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CORPORATE ENERGY REPORT 2010

The Finance and Administration Committee recommends the adoption of the recommendation contained in the following report dated May 18, 2011, from the Commissioner of Corporate Services.

1. RECOMMENDATION

It is recommended that this report be received for information.

2. PURPOSE

This report is an annual update on Regional corporate energy and greenhouse gas management activities.

3. BACKGROUND

This report meets the energy reporting requirements of the *Sustainability Strategy* and *Corporate Air Quality Strategy* and is evolving to satisfy the *Ontario's Green Energy Act*

Since 2003, the Property Services Branch of the Corporate Services Department has been mandated to implement and report annually on energy cost reduction initiatives across Regional buildings and operations.

The energy management program and the Corporate Energy Report support a number of principles and actions in the York Region *Sustainability Strategy (2007)*, including the following:

- Build Regional buildings at a minimum LEED Silver level as directed by Council.
- Continue to increase the energy efficiency and sustainability of York Region buildings through retrofits, procurement and conservation measures.
- Reduce greenhouse gas emissions in existing and future Regional facilities.
- Expand on energy efficiency initiatives and pursue other forms of renewable energy.
- Track energy performance and costs across the Region on an annual basis, and monitor greenhouse gas emissions corporate-wide.

The reporting requirements of the *Corporate Air Quality Strategy (2008)* greatly mirror the content of the Corporate Energy report, therefore, the two mandates have been

combined into this single annual report under the direction of the Property Services Branch to maximize efficiencies and expertise.

The Province's *Green Energy and Green Economy Act, 2009*, pending Regulations, will require all public agencies to prepare an energy conservation and demand management plan summarizing annual energy consumption for each of the public agency's operations and a description of the expected results of current and proposed conservation activities. Similar requirements relating to public agency water use were one aspect of the *Water Opportunities and Water Conservation Act, 2010* (WOWCA). The Property Services Branch continues to enhance the Corporate Energy report to include the anticipated reporting requirements of the two Acts. WOWCA also has water quality and community water conservation aspects that will be managed by the Environmental Services Department.

In 2010, Regional energy costs totalled \$35.6 million and greenhouse gas emissions totalled 83,000 tonnes

Corporate energy costs were \$35.6 million in 2010. As illustrated in Figure 1 and detailed in *Attachment 1*, fleets represented 61% of the total, Environmental Services (particularly water and wastewater operations) was 18% and all other facilities including Housing and street and traffic lighting was 21%.

In terms of greenhouse gases (GHGs), total emissions were 83,000 tonnes of carbon dioxide equivalent (CO₂e) in 2010, which is approximately equal to the emissions from 16,600 light passenger vehicles for a year. The breakdown of GHGs by end-use, as shown in Figure 2, is very similar to the energy cost allocation.

