

**REGION OF WATERLOO****CORPORATE RESOURCES  
Facilities Management and Fleet Services**

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**TO:** Regional Chair Ken Seiling and Members of Regional Council**DATE:** October 9, 2013**FILE CODE:** D06-80**SUBJECT: PROGRESS REPORT/ REVISED TARGET - CORPORATE GREENHOUSE GAS ACTION PLAN**

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**RECOMMENDATION:**

THAT the Regional Municipality of Waterloo adopt an enhanced target to reduce greenhouse gas (GHG) emissions from Regional Operations at an absolute level of 10% below 2009 levels by the year 2019 as described in report CR-FM-13-015.1 dated October 9, 2013;

AND THAT this report be forwarded to FCM Partners for Climate Protection (PCP) program and Sustainable Waterloo's Regional Carbon Initiative for formal acknowledgement and recognition.

**SUMMARY:**

In May 2011, Regional Council approved a GHG Action Plan for corporate operations under the responsibility of the Region of Waterloo (report CR-FM-11-011). Staff have recently prepared an updated emissions inventory which indicates that the Region has achieved almost a 15% reduction GHGs in two years. Based on the success achieved to date and the identification of practical and beneficial actions to implement, staff believe that over the life of the plan to 2019, the existing target of stabilizing absolute emissions at 2009 levels will be fulfilled and reduced further by up to 5%. Given this and the increasing need for mitigation of climate change, staff are recommending that the current target be replaced with a more aggressive target of 10% absolute emissions reduction to be achieved by the year 2019 (equivalent to an *intensity* target of 25% reduction per capita). The progress report captures actions implemented to date and also flags other benefits such as cost savings, better operation/maintenance of assets and reduced release of air pollutants associated with smog and ill health effects. The impacts from implementing the remainder of the action plan are outlined within this covering report and in more detail within Appendix A. The progress report and new reduction target, if approved, can be used to attain formal recognition from FCM for achieving the final milestones of the national PCP program as well as attain Bronze Pledging Member status within the local Sustainable Waterloo Regional Carbon Initiative based on the new per capita intensity target.

**REPORT:****Background**

In recent years, reports at the international, national and regional levels have indicated that climate change and variability is already impacting various places around the world including Canada. Conservation Authorities in Ontario have already acknowledged changes to the hydrological cycle which affect the occurrence of droughts, floods and create challenges to protecting water quality. Evidence that climate change is occurring within Waterloo Region can be observed within local weather data from over the past 60 years. Notable local effects include record breaking warm weather last year in March that was followed by more colder seasonal April temperatures which severely impacted some agricultural crops. More recently, intense rain and wind storms in July of this year caused significant damages to trees, homes and other buildings and infrastructure within the

community. While no single storm or weather-based record can be attributed solely to climate change, the long-term trends show a strong correlation between historical and current GHG emissions from human activity, atmospheric CO<sub>2</sub> concentration levels and changing climate conditions.

With a growing urgency for GHG mitigation, a call to action went out to local governments around the world in the mid-1990's as municipalities account for 30-50% of worldwide emissions and 60% of global energy consumption according to the Federation of Canadian Municipalities (FCM). In Canada, under the FCM's Partners for Climate Protection (PCP) program, over 240 municipalities have responded with commitments to reduce GHGs from their local operations and at the community scale. Regional Council passed a resolution on April 6, 2010 (CR-FM-10-007) to join the national FCM-PCP program as well as the local Sustainable Waterloo Regional Carbon Initiative (SWRCI), both requiring commitment to action towards achieving a reduction target. This report provides an update on the Region's Corporate GHG Action Plan. A report on the community action plan will follow later this fall.

### **Current Emissions and Progress to Date**

In May 2011, Regional Council approved a GHG Action Plan for corporate operations under the responsibility of the Region of Waterloo (report CR-FM-11-011). The report included an inventory of emissions from operations in 2009, a 10 year forecast and reduction target along with an action plan which included existing and planned actions being implemented from 2010 onward. The target that was approved aims to stabilize *absolute* emissions at 2009 levels out through the year 2019 (required for FCM-PCP) translating to a 15% reduction per capita based on anticipated population growth (*intensity* target used for SWRCI). The report also indicated that at that time, not all actions to meet that target were specifically quantified and that staff would report back to further describe the strategy proposed to fill the gap. This assessment has now been completed and consequently the current report provides an update on progress made as a result of actions completed over the past two years as well as the projected impact from implementing the remainder of the action plan including projected emission levels and estimated costs.

