

Clause 2 in Report No. 16 of Committee of the Whole was adopted, without amendment, by the Council of The Regional Municipality of York at its meeting held on October 15, 2015.

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## 2014 Corporate Energy Report

Committee of the Whole recommends adoption of the following recommendation contained in the report dated April 14, 2015 from the Commissioner of Environmental Services.

### 1. Recommendations

It is recommended that this report be received for information.

### 2. Purpose

This report provides Council with an update on greenhouse gas emissions from Regional operations along with associated energy consumption. It also provides an overview of current energy conservation and greenhouse gas management activities.

### 3. Background

This report meets the greenhouse gas reporting requirements of the Regional Official Plan, Sustainability Strategy and the Corporate Air Quality Strategy

The Corporate Energy Report has been prepared annually since 2006 to provide insight into trends for greenhouse gas emissions from energy consumption by Regional operations. The report also fulfills the greenhouse gas tracking requirements of the Region's Sustainability Strategy (2007), Corporate Air Quality Strategy (2008) and Regional Official Plan (2010).

This report meets and exceeds energy reporting requirements of Ontario's *Green Energy Act, 2009*

Ontario Regulation 397/11, made under the *Green Energy Act, 2009* requires all public agencies to publish annual energy consumption for prescribed facilities. *Attachment 1* provides a summary of York Region's submission of 2013 data that was provided to the Ministry in advance of the July 1, 2015 deadline.

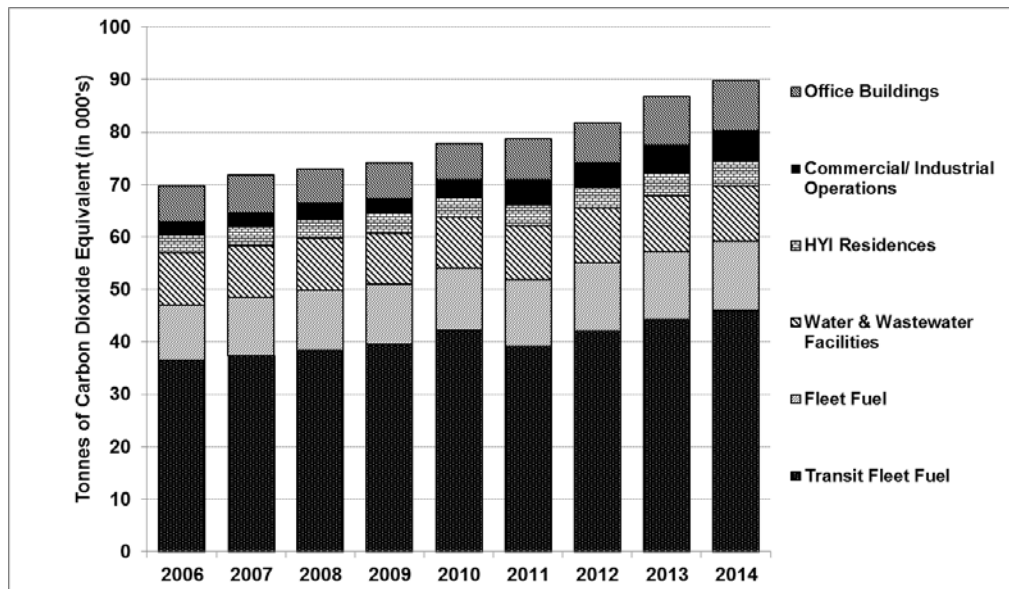
The scope of reporting in Ontario Regulation 397/11 is prescriptive and reports just 13 per cent of the Region's total greenhouse gas emissions as compared to the Corporate Energy Report. This Corporate Energy Report goes beyond the regulated reporting requirements and summarizes additional energy use, such as fleet fuel, public housing, streetlights, Regional facilities operated by third parties (i.e. Waste Management Centre, etc.) and estimations for leased properties and business related travel in personal vehicles.

