

Clause 12 in Report No. 12 of Committee of the Whole was adopted, without amendment, by the Council of The Regional Municipality of York at its meeting held on September 22, 2016.

12  
2015 Corporate Energy Report

Committee of the Whole recommends adoption of the following recommendation contained in the report dated August 12, 2016 from the Commissioner of Environmental Services:

1. This report be received for information.
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Report dated August 12, 2016 from the Commissioner of Environmental Services now follows:

1. Recommendation

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 and costs. This annual report also discusses initiatives undertaken by the Region to achieve goals set out in the Energy Conservation and Demand Management Plan.

3. Background

Region is making progress towards emissions reduction targets set in the Energy Conservation and Demand Management Plan

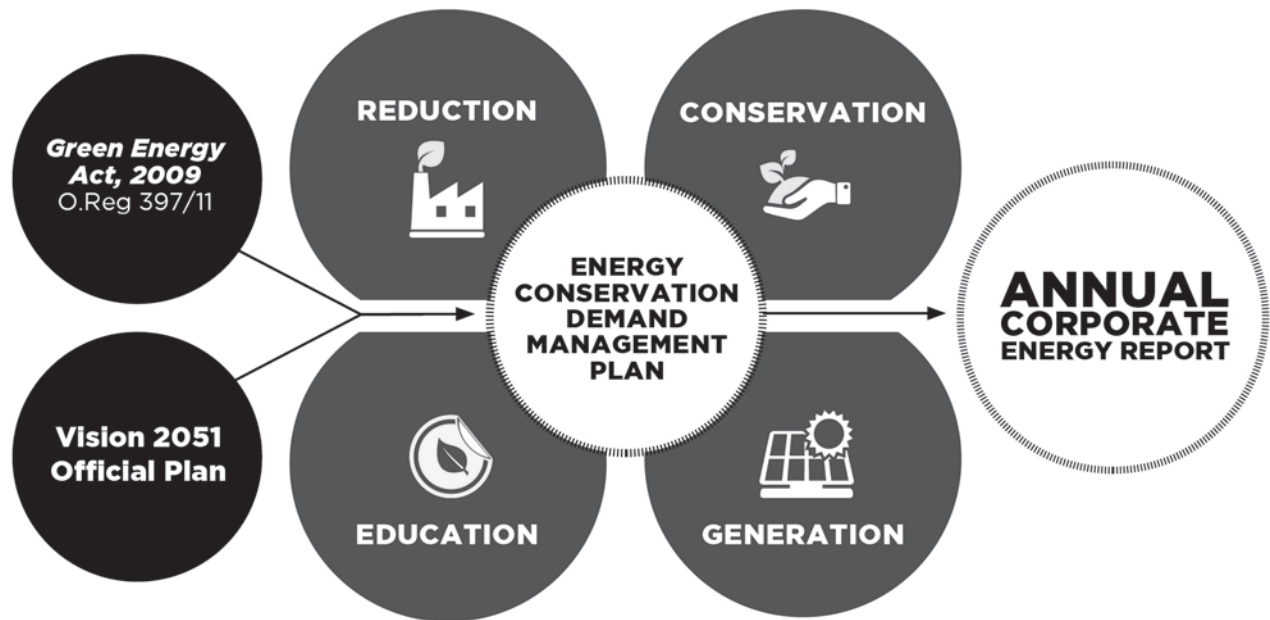
The Energy Conservation and Demand Management Plan (the Plan), endorsed by Council May 19, 2016, is a legislative requirement as part of the *Green*

*Energy Act, 2009* and Ontario Regulation 397/11. The Plan sets targets for greenhouse gas emissions inspired by Vision 2051 and its goal of moving the Region toward zero emissions from Regional operations.

While the Corporate Energy Report is not legislatively required, it has been prepared annually for Council since 2006. With the advent of the Plan, the Corporate Energy Report has become the primary tool that tracks annual progress toward the Region's greenhouse gas emissions targets.

Achieving a long-term goal requires near-term targets and commensurate financial investments. Annual measurement and reporting of performance provides transparency to stakeholders that investments are achieving desired financial returns, achieving conservation, and reducing greenhouse gas emissions. Figure 1 below shows how Provincial policy and Regional strategic guidance documents drive on-the-ground actions that are summarized in the annual Corporate Energy Report.