The main approach incorporated within the action plan to achieve emission reductions include:

- Energy efficiency and conservation in Regional facilities and streetlights
- On-site generation and utilization of renewable power (i.e. solar, geothermal)
- Methane gas emission management at the landfill
- Greening the Regional fleet and reducing employee business travel
- Improvements to processes in wastewater treatment and biosolids management

This approach led to an estimated annualized reduction of over 26,000 Tonnes of GHG emissions in 2012 based on actions completed to date. The most recent emissions inventory prepared by staff estimates that absolute GHG emissions from Regional operations for year-end 2011 have decreased by approximately 15% compared to 2009 levels as indicated in table 1. Although emissions from the Region's vehicle fleet grew moderately during this time (including transit, EMS and police), emissions from energy use in the Region's buildings, staff business travel, landfill operations, wastewater treatment and biosolids management all decreased compared to base year levels. Appendix A contains a more detailed progress report on actions implemented during 2010 - 2012, emission levels for 2011 in relation to base year values (2009) as well as improvements to monitoring of corporate emissions to better reflect progress and provide more efficient ongoing reporting.

The significant reduction between 2009 and 2011 is largely a result of changes made to wastewater operations and management of biosolids as well as the expansion of the organic waste diversion and solar/portable flaring activities at the Region's landfill which reduces methane, a GHG that is more than 20 times more potent than CO<sub>2</sub> in terms of global warming potential. Almost 900 megawatts of electricity were also reduced from 2009 to 2011 coupled with a lower carbon intensity of the provincial energy grid which further reduced emissions from the Region's electricity consumption in buildings and exterior lights on streets.

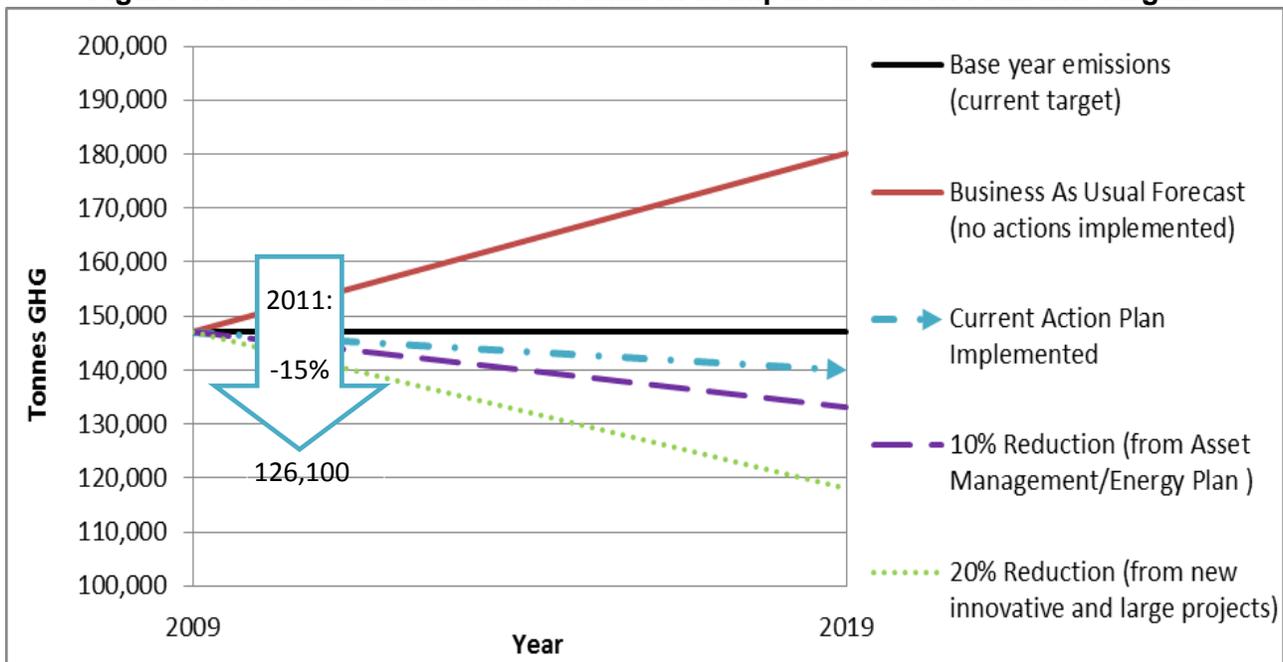
**Table 1. Comparison of 2009 and 2011 Corporate GHG Emissions from Regional Operations**