#### 4. Analysis and Options

Greenhouse gas emissions from Regional operations totaled 89,957 tonnes in 2014; equivalent to annual emissions from 18,000 light passenger vehicles

Greenhouse gas emissions from Regional operations are linked to the consumption of energy. The trend of corporate greenhouse gas emissions by operation type from 2006 to 2014 is depicted in Figure 1. During this period, emissions increased by 29 per cent, or 3.2 per cent annually, reaching 89,957 tonnes in 2014. In contrast, the Regional population increased by 21 per cent, or 2.4 per cent annually over the same period.

**Figure 1  
Greenhouse Gas Emissions by Operation, 2006 – 2014**

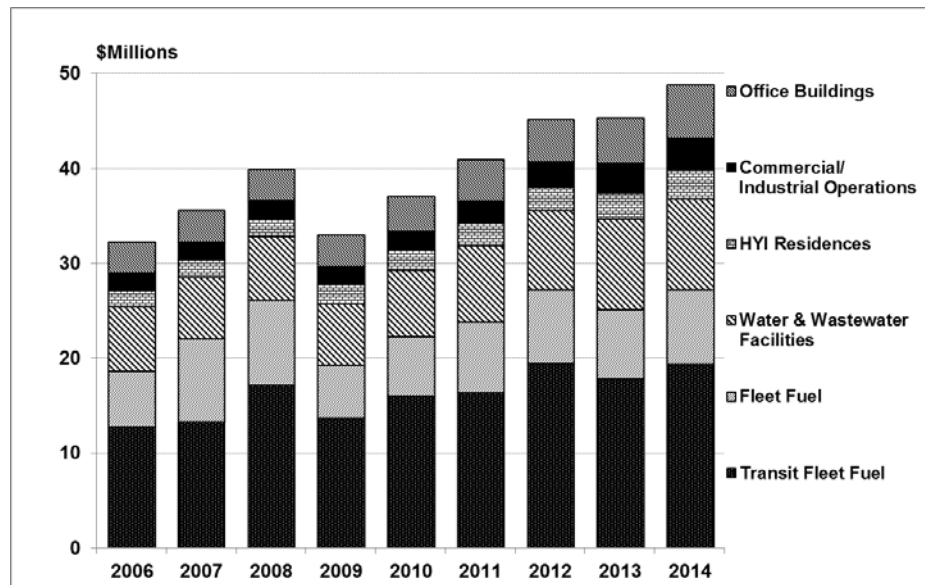


Vehicle fuels account for two-thirds of the Region's total greenhouse gas emissions. Transit vehicle fuel emissions were the largest single contributor to Regional emissions. Overall reductions, however, in community generated greenhouse gases from migration to transit (and away from passenger vehicles) is estimated to be approximately 40,000 tonnes, which offsets emissions generated by transit operations. The balance of the Region's greenhouse gas emissions are driven by electricity (20 per cent) and natural gas (14 per cent).

Energy costs due to Regional operations totalled \$48.8 million in 2014

As might be expected with the growth York Region continues to experience, energy use and the costs associated with procuring energy continues to rise. Energy use for Regional operation totalled \$48.8 million in 2014. An overview of energy costs trends is depicted in Figure 2.

**Figure 2**  
**Energy Costs Trend by Operation, 2006 – 2014**



In 2014, three factors accounted for the majority of the Region’s increase in energy costs: rising electricity prices, rising fuel prices, and higher fuel consumption. Vehicle fuels represented 56 per cent (\$27 million) of the total 2014 Regional expenditure on energy. Electricity was second at 37 per cent (\$18 million). Natural gas for heating (including propane) and water use in Regional facilities were relatively small components of total energy cost.