**Figure 1**  
**Annual Corporate Energy Report**

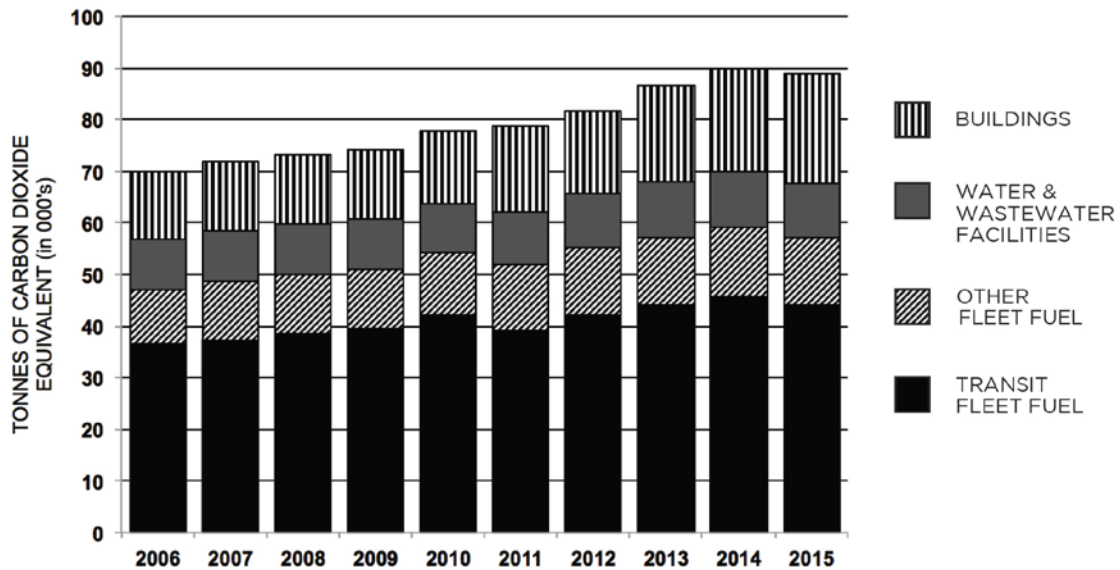


#### 4. Analysis and Options

Greenhouse gas emissions from Regional operations totalled 88,963 tonnes in 2015

In 2015, total corporate emissions linked to the consumption of energy for Regional operations totalled 88,963 tonnes. Figure 2 shows the trend and breaks down total emissions by operation from 2006 to 2015.

**Figure 2  
Greenhouse Gas Emissions by Operation, 2006 – 2015**



Regional greenhouse gas emissions fell in 2015, but the short-term future trend is anticipated to increase

Total Regional emissions in 2015 were 1.1 per cent lower than 2014 levels. By contrast, forecasted Energy Conservation and Demand Management Plan emissions anticipate an increase in emissions over the next 15 years to support projected Regional growth. Differences between actual and forecasted results are expected, but the anticipated trend for greenhouse gas emissions from Regional operations is anticipated to grow over the next 15 years.

Emissions from Transit operations dropped in 2015 due to route optimization

Vehicle fuels account for 64 per cent of the Region’s total greenhouse gas emissions, with Transit vehicle fuel being the largest single contributor (49 per cent of the total). In 2015, greenhouse gas emissions from Transit operations fell as a result of route optimization. Consumption by the Region of all other commodities (electricity, natural gas, and gasoline) increased over 2014 volumes.

The balance of the Region's greenhouse gas emissions are driven by electricity and natural gas consumption. Consumption of both electricity and natural gas increased by 3 per cent and 2 per cent respectively due to two large Regional facilities (9060 Jane Street and 55 Orlando Avenue) that began full scale operations in 2015.

Regional growth will put upward pressure on emissions as services expand to meet future demand

Emissions are anticipated to grow again in the short-term as services increase to meet future Regional growth, but at a slower rate as conservation and optimizing programs are implemented. In Regional centres and corridors where services can be concentrated in joint facilities within compact, complete communities that are home to more people and jobs per hectare, the Region will gain energy efficiencies for service delivery. Growth outside of centres and corridors will mean that transit buses, police officers, and ambulances will need to travel further from established bases, and water and wastewater may need to be pumped further for distribution and treatment. As part of the Region's commitment to deliver high quality service to all residents, innovative or alternative service delivery models will be considered to minimize the impact that growth will have on greenhouse gas emissions such as using smaller transit vehicles when possible. As greenhouse gas reduction programs identified in the Energy Conservation and Demand Management Plan are implemented and population growth materializes, emissions will decrease in the long-term.