Emission Source	2009 GHGs (Tonnes)	2011 GHGs (Tonnes)	Difference (rounded)
Electricity (Buildings/facilities, streetlights and traffic signals)	17,402	15,802	-9%
Natural gas (Buildings/facilities)	15,099	14,262	-6%
Fleet Vehicles (incl. Transit and 3 <sup>rd</sup> party waste collection)	36,244	37,550	+4%
Staff business travel	550	521	-5%
Solid waste (Waterloo and Cambridge landfills)	64,428	56,593	-12%
Wastewater treatment / biosolids (non-energy based emissions)	14,020	1,372	-90%
<b>Totals</b>	<b>147,743</b>	<b>126,100</b>	<b>-15%</b>

**Reduction Targets Revisited**

The assessment of the current action plan has now been completed and forecasts that the existing target of maintaining 2009 emission levels will be surpassed when fully implemented despite expected growth in Regional facilities and quantity of vehicles. Given this strong progress achieved to date and availability of practical actions remaining to be implemented, staff are confident that more aggressive absolute emission reductions can be achieved by the target year 2019 while improving operations. Several different options to enhance the Region’s GHG reduction target ranging from 5% to 20% were considered and discussed with the Environmental Leadership Committee which is comprised of senior management from all seven Regional departments. Potential reduction levels are illustrated in Figure 1 in relation to the current target, updated action plan and emission levels as of year-end 2011. The target options considered by the Committee are summarized within table 2 including an overview of associated financial and technological related risks.

**Figure 1. Forecasted Emissions in Relation to Impact of Action Plan and Targets**



(Note: GHG emission forecast and reduction targets are illustrated in absolute terms (i.e. not per capita).

Although the Region has achieved strong early progress on emission reductions, it is expected that this will be tempered by growth in emissions during 2014 – 2019 as various operations, infrastructure and services expand to fulfill the demand from an increasing population in Waterloo Region (e.g. transit, police, new facilities). However, it is anticipated that significant opportunities to further improve emissions, financial and service performance will emerge from the current asset management activities in facilities and fleet management along with implementation of the Region's pending corporate energy conservation plan which is required under the Province's Green Energy Act by July 1, 2014 (report for consideration by Regional Council will be prepared in Spring 2014).

**Table 2. Summary Implications of GHG Reduction Target Options** (from base year 2009 to 2019)

Target Options (Absolute)	Per Capita Reduction	Actions Required	Risk Implications (financial / technological)	Estimated <u>New</u> * Costs	
				Capital	Operating
0% (current target)	15%	Completed or committed actions up to year-end 2014/15	<b><u>Negligible:</u></b> - Supported by existing budgets - Use of proven technologies - Paybacks within life of asset,	0	0
0 - 5%	15 - 20%	Full implementation of current action plan	<b><u>Low</u></b> (Same as above +): - Budget issue papers may be required for larger projects where business case exists (e.g. streetlights: \$4M with a simple payback of 8 years) - Prioritization of paybacks within life of asset,	\$5M – \$7.5M Avg. payback: 5 - 10 years	\$100,000
<b>10% Recommended New Target</b>	24%	Same as above + additional improvements from Corporate Energy and Asset Management Plans (2014)	<b><u>Low - Medium:</u></b> - Additional improvements supported by base operating and capital replacement budgets as part of improved asset management processes (i.e. facilities, fleet, equipment) - Budget issue papers maybe required for large projects where payback is within asset life - Use of proven technologies with some pilot projects testing of advanced applications	Same as above with no incremental cost increases expected	
15%	28%	Same as above plus more aggressive and innovative action plan	<b><u>Medium to High:</u></b> - Innovative actions may require significant new budget support - May include several actions without a payback or where payback exceeds asset life - Likely to involve use of advanced technologies which may have reliability and uncertainty implications	\$10M - \$15M Avg. payback: 10 - 15 years	\$250,000- \$500,000
20%	32%			\$15M - \$20M Avg. payback: 10 - 20 years	\$500,000- \$1,000,000