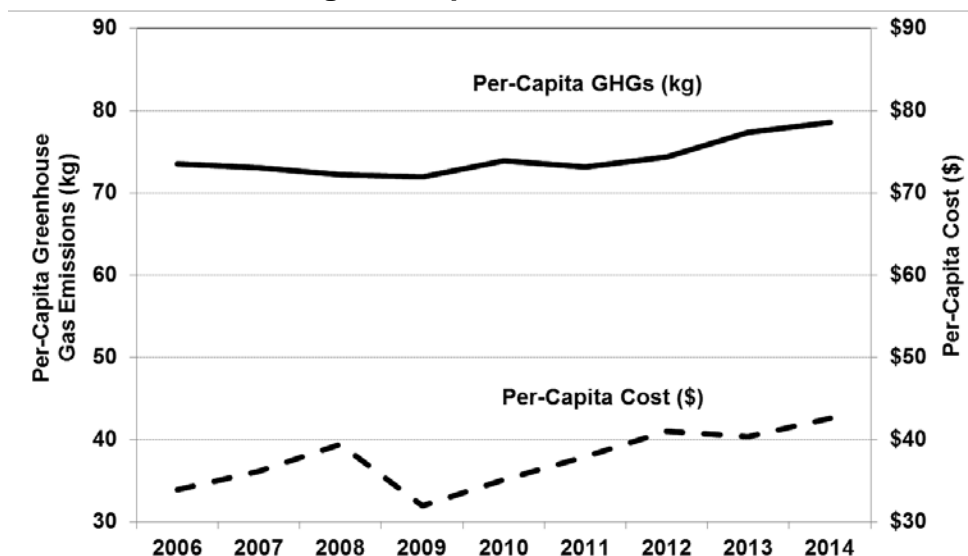
Fuel prices fell sharply in 2009 due to the global economic recession. Even though there was a reduction in some commodity prices like natural gas, the Region’s total energy consumption increased annually; consequently greenhouse gas emissions continue to rise year over year as depicted in Figure 1.

Per-capita greenhouse gas emissions for municipal operations were steady from 2006 to 2011, but emissions growth has outpaced population growth since 2012

York Region’s population has been growing at an average rate of 2.4 per cent annually since 2006. Growth in services and infrastructure are driven by population growth, however the Region’s services cannot always scale up to meet service demands in the same way. Some services, such as water, wastewater and transit increase in steps that result in overall higher greenhouse gas emissions due to fixed energy requirements needed to deliver the expanded services (i.e. new transit routes, pumping stations, etc.). It is informative to normalize energy costs and greenhouse gas emissions from Regional operations against the population to understand the intensity of energy required to deliver a particular service. Figure 3 and Table 1 show the trend in per-capita annual

greenhouse gas emissions and energy cost. The upward trend in the per-capita greenhouse gas emissions shows that emissions are growing at a pace that is greater than the population served.

**Figure 3**  
**Per-Capita Energy Cost and Greenhouse Gas Emissions**  
**from Regional Operations, 2006 – 2014**



**Table 1**  
**Per-Capita Energy Cost and Greenhouse Gas Emissions**  
**from Regional Operations, 2006 – 2014**

	2006	2007	2008	2009	2010	2011	2012	2013	2014	Year Over Year Rate of Change
<b>Population (in millions)‡</b>	0.95	0.98	1.01	1.03	1.05	1.08	1.10	1.12	1.15	2.4%
<b>Energy cost</b>	\$32.3M	\$35.6M	\$39.9M	\$33.0M	\$37.0M	\$40.9M	\$45.1M	\$45.3M	\$48.8M	5.3%
<b>- Per capita</b>	\$33.96	\$36.17	\$39.43	\$31.95	\$35.11	\$37.98	\$41.03	\$40.34	\$42.65	2.9%
<b>GHGs (tonnes)</b>	69,826	71,824	73,076	74,268	77,862	78,808	81,763	86,737	89,957	3.2%
<b>- Per capita (kg)</b>	73.5	73.1	72.2	71.9	73.9	73.1	74.3	77.3	78.6	0.8%

‡ Based on year-end estimates from the Region's Long Range Planning Branch (rounded to the nearest 1000). The model was revised to reflect Statistics Canada's official undercount adjusted population which also impacted the 2011 and 2012 population estimates included in previous reports.

Following a number of years where growth in greenhouse gas emissions kept pace with population growth, in 2012 greenhouse gas emissions growth began to outpace population growth. This growth is predominantly the result of the Region's expansion of transit services. Although Regional sources of emissions growth are not desirable, the overall effect of increasing transit service and ridership should be considered a net positive when it results in fewer single

occupant vehicles on the road over time and reduced overall emissions in York Region.

