with greater extremes in rainfall and drought events is very likely.<sup>16</sup> Over the course of the 21<sup>st</sup> century, sea level rise is expected to continue: the province recommends that long-term planning should assume 1 metre of sea level by the year 2100.

With regard to the direct impact of sea level rise, the City of Richmond's *2008-2031 Flood Protection Strategy* and *Dike Master Plan* as funded by the City's pioneering Drainage and Dike Utility improves upon the one-meter planning target recommended by the province: with full implementation Richmond shall mitigate up to 1.2m of local sea level rise. The City of Richmond is unique within BC both for its drainage and diking utilities, and for the climate adaptation policies and programs they fund.

Expected secondary impacts of climate change include changes to vegetation (altering the quality and types of wildlife habitat found in Richmond), and an increased likelihood of new invasive species (notably including endemic disease vectors and/or disease organisms). There will be changes to the timing, length and predictability of growing seasons that will likely bring changes to the types of crops grown locally. Similarly, increases in the frequency and severity of storm and drought events may require changes to civic infrastructure to reduce potential impacts. As a culturally diverse community that is home to many businesses reliant on international trade, shifts in international and interprovincial population movements, trade patterns and resulting security concerns resulting directly or indirectly from climate change are also likely to impact the community.

In order to mitigate the root cause of these impacts the GHG reduction targets adopted within the city's OCP and CEEP, while ambitious, are consistent with those set by the province in 2007. They are also broadly consistent with achieving the targets of the Paris Agreement. A continued focus on the implementation of identified measures, and identifying additional emission reduction opportunities as they arise will be essential to meet these targets.

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<sup>15</sup> The Coupled Model Intercomparison Project Phase 5 (CMIP5), which constitutes the climate change projections used by the IPCC in the Fifth Assessment Report - incorporates all qualifying climate model outputs available as of 15 March 2013. Outputs for the Representative Concentration Pathway (RCP) scenario 4.5 cited in this report are the product of data produced by 42 different climate models developed by 21 different research institutions worldwide. The outputs of each model are given equal weighting. Source: IPCC, 2013. *Fifth Assessment Report. Annex I: Atlas of Global and Regional Climate Projections*. Pp. 1313-1315 and Table AI.1. [https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5\\_AnnexI\\_FINAL.pdf](https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_AnnexI_FINAL.pdf)

<sup>16</sup> IPCC, 2013. *Fifth Assessment Report: Summary for policymakers*. p.23.

The current federal reduction target will need to be revised over time to meet the intent of the Paris Agreement. While the limited implementation of GHG reductions policies and programs by senior levels of government has been an issue in recent years, there now appears to be greater potential for progress as pan-Canadian discussions resume. City staff will continue to monitor the development of the BC Climate Leadership Plan, and plan to work together with other local governments on the province's Energy Efficiency Working Group in providing comment on the draft plan. Staff shall provide an update to Council once the province's draft plan has been released and reviewed.

### **Financial Impact**

None.

### **Conclusion**

The Paris Agreement has not “solved” the issue of climate change, but it provides the strongest, broadest basis for global action on climate change. National and provincial level emission reduction commitments are a first step towards limiting global average warming to the levels that would achieve the targets set out in the Agreement, but continued and concerted action at all levels of government will be required in order to limit the impact of climate change.

This report summarizes current GHG emissions and reduction targets at the global, national, provincial and local level, and summarizes the actions that have been taken by the City of Richmond to increase energy efficiency and reduce GHG emissions within the City's own operations and throughout the community. Results to date are encouraging; despite an overall population increase of 14% since 2007, Richmond's overall consumption of natural gas has decreased by 4%, and electricity use has increased by only 1%. GHG emissions declined by 6% to 2010, and have remained relatively flat within the building sector (the only sector with more recent data) to 2014.

Going forward and in the context of Richmond's growing population, intensifying the City's focus on implementation will be essential to achieve the City's targets for energy efficiency and GHG emission reductions.



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NH:nh