Per capita key performance indicators are commonly used by municipalities, like the Region, that are experiencing significant population growth to assess program efficiency. Normalizing corporate emissions by population shows the impact York Region's actions have, even though emissions are projected to increase as services expand to meet population growth.

Intensity measures provide deeper insight into greenhouse gas impacts of Regional service growth and changes

Population growth is a key driver of service growth, but is not necessarily an accurate measure of service performance. For example, the number of transit routes operated by Transit does not necessarily increase because the population increases. Additional passengers serviced by existing routes achieve better economies of scale and provide community offsets by displacing passenger vehicles. Conversely, expanded routes can increase greenhouse gas emissions through fuel consumption until a critical mass of ridership is achieved.

The Environmental Commissioner of Ontario's *Annual Energy Conservation Progress Report – 2015/16* sets out recommendations for measuring service delivery performance. Service oriented metrics help the Region to better understand changes in performance in relationship to each service area's core drivers and to evaluate service energy performance year-over-year. York Region's metrics were developed in consultation with staff from each department and are summarized in Table 1 by type of service.

**Table 1  
Drivers for Energy Metrics by Service Type**

<b>Service</b>	<b>Driver</b>	<b>Metric*</b>	<b>Rationale</b>
Buildings	Area	KG eCO <sub>2</sub> /ft <sup>2</sup>	Area directly impacts amount of energy required to heat, cool, and illuminate buildings.
Police Services	Number of Front-Line Police Officers	KG eCO <sub>2</sub> /officer	Number of front-line staff influences the number of vehicles being driven and facilities built and operated.
Paramedic Services	Number of Front-Line Paramedics	KG eCO <sub>2</sub> /paramedic	It also means an increase in administrative staff and functions needed to support front-line staff.
Transit Fleet	Passengers	KG eCO <sub>2</sub> /passenger	Routes are designed according to anticipated passenger demand.
Social Housing	Domicile Units	KG eCO <sub>2</sub> /Domicile Unit	Number of domicile units in a building will drive energy consumption (e.g. heating/cooling, illumination, etc.)
Water & Wastewater	Volume pumped and treated	KG eCO <sub>2</sub> /Megalitre	Volume of water and wastewater to pump and treat drives energy consumption needed to provide the service.

\*eCO<sub>2</sub> (equivalent carbon dioxide) is a measure of global warming potential by greenhouse gas emissions relative to carbon dioxide

Total corporate emissions are measured on a per capita basis because serving residents is the primary driver of the Region's energy consumption.

Typical municipal corporate emissions are one to three per cent of the total community emissions

The International Council for Local Environmental Initiatives Canada estimates typical municipal operations, both upper and lower tier, amount to an estimated one to three per cent of total community greenhouse gas emissions. Figure 3 breaks down community and municipal emissions by proportion and sources.