New department-specific intensity measures are being used to provide deeper insight into greenhouse gas impacts of Regional service growth and changes

Population growth is a key driver of service growth, but population growth doesn't specifically drive energy consumption or greenhouse gas emissions growth. For example, the number of buildings occupied by the Region does not necessarily increase because the population of the Region increases. Therefore, building energy use per square foot or square metre is an effective way to measure efficiency. Per-capita measures of building energy consumption are affected by changes in population, regulations, and customer demands but are not direct measures of building performance. To better account for the impact of growth on the Region's key services, new greenhouse gas metrics were developed in consultation with staff from each department. Drivers for these metrics are summarized in Table 2 by type of service.

**Table 2  
Energy Metrics by Service Type**

<b>Service</b>	<b>Driver</b>
Buildings	Area
Police Services	Number of Front-Line Police Officers
Paramedic Services	Number of Front-Line Paramedics
Transit Fleets	Paying Customers
Social Housing	Residential Units
Water & Wastewater	Megalitres pumped

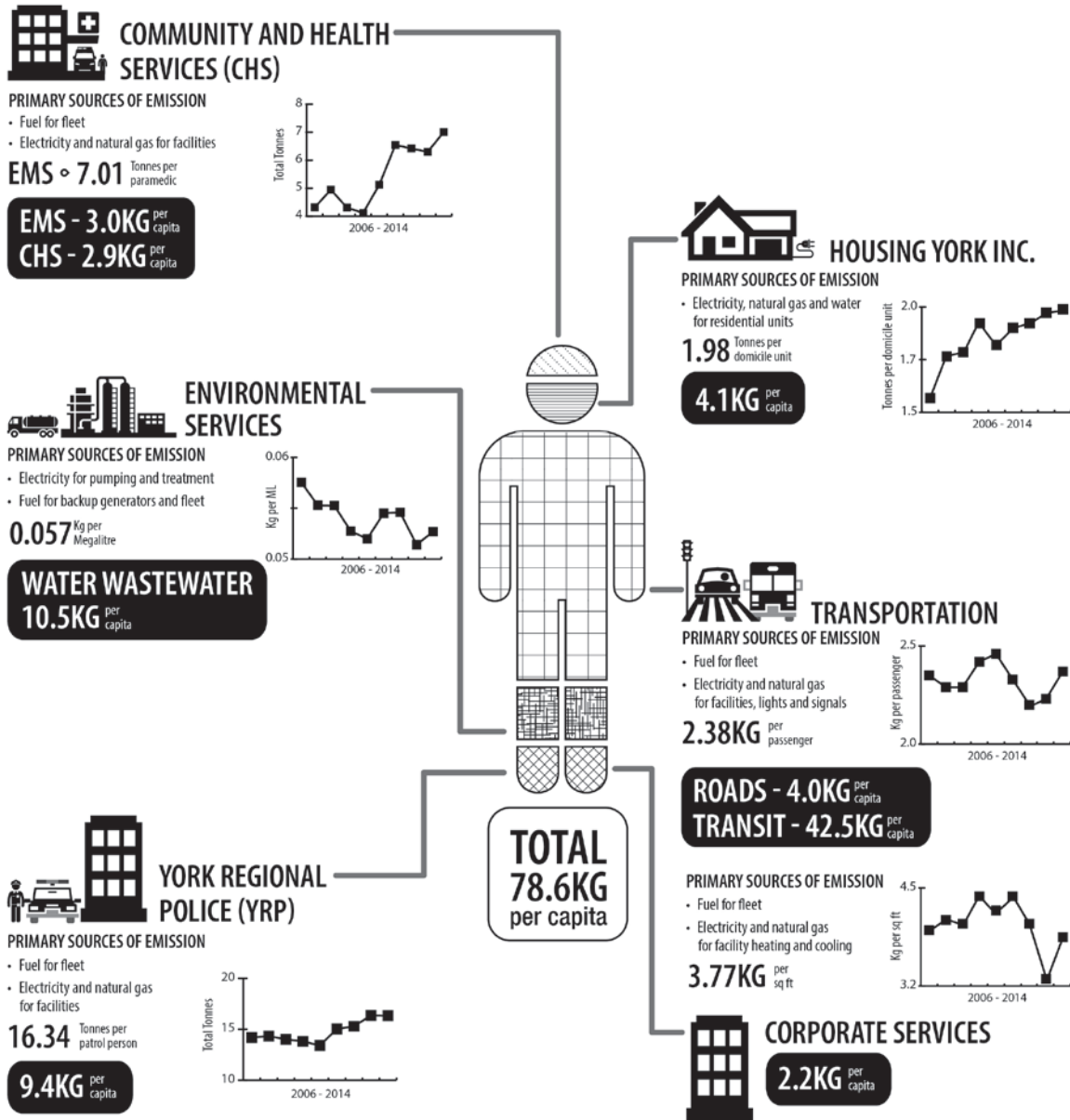
Service oriented metrics help the Region better understand changes in greenhouse gas emissions in relationship to its core drivers. Discussions are continuing internally to understand the implications of the new metrics and to fine-tune them to better reflect Regional services that are the primary emitters of greenhouse gas. Staff will also conduct further analysis to understand how some Regional services offset community sources of greenhouse gas emissions. Absolute emissions are still most important, and their reduction is still the objective, but these intensity metrics will provide better insight into where the Region can target its efforts.