Figure 1
Energy Cost Allocation by End Use in 2010

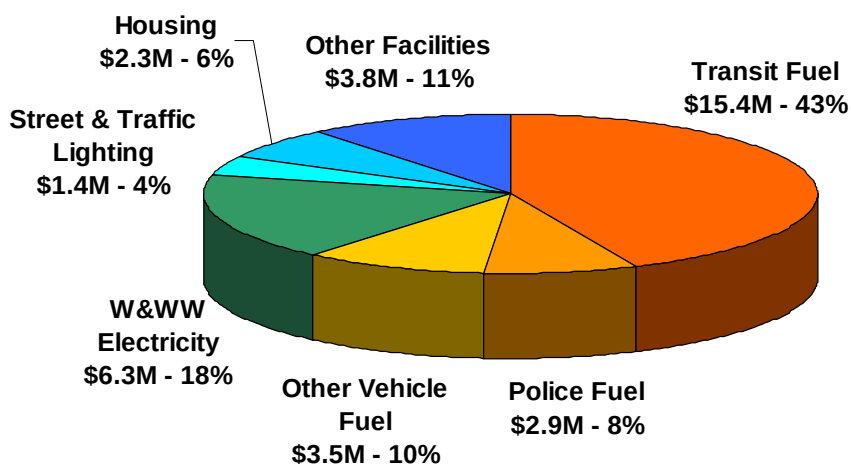
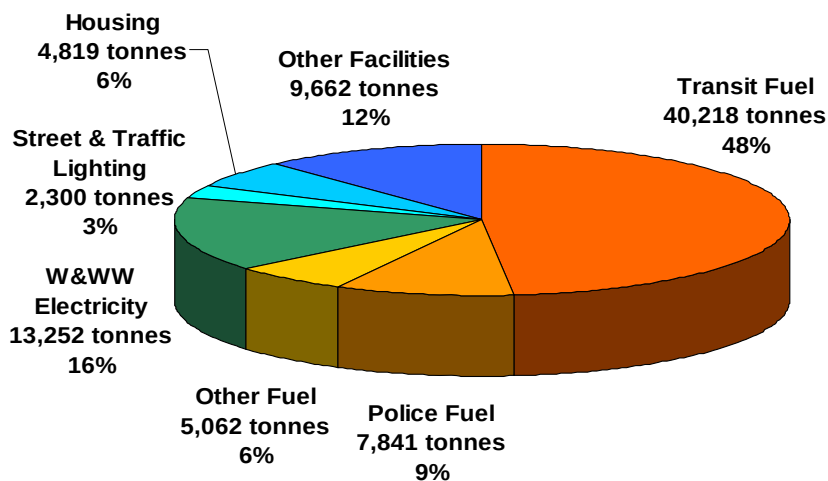


Figure 2
Greenhouse Gas Allocation by End Use in 2010



4. ANALYSIS AND OPTIONS

Per-capita energy costs and greenhouse gas emissions have declined since 2006

A significant factor driving corporate energy consumption and off-setting efficiency gains is population growth in the Region. Table 1 illustrates that on a per-capita basis, energy costs have declined slightly since 2006, and greenhouse gas emissions have dropped by 5%.

Table 1
Per-Capita Energy and Greenhouse Gas Trends

	2006	2007	2008	2009	2010
Population‡	949,600	982,900	1,012,000	1,032,600	1,062,000
Energy cost	\$31.9M	\$32.7M	\$37.3M	\$32.0M	\$35.6M
- Per capita	\$33.59	\$33.22	\$36.87	\$31.01	\$33.49
GHGs (tonnes)	78,641	80,982	80,378	81,005	83,154
- Per capita (kg)	82.8	82.4	79.4	78.4	78.3

‡ Based on year-end estimates from the Planning & Development Services Department, rounded to the nearest 100

Reduced electricity and natural gas consumption in 2010 was overshadowed by increased vehicle use and rising fuel and electricity rates

Table 2 below shows the Region's energy cost trend over the last five years, and the relative impact of consumption and rate changes. Several observations can be derived from the table:

- Consumption of electricity, natural gas and water all decreased relative to 2009. In fact, electricity use is lower than in 2006 and natural gas use is the same as in 2006.
- Natural gas rates continue a long-term downward trend and are now 28% lower than in 2006.
- Total energy costs rose \$3.6 million in 2010 compared to 2009. Most of this increase was due to a 6% increase in fuel consumption (i.e. volume index increased from 105 to 111) and an 11% increase in per-litre fuel cost (i.e. unit cost index increased from 97 to 108).
- Electricity rate increases were the other significant inflationary factor in 2010, advancing by 7%. Water rates increased by a comparable amount but corporate water use still represents a relatively minor cost to the Region.

Table 2
5-Year Energy Cost Trend and Drivers

		2006	2007	2008	2009	2010
Vehicle Fuel	Relative Volume	100	103	104	105	111
	Relative Rate	100	102	126	97	108
	Volume × Rate	100	105	131	102	120
	Cost	\$18.1M	\$19.0M	\$23.7M	\$18.5M	\$21.8M
Electricity	Relative Volume	100	98	98	99	97
	Relative Rate	100	98	99	99	106
	Volume × Rate	100	96	97	97	102
	Cost	\$11.5M	\$11.0M	\$11.2M	\$11.2M	\$11.8M
Natural Gas	Relative Volume	100	118	103	106	100
	Relative Rate	100	98	95	87	72
	Volume × Rate	100	115	98	93	71
	Cost	\$1.8M	\$2.0M	\$1.7M	\$1.7M	\$1.3M
Water	Relative Volume	100	112	117	120	114
	Relative Rate	100	109	114	125	135
	Volume × Rate	100	122	134	151	155
	Cost	\$0.5M	\$0.6M	\$0.6M	\$0.7M	\$0.7M
Total	Cost	\$31.9M	\$32.7M	\$37.3M	\$32.0M	\$35.6M

Note: Volumes and rates are indexed relative to 2006 values.