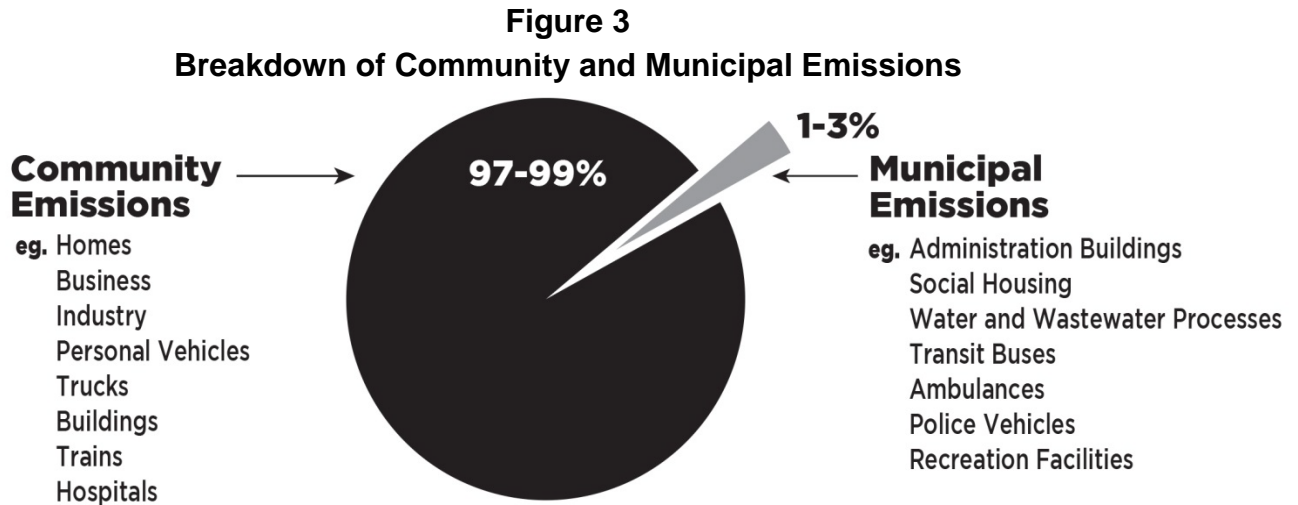
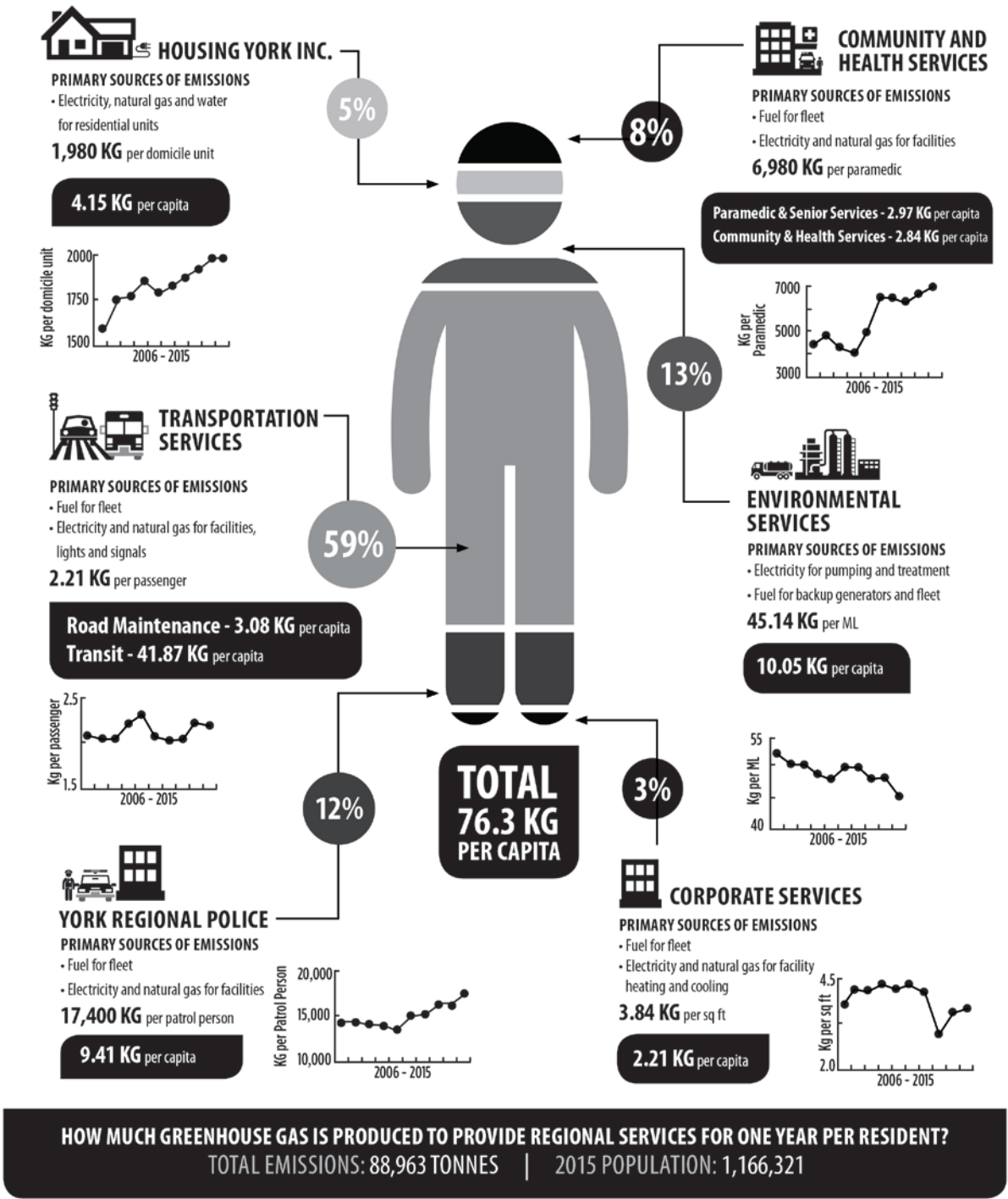


Figure 4 summarizes department specific energy intensity measures for the less than one to three per cent of total community emissions that are the result of Regional service delivery in 2015.