\*Any new costs would be subject to normal budget approval process. See page 5 and the Financial Implications section for further explanation.

Sample initiatives associated with each target level are included in Appendix B. All actions considered within the plan are based on the premise that they should provide multiple benefits in an economic, environmental, and social (community) context. This is an integral part of the Region's Sustainability Strategy in terms of the principle of balancing environmental considerations with financial responsibility and fulfillment of community needs via the delivery of high quality programs and services. The Corporate GHG Action Plan demonstrates this approach by focussing on what the Region of Waterloo is already doing and planning within its operations or program delivery and identifying different methods which reduce environmental impact and costs where possible while maintaining or improving current levels of service.

Although specific implementation costs for some actions are included in the attached progress report, it is important to note that these are not necessarily extra costs for "environmental" initiatives. In many cases the costs associated with the actions identified within this plan are embedded within existing budgets for regular maintenance and improvement of operations and services. Examples of this include:

- Capital replacement budgets for buildings and equipment (e.g. furnaces, boilers and lighting);
- Incorporation of improved fuel economy in life-cycle cost analysis for replacement/new vehicle purchases and optimization of overall fleet efficiency;
- Improvements in landfill gas management and waste diversion, wastewater treatment processes and management of biosolids.

Many actions will improve the maintenance and operation of assets such as facilities and vehicles which in turn can positively affect their performance and longevity (e.g. LED streetlights, use of biodiesel). Several actions will also reduce or avoid costs associated with energy/fuel consumption in addition to decreased emissions of air pollutants causing smog and related ill health effects (e.g. idling reduction equipment on fleet vehicles). Furthermore, all emission reductions achieved to date have utilized existing budgets including the Corporate Sustainability Fund, the resources allocated for Corporate Energy Office projects and capital replacement for equipment and facilities construction (e.g. LEED buildings). External sources of funding used by staff for implementing initiatives include rebates from local utility providers, grants for solar PV installations as well as the FCM Green Municipal Fund to name a few. Any additional funds to implement these projects will be subject to the normal budget approval process as required and any such requests for new funding, or to utilize existing approved funds, will include business cases relative to the cost/ benefit of the initiative.

Based on the approach outlined above, staff are recommending that the Region's Corporate GHG commitment be enhanced to a 10% *absolute* reduction target of emissions by 2019 compared to 2009 levels which translates to an *intensity* target of 24% reduction of emissions per capita. These enhanced targets are expressed in this manner with respect to two different GHG reduction programs:

- An absolute reduction target figure is used with reference to the Region's commitment to the FCM Partners for Climate Protection program. The attached progress report can be submitted for formal recognition for achieving the final milestones within this national program.
- Within the local Sustainable Waterloo Regional Carbon Initiative, the enhanced per capita intensity target would enable the Region attain Bronze *Pledging Partner* status (current status is *Observing Member*).

Although it is recognized that a 20% or greater reduction may be more desirable from a climate protection and sustainability perspective, at this time staff believe that a 10% absolute emission reduction target is still ambitious yet reasonably achievable. The 10% target can be achieved with the existing action plan along with the anticipated improvements related to the pending asset management and corporate energy plan both slated for completion by 2014. Updates to the Region's corporate GHG emissions inventory will continue to be provided to Regional Council every other year with respect to actual progress made in relation to the reduction target.