Rising electricity prices can be partially mitigated through supply management initiatives

As indicated in Table 2, electricity represents the second-highest energy cost component for the Region. Supply management initiatives such as utility bill auditing and accelerated adoption of interval meters have yielded significant savings in past years, helping to keep rates relatively flat from 2006 through 2009. However, *Ontario's Long-Term Energy Plan* released in November 2010 predicted electricity rate increases of between 2.7% annually for large industrial accounts to as much as 7.9% annually over the next five years for residential and small business accounts. As a result, additional supply management strategies are being developed by the Property Services Branch.

As reported to Council in November 2009, WattsWorth Analysis Inc. was hired for a three-year term to help the Region further develop its electricity procurement strategy and assist in balancing risk and cost minimization. WattsWorth is paid a fixed annual fee and does not receive additional benefit from any procurement strategies it recommends.

Initially, 90 mid-sized electricity accounts were moved to the spot market in late 2010. This strategy is forecasted to yield savings in the order of \$130,000 annually starting in 2011.

An electricity hedging strategy is being developed in compliance with the Region's Commodity Price Hedging Policy, and will be presented in a separate report later this year.

Renewable energy is an increasingly important part of the Region's energy supply mix

Renewable energy is an important aspect of the Region's energy supply strategy. Current initiatives include:

- Tendering and renewal of contract in early 2011 for electricity from low-impact green power generators in Ontario. Participating facilities are the Administrative Centre, the Household Hazardous Waste Depot in East Gwillimbury, the Stouffville Zone 2 Pumping Station, YRT transit shelters and the Police Central Services building in Aurora. The greenhouse gas offset amounts to 600 tonnes per year, equal to taking 120 passenger vehicles off the road.
- Installation of a solar air heating SolarWall® at Mount Albert Water Pollution Control Plant.
- Installation of small solar photovoltaic systems at Stouffville Zone 2 Pumping Station, YRT transit shelters and the new EMS Operations Centre in East Gwillimbury.
- Feasibility study and related due diligence for large solar photovoltaic arrays at selected Regional facilities.

Energy efficiency upgrades in existing buildings continue to provide a strong foundation for controlling costs and greenhouse gas emissions

Property Services continued to improve the energy efficiency of existing buildings and operations throughout 2010. Examples included:

- Replacement of an oversized and failing rooftop chiller at York Regional Police 2 District Headquarters with a smaller and more efficient unit at a cost of \$190,000 less \$60,000 in incentives to save \$16,000/year for a payback of 8.1 years.
- Lighting upgrades and automatic controls at seven facilities at a cost of \$165,000 less \$40,000 in incentives to save \$19,000/year for a payback of 6.6 years.
- Improved ventilation controls at the Georgina Water Treatment Plant, avoiding the extra capital and operating cost of planned dehumidification equipment at a cost of \$50,000 to save \$22,000/year for a payback of 2.2 years.
- Support to the Environmental Services Department for process energy audits at seven facilities, and staff training and outreach activities.

All energy efficiency upgrades are based upon a strong business case, ensuring payback is less than ten years in aggregate.

The success of the Region's LEED® construction standard grows

The list of new Regional facilities being built to Leadership in Energy and Environmental Design (LEED®) standards is increasing. Table 3 shows the 14 projects completed or in progress. Two were awarded LEED Gold certification in 2010, exceeding the minimum LEED Silver policy, and one facility achieved LEED Silver. Three facilities targeting the LEED Certified level fall outside the official scope of the Region's LEED policy, but project teams have recognized the value of applying LEED.