Figure 4



2015 Per Capita Greenhouse Gas Emissions from Regional Corporate Services



Greenhouse gas emissions from Regional operations were 76.3 kilograms per resident in 2015

Demand and delivery of Regional services in 2015 resulted in greenhouse gas emissions of 76.3 kilograms per resident; a reduction of 2.9 per cent from 2014. This reduction resulted from efforts to reduce greenhouse gas emissions that were initiated across the entire corporation. Notable successes in support of greenhouse gas emissions reductions are summarized in Table 2.

**Table 2**  
**2015 Greenhouse Gas Reduction Accomplishments**

<b>Accomplishments</b>	<b>Department</b>
<p><b>Administrative Centre Renovation</b> Improved environmental conditions and energy efficiency through efficient lighting, motors, and improved controls in former York Regional Police space</p>	Corporate Services and Environmental Services
<p><b>Solar Array Installation</b> A total of 165kW additional generating capacity</p>	Corporate Services
<p><b>Transit route optimization</b> Conserved 684,000 litres of diesel fuel, which avoided 1,800 tonnes of greenhouse gas emissions</p>	Transportation Services
<p><b>Transit bus upgrades</b> Installed shift-optimization transmission software Overhaul of older bus units Electric cooling fan upgrades</p>	Transportation Services
<p><b>Tenant Engagement Workshops</b> Pilot at Housing York Inc. residences highlighted impact of behaviour (e.g. turn off lights/appliances, adjust thermostats, etc.) on energy consumption and cost Measured energy consumption at the pilot facility dropped by 9 per cent immediately after workshops</p>	Community and Health Services
<p><b>Improving Fleet Efficiency</b> Installed anti-idle technologies, invertors, supplemental heating systems, LED lighting and accessory batteries that provide full function of equipment without the need to idle vehicles</p>	Transportation Services

<b>Accomplishments</b>	<b>Department</b>
<p><b>Sewage Pump Improvements</b></p> <p>Aurora Sewage Pump Upgrade, reduced electricity consumption by approximately 20 per cent</p> <p>Newmarket Pump Optimization, scheduled pump operations to optimize energy efficiency</p>	Environmental Services
<p><b>Bill Fisch Forest Stewardship and Education Centre</b></p> <p>Built to earn LEED® Platinum certification and to achieve the Living Building Challenge and received the Professional Engineers of Ontario, York Chapter, 2015 Engineering Project of the Year</p>	Environmental Services and Corporate Services
<p><b>Sustainable Building Certifications</b></p> <p>Administrative Centre earned the LEED® Silver - Existing Building Operations and Maintenance</p> <p>Roads/York Regional Police Operations Centre earned the BOMA BEST® – Gold certification</p> <p>Twelve facilities working toward minimum LEED® Silver through design and construction</p>	Environmental Services and Corporate Services
<p><b>Energy Conservation and Demand Management Plan</b></p> <p>Completed an update that sets multi-year greenhouse gas emissions reduction targets to 2051</p>	Environmental Services with support from all departments

Regional programs not measured by the Corporate Energy Report also reduce or offset community emissions

In addition to reducing emissions from Regional operations, the Region implements a number of programs that reduce greenhouse gas emissions from the broader community.

The Durham York Energy Centre was commissioned in January 2016. The facility has the potential to generate up to 17 MW using household garbage. In addition to generating revenue that will offset tipping fees, the facility reduces emissions produced by trucks transporting garbage to distant landfills and eliminates fugitive landfill gas emissions.

York Region's forest cover is certified by the Forestry Stewardship Council and has the capacity to sequester approximately 35,000 tonnes of CO<sub>2</sub> each year.