Regional greenhouse gas emissions in 2014 equate to 78.6 kilograms per resident

Figure 4 shows Regional emissions per resident in 2014. Included with the per-capita emissions by operation are department specific intensity measures that will assist the Region in further identifying opportunities for efficiencies.

Greenhouse gas emissions continue to increase on a per-capita basis as shown in Figure 4. Individual intensities, illustrated by the operational graphs, show that some intensities are falling. Transit and water and wastewater present areas of greatest opportunity to explore innovative ways to reduce energy consumption. Efforts are already underway in these heavily regulated industries to minimize environmental impacts through demand management, emissions reductions, and evaluation of alternative fuels. At the same time, opportunities exist in every department to become more efficient as the main objective is to reduce absolute greenhouse gas emissions. Metrics will continue to be refined to align with the Corporate Strategic Plan and external benchmarking programs to assess the performance of Regional services against other Canadian municipalities.

**Figure 4**  
**2014 Greenhouse Gas Emissions from Regional Services**



**HOW MUCH ENERGY DOES IT TAKE TO PROVIDE SERVICES TO A RESIDENT FOR A YEAR?**

2014 POP. 1,144,760  
 TOTAL EMISSIONS 89,957 TONNES



The Region employs multiple strategies to ensure effective energy and environmental stewardship

The following section summarizes Regional initiatives that focus on energy conservation, demand management, and energy production.

Energy from waste facility will generate electricity and reduce amount of municipal waste that will be directed to landfill

At full capacity, the Durham York Energy Centre will generate up to 17,000 kW of electricity, divert up to 140,000 tonnes per year of residual municipal waste from landfill, and reduce greenhouse gas emissions by from non-corporate sources by approximately 24,000 tonnes per year. Non-corporate sources of greenhouse emissions include transportation of waste and fugitive emissions of methane from landfills. These emissions are not included in corporate accounting of greenhouse gas emissions or this report. York Region owns 21.4 per cent of the facility and will account for 30,000 tonnes of the total 140,000 tonnes per year of residual municipal waste consumed by the facility to generate electricity. Revenues from the sale of electricity to the electricity grid will help to offset the Region's cost of waste disposal.

Sustainable buildings generate a continuous stream of energy conservation and avoided greenhouse gas emissions

In 2006, Council approved a sustainable building policy that requires all buildings over 500 m<sup>2</sup> to achieve LEED Silver certification or better. Ten projects are in progress that are expected to earn LEED – Silver certification or higher, which will bring the Region's total LEED certified building stock up to twenty-two. It is estimated that LEED buildings consume 35 per cent less energy than an equivalent building that is built to the minimum building code standard. Sustainable buildings generate energy savings and reduce greenhouse gas emissions over the entire useful life of the building.