**CORPORATE STRATEGIC PLAN:**

Focus Area 1 - Protect and Enhance the Environment:

- Objective 2 – Reduce Greenhouse gas emissions and work to improve air quality

**FINANCIAL IMPLICATIONS:**

As indicated previously when Regional Council approved the Corporate GHG Action Plan, a significant portion of the financial resources within the current action plan exist within approved budgets (report CR-FM-11-011). Estimated incremental capital and operating costs were provided on the current action plan at that time. Those actions that require new financial support will follow the normal budget approval processes prior to implementation with priority given to those initiatives with strong business cases and where paybacks exist within the Region's useful life of the asset. Further details of estimated financial implications from implementation of the Corporate GHG Action Plan are included within Appendix A.

The energy savings referred to in Appendix A are generally used to help reduce program area operating budgets. Similarly, fleet and transit initiatives that result in fuel savings help to offset increased usage (i.e. kilometres driven or hours of operation) as well as offsetting increases in fuel costs. Additionally, the recent recommendation approved by Regional Council regarding the use of Solar PV Feed-In-Tariff revenue will bolster the implementation of the pending corporate energy conservation plan and is estimated to result in additional savings and cost avoidance over 20 years of \$6.26 million from a \$2.98 million investment (see report CR-FM-13-008). Using the projected average annual net revenue from the Region's installed FIT projects (\$149,000), a total of almost \$900,000 could be used to invest in future energy conservation and efficiency measures during the remaining time period of the Corporate GHG Reduction Plan (2014 – 2019).

There are no financial implications of changing the current *Observing* member status with Sustainable Waterloo's Regional Carbon Initiative to *Pledging* member status in terms of membership fees paid to the organization.

**OTHER DEPARTMENT CONSULTATIONS/CONCURRENCE:**

Development of this report included consultation with the Environmental Leadership Committee with representation from all seven Regional departments.

**ATTACHMENTS:**

Appendix A: Progress Report: Region of Waterloo's Corporate GHG Emission Reduction Plan  
(Attachment distributed separately)

Appendix B: Examples of Actions to Achieve Corporate GHG Emission Targets

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**APPROVED BY:** Gary Sosnoski, Commissioner, Corporate Resources

**Appendix B**  
**Examples of Actions to Achieve Corporate GHG Emission Targets**

<b>Timeframe - %Target from Base Year</b>	<b>GHG Emissions (Tonnes)</b>	<b>Sample Projects to Achieve Emission Reduction Target</b>
2009 Base Year	147,743	
2019 Forecast (no action)	180,143	
0% reduction by 2019 (Current plan implemented between 2010 – 2013)	147,743	Green bin diversion, solar flaring at landfill, changes in wastewater and biosolids management operations and practices (e.g. installation of dewatering equipment, decommissioning biosolids lagoon, diverting dried cake from landfill to agricultural land application), photovoltaic installations (2011/2012), heat recovery at Sunnyside, interior lighting retrofits at office buildings (2010 - 2012).
5% reduction by 2019 (Current plan implemented between 2014 – 2019)	140,356	Biodiesel in GRT, expansion of fleet telematics pilot project, aggressive right-sizing for vehicle purchases as standard procedure; centralized fleet pool (post fleet program review), increased emphasis of staff Travelwise program (coinciding with full employee pay parking in 2014), streetlight replacement with LED technology, further lighting retrofits and HVAC upgrades in buildings.
10% reduction by 2019 (Implementing new Corp. Energy and Asset Mgmt. Plan in facilities/fleet, expanding pilot projects where feasible)	132,969	Expanding use of heat recovery units in buildings, solar thermal for hot water at Sunnyside, Asset Management processes involving optimized energy performance in existing buildings (e.g. higher building envelope standards improving roofs/windows etc.), use of a solar wall for heating in a new LEED building, expansion of anti idling pilot project in fleet, pilot plug-in electric vehicles in Regional fleet.
15% reduction by 2019	125,582	Co-generation/district energy/combined heat and power at a cluster of Regional buildings, ground mount solar PV (e.g. Airport), piloting use of stationary hydrogen fuel cells as power source, more use of geothermal where appropriate.
20% reduction by 2019	118,194	