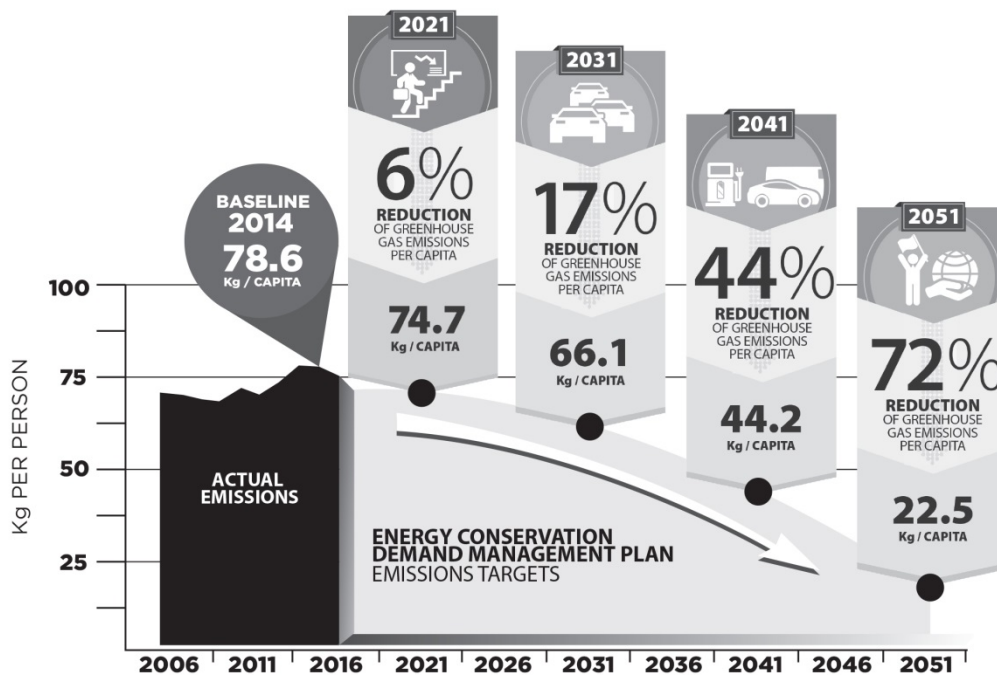
Transit reduces the number of single occupant vehicles on Regional roads. In 2014, this reduction was estimated to equate to 40,000 tonnes of greenhouse gas emissions that were avoided by transit riders.

Energy Conservation and Demand Management Plan process was initiated in 2015 and completed in Q2 of 2016

The process to deliver a comprehensive Energy Conservation and Demand Management Plan was initiated in 2015 and completed in Q2 of 2016. Through the Plan process, Regional staff identified programs and initiatives to be implemented over the next 35 years that will help the Region achieve its emissions targets.

Figure 5 shows the actual per resident trend from 2006 to 2015 and highlights intensity targets set for 2021, 2031, 2041, and 2051.

**Figure 5**  
**Per-Capita Greenhouse Gas Emissions and Targets**  
**for Regional Operations, 2006 – 2051**



Regional initiatives planned for 2016/17 will have an impact on future greenhouse gas emissions

Looking forward, the Region plans to implement a number of initiatives in 2016/17 that will have an impact on future greenhouse gas emissions.

Housing York Inc.'s annual program for Building Condition Assessments and Site Review will assess 20 per cent of both theirs and Housing Provider's portfolio each year. Similar programs and audits are planned for Regional facilities and processes.

Transit will pilot a zero-emission electric bus by late 2017

York Region is one of eight municipalities participating in the Pan-Ontario Electric Bus Demonstration and Integration Trial beginning late 2017. With financial support from the Provincial Government and in partnership with private sector companies and local utilities, the Region will pilot zero-emissions transit. This initiative has significant implications for the Region as 49 per cent of corporate emissions are from transit bus fuel consumption.

Anti-idling technology and education programs will be implemented by York Regional Police

York Regional Police will be researching anti-idling technologies and implementing conservation education programs with staff. A pilot will be conducted on one vehicle from each District over the life of the vehicle to better understand the impact of idling on fuel consumption, energy cost, and greenhouse gas emissions.

Staff evaluating 2016 Feed-In Tariff program for solar photovoltaic projects at Regional facilities

The Region applied to the Independent Electricity System Operator's Feed-In Tariff program in 2015 for solar photovoltaic arrays at the Administrative Centre, Schomberg Water Resource Recovery Facility, Transit's Viva and North Divisions Operations, Maintenance and Storage Facilities. The Region's application was unsuccessful but staff are assessing the 2016 Feed-In Tariff program with plans to resubmit applications for sites that demonstrate a compelling return on investment.