Trees in the Region's urban municipalities sequester 39,979 tonnes of carbon annually

The Region supports local municipalities in the completion of Urban Forest Studies to better understand the carbon sequestering function of trees in the Region. The results for the urban municipalities (Cities of Markham and Vaughan, Towns of Aurora, Newmarket and Richmond Hill) have indicated that trees in these municipalities sequester 39,979 tonnes of carbon annually.

Energy audits at eight water and wastewater facilities were conducted

The Region received \$42,500 from the saveONenergy program to help fund energy audits at eight water and wastewater facilities. The final report identifies opportunities for the Region to become more efficient in its water and wastewater operations such as energy-water modeling for Maple and Richmond Hill pumping stations, in addition to capital upgrades such as turbo blower installation and flow pacing UV disinfection at Keswick Water Resource Recovery Facility.

Initiatives are in progress to address emission from fleet fuels; the Region's single largest generator of greenhouse gas emissions

Fleet fuels account for almost two-thirds of the Region's annual emissions. Initiatives are in progress to conserve energy and optimize services with anti-idling technology, fleet optimization software, higher efficiency vehicles, and locating bases of operation like EMS stations closer to the populations that are being served.

Net greenhouse gas savings provided by YRT/Viva service through reduction of private vehicle use was approximately 40,000 tonnes in 2014

In accordance with the Region's Sustainability Strategy, YRT/Viva began the use of bio-diesel for its Viva fleet in 2007 and is currently exploring opportunities for other alternative fuels such as diesel-electric, natural gas, and new propulsion technologies.

York Region Transit has implemented programs to reduce the number of transit vehicles duplicating service with its family of services and, in 2013, implemented an anti-idling program.

Region's capacity to generate clean zero-emission electricity increases by 165 kW with completion of two more solar photovoltaic projects

Two projects, one at 90 Bales Drive, East Gwillimbury and the other at the Georgina Water Treatment Plant, have increased the Region's capacity to generate electricity by 165 kW by harnessing the sun's energy. Annual revenue through the sale of clean zero-emission electricity back to the electricity grid is projected to yield \$120,000 annually for the Region. At the time of writing, these installations have generated over \$48,500 in revenue since being commissioned in March 2015.

Natural gas strategy development by the Region is on track to be implemented by November 2015

In June 2015, Council approved increased participation in the Association of Municipalities of Ontario's natural gas buying group and negotiation of terms that would provide the Region with more control over its own natural gas procurement strategy. The Region will benefit by using a strategy tailored to its specific needs and changes. The Region is on track to have all of the necessary arrangements finalized to implement its natural gas buying strategy by November 1, 2015.

A more detailed Energy Conservation and Demand Management Plan is required to meet long-term Council objectives

Through the Regional Official Plan and Vision 2051, Council has expressed a desire to take a leadership position on energy conservation and greenhouse gas emissions reductions. Moving towards zero greenhouse gas emissions by 2051 has been outlined as an action in Vision 2051. To effectively make progress on this ambitious goal, a detailed plan is now being developed with short and long term actions and targets. The plan will include: conservation goals and objectives, proposed conservation measures, estimated costs and benefits, and renewable energy initiatives. The plan will identify a series of projects and programs with estimated greenhouse gas reductions and associated costs, along with a greenhouse gas emissions model and an ongoing monitoring program.

The plan will propose a baseline for Regional service delivery and systemic metrics for verifying project performance. The Region has also begun to revisit its past sustainable building projects to verify the performance of LEED building energy performance.

Established initiatives such as the Partners for Climate Protection through the Federation of Canadian Municipalities will also be revisited as part of the process to evaluate this initiative or other options for effectively monitoring and reporting the Region's energy consumption and production of greenhouse gas emissions.

The Energy Conservation and Demand Management Plan will be brought to Council in Q2 2016.

Region has identified potential opportunities to generate an additional 1,300 kW of electricity using clean zero-emission solar energy at its facilities

An additional 1,300 kW of solar generating opportunities has been identified at Regional facilities. The Region is in the process of consulting stakeholders, developing a business case, and preparing submissions to the Independent Electricity System Operator (IESO) for evaluation.