Preliminary numbers indicate that the average cost of LEED construction projects for the Region has been about 4% higher than conventional construction, but the upgrades save significantly more over their useful life. When sufficient operating history has been gathered, a report will be prepared to evaluate the real-life performance of the Region's LEED buildings.

The feasibility of applying the new LEED for Existing Buildings: Operations and Maintenance standard at the Administrative Centre was undertaken in 2010 and completed in 2011, with support from key Departments including Supplies and Services and York Regional Police. The study concluded that current efficiencies and operational practices favourably position the facility for certification within an acceptable timeline and budget. Implementation will proceed in 2011 and 2012.

Table 3
The Region's LEED® Projects at Year-End 2010

Project	Municipality	Construction Status	LEED Certification Level & Status
Scott Somerville Fire & EMS Station	Vaughan	Completed 2007	LEED Gold in 2007
McCleary Court CEC	Vaughan	Completed 2008	LEED Gold in 2010
Tom Taylor Place‡	Newmarket	Completed 2009	LEED Gold in 2010
Stouffville Zone 2 Pumping Station‡	Whitchurch-Stouffville	Completed 2009	Certified target
Leeder Place‡	East Gwillimbury	Completed 2009	LEED Silver in 2010
York Regional Police Central Services Building	Aurora	Completed 2010	Silver target
YRT Operations and Maintenance Facility	Vaughan	Completed 2010	Silver target
Kingview Addition‡	King	Construction in progress for 2011 completion	Silver target
Bales EMS Operations Centre	East Gwillimbury	Construction in progress for 2011 completion	Silver target
Mapleglen Residences‡	Vaughan	Construction in progress for 2011 completion	Silver target
Mackenzie Green (145 Essex Avenue)‡	Richmond Hill	Construction in progress for 2012 completion	Certified target
Leslie Street Pumping Station‡	Markham	Preliminary design	Certified target
Central Services Centre	Newmarket	Preliminary design	Silver target
Richmond Hill Bus Maintenance Facility	Richmond Hill	Preliminary design	Silver target

‡ Indicates facilities not covered by the Region's LEED Silver policy, i.e. Housing York Inc. buildings and process facilities. Any facility less than 500 m² is also excluded.

From lowest to highest, the LEED certification levels are Certified, Silver, Gold and Platinum.

A rebuild of the EEMS software in 2011 will support preparatory activities for the *Green Energy Act*

The Region's Energy and Environmental Management System (EEMS) software is a key tool for tracking and reporting Regional energy consumption and greenhouse gas emissions, including the data for this report. Seven other municipalities have recognized the value of EEMS by purchasing licences. EEMS will become even more critical for meeting the pending municipal energy reporting and conservation planning requirements under Ontario's *Green Energy and Green Economy Act, 2009*. To this end, a major rebuild of EEMS was designed and tendered in 2010, in consultation with other Departments and external licencees. Enhancements include:

- Self-service ad hoc reporting.
- Custom energy performance indicators.
- Enhanced billing verification and exception reporting.
- More flexible data import and export, including weather and mapping feeds.

The rebuild is underway in 2011 and will continue into 2012.

In 2011, the Property Services Branch will continue to prepare for Regulations under the *Green Energy Act*, including:

- Refining the current corporate baseline of energy consumption to account for all aspects of energy in the delivery of our services, including fuel use for corporate fleets.
- In cooperation with other Departments, development of benchmarks and a suite of initiatives to reduce consumption relative to possible reduction targets.
- Financial modeling of the cost implications associated with meeting the possible reduction targets.

Relationship to Vision 2026

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

5. FINANCIAL IMPLICATIONS

Savings from energy initiatives continue to accumulate

Cost savings from energy retrofits continue on an upward trend as the benefits accumulate year over year. One-time savings from grants, incentives and energy supply initiatives add significant but highly variable gains. Table 4 below provides a summary for the Energy Program for 2006-2010:

Table 4
Energy Program Summary 2006-2010 (\$Thousands)

Component	2006	2007	2008	2009	2010	Cumulative
Energy Retrofits & Other Capital