[Link to Key Council – approved Plans](#)

The Corporate Energy Report details annual progress on reducing greenhouse gas emissions against targets set in the Energy Conservation and Demand Management Plan.

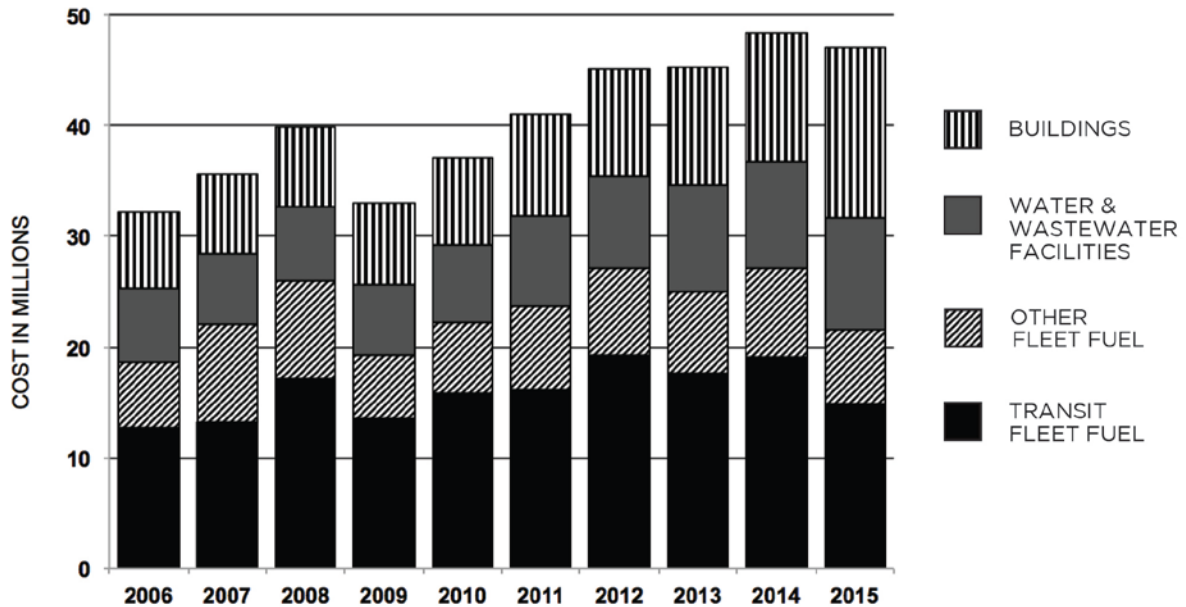
Reducing greenhouse gas emissions and increasing energy conservation are specifically highlighted in a number of Council objectives, policies and actions. Initiatives proposed in the Energy Conservation and Demand Management Plan align with the 2015 to 2019 Strategic Plan that prioritize areas of Sustainable Environment, Healthy Communities, and Good Government; the Regional Official Plan's promotion of Healthy Communities; and Vision 2051, which strives to achieve a Resilient Natural Environment and Agricultural System, along with Living Sustainably.

## 5. Financial Implications

Energy costs due to Regional operations totalled \$47.1 million in 2015

The Region is a growing municipality that continues to provide high quality, affordable services to an increasing and diverse population. Total 2015 energy costs for Regional operations dropped by \$1.3 million as compared to 2014 and totalled \$47.1 million. Savings are primarily the result of declining fleet fuel prices and reduced Transit fuel consumption. Figure 6 shows the trend and breaks down costs by operation.

**Figure 6**  
**Energy Costs Trend by Operation, 2006 – 2015**



Expenditures for both electricity and natural gas increased in 2015 as a result of both an increase in Regional consumption and price for each commodity. Electricity costs in particular are worth noting because annual growth in commodity price continues to be very strong. Since the introduction of the *Green Energy Act, 2009*, average year-over-year electricity prices have increased by 8 per cent.