### Link to Key Council – approved Plans

Monitoring and mitigating energy consumption and greenhouse gas emissions from Regional operations are a key aspect of the Regional Official Plan, Sustainability Strategy and the Corporate Air Quality Strategy. Mitigation measures such as target-setting, efficiency retrofits, dedicated funding and renewable energy are specifically encouraged.

The Strategic Plan has related objectives including:

- Ensuring a fiscally prudent and efficient Region
- Stewardship of the Region's assets
- Strengthening organizational capacity and effectiveness

## 5. Financial Implications

Current conservation and demand management initiatives are funded through the tax levy. In 2014, Corporate Energy Services spent \$473,000 on initiatives such as existing building energy retrofits, sub-metering and solar array design. Additional initiatives were undertaken through funding that was embedded in other departmental budgets. Examples of this include building to LEED standards and end-of-life-cycle building retrofits.

Implications of carbon cap-and-trade to be assessed

Carbon cap-and-trade, which was introduced by the Province in 2015, could be a financial risk to the Region for its future energy procurement. Details of the program are expected in Q1 2016. Staff will monitor this program and report to Council on the implications for the Region when more details are available.

An effective strategy to mitigate additional cap-and-trade costs on energy is to consume less energy. The long-term Energy Conservation and Demand Management Plan being developed will include reduction targets that will serve to mitigate the Region's potential cap-and-trade costs.

## 6. Local Municipal Impact

The Region's energy management activities benefit residents and local municipalities by reducing operating costs and demands on infrastructure, mitigating environmental impacts, providing an advisory outreach role and promoting sustainable practices.

The Region will build upon initial efforts to continue a dialogue with local municipalities to exchange information, share experiences and best practices, and compare initiatives for reducing energy consumption and greenhouse gas emissions.

## 7. Conclusion

In 2014, Regional energy costs totaled \$48.8 million and produced 89,957 tonnes of greenhouse gas emissions. Transit was the largest single driver of corporate emissions, but with density and migration to transit (and away from single occupant vehicles), community greenhouse gas emissions were reduced by an estimated 40,000 tonnes. Since 2006, Regional emissions have increased by 3.2 per cent annually to serve a population that has grown by 2.4 per cent over the same period. Emissions growth outpaced population growth in part because implementing some services needs to precede demand (i.e. transit availability, water and wastewater services, etc.). As the population continues to grow, per-capita corporate emissions will stabilize and may even start to decline due to existing Regional strategies and initiatives, provincial policy, and new technology.

Addressing climate change requires a targeted approach that will bend the curve even further toward greater greenhouse gas reductions. Staff are developing a long-term Energy Conservation and Demand Management Plan including new funding mechanisms, and with greenhouse gas reduction targets that consider service growth in anticipation of this greater need.

For more information on this report, please contact David Szeptycki, Head of Strategy, Liaison and Policy Implementation at ext. 75723.

The Senior Management Group has reviewed this report.

April 14, 2015

Attachment

#6335106

Accessible formats or communication supports are available upon request

**Summary of O. Reg. 397/11 Public Sector Report - 2015 Submission  
2013 Energy Consumption**

Facility Type	# Utility Accounts	Electricity (kWh)	Natural Gas (m <sup>3</sup> )	Propane (L)	Total GHG Emissions (T)
Administrative Offices	27	11,874,961	803,735	2,216	2,426
Ambulance Stations and associated facilities	8	1,471,088	182,117		456
Sewage Pumping	25	25,056,105	43,848		1,987
Water Pumping	57	22,645,422	38,590		1,794
Sewage Treatment	8	10,590,260	187,775		1,160
Water Treatment	10	3,232,779	187,979		601
Police Stations and associated facilities	11	7,472,383	851,222	29,093	2,222
Storage and maintenance facilities for equipment and vehicles	5	945,791	124,658		307
<b>Total</b>	<b>151</b>	<b>83,288,788</b>	<b>2,419,925</b>	<b>31,309</b>	<b>10,953</b>