Cap and Trade will impact the Region’s cost of energy and underscores the importance of energy conservation

Details provided by the Province with regard to the Cap and Trade program indicate that facilities emitting greater than 10,000 tonnes of equivalent carbon dioxide per year will be impacted. The Durham York Energy Centre will exceed this threshold with estimated emissions of approximately 75,000 tonnes of carbon dioxide equivalents per year. Covanta, as the plant’s operator, is responsible for completing the documentation that York and Durham Regions will submit to the Province. The Province has committed to providing free allowances to offset emissions from the Durham York Energy Centre during the first compliance period. The Region’s next largest emitting facility generates 1,900 tonnes of carbon dioxide annually, which is well below the participation threshold.

Indirectly, the Region will be impacted by this program through its purchase of goods and services; most prominently fossil fuels. Regional estimates predict annual transportation fuel and natural gas purchases to increase nominally by 6 per cent (\$1.3 million) and 4 per cent (\$100,000) respectively. Because the price for these commodities are subject to supply and demand, the effective impact from Cap and Trade legislation may be offset or exacerbated by changes in market prices.

Energy conservation and demand management initiatives are an effective way for the Region to reduce financial exposure to the Cap and Trade program

The financial impact to the Region of the Cap and Trade program can be mitigated through energy saving opportunities identified in the Energy Conservation and Demand Management Plan. An increase in the cost of fossil fuel based energy will increase the financial return for initiatives that reduce diesel fuel, gasoline, and natural gas consumption. An increase in financial return may help make conservation initiatives financially viable sooner than some timelines identified in the Plan.

The Region's solar photovoltaic projects generated 218,000 kWh of electricity and earned \$119,000 in 2015

The Region had four solar photovoltaic arrays generating clean, emissions-free electricity in 2015. In 2015 these installations generated 218,000 kWh of electricity that produced \$119,000 in revenue as part of its Feed-In Tariff contracts. The Region's contracts with the Feed-In Tariff program have durations of 20 years, under which the projected average payback of these capital investments is 13 years.

Manufacturer's warranty performance of the solar panels is 25 years, but it is expected that the actual life of the panels will extend beyond the warranty period. At present, there is very little information available about the expected life of current solar panel technologies. Financial and asset life cycle information will continue to be assessed as input to future business cases and decisions in the coming years.

Investments identified in the Energy Conservation and Demand Management Plan are estimated to save the Region \$104 million in energy costs from 2016 to 2025

Between 2016 and 2025 the Region is estimated to spend \$775 million on energy (electricity, natural gas, diesel fuel, gasoline, and propane) to deliver services. The Energy Conservation and Demand Management Plan has

identified a total of \$95 million in capital investments from 2016 to 2025 with an expected Regional energy cost savings from these investments projected at \$104 million over the same period. These estimated costs are incremental to those already budgeted through 2016 to 2025. Any future funding needs will be included in annual budget requests as part of the 2017 and future budget processes. Beyond 2025, and for the life of each measure, annual savings to the Region are estimated to be \$22 million per year.

A triple-bottom line approach is proposed to evaluate future investment in energy conservation initiatives

The Environmental Commissioner of Ontario's *Annual Energy Conservation Progress Report - 2015/16* and the Energy Conservation and Demand Management Plan stress the importance of data, measurement, and benchmarking as fundamental components for making evidence-based decisions. Energy consumption data, including utility data, sub-meter data at various facilities, and fleet fuel data, is collected and analysed to develop a solid business case for new projects. A triple-bottom line approach is proposed to be used to evaluate financial, environmental, and societal benefits of each initiative.

Financial measures are most common and highlight the economic benefit to the organization. Environmental and social measures are less common but are equally important for a sustainable project. Environmental impacts of these projects include reducing corporate greenhouse gas emissions into the atmosphere, which helps mitigate climate change. Social impacts include improved local air quality and reducing the impact of increasing energy costs on taxes and service charges to residents and businesses. A strong triple bottom line project will provide a positive impact to residents, the environment, and the corporation.

## 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, and promoting sustainable practices.

The Region will continue to 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 2015, Regional energy costs totaled \$47.1 million and produced 88,963 tonnes of greenhouse gas emissions; a 1.1 per cent reduction compared to 2014 emissions. In 2015, Transit was both the largest single greenhouse gas emitter and the driver behind the Region's reduction over 2014 emissions. As the population continues to grow, and with the programs and initiatives planned in the near-term, per-capita corporate emissions will stabilize and are anticipated to decline as the Region moves toward its 2021 Energy Conservation and Demand Management Plan targets.

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.

August 12, 2016

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Accessible formats or communication supports are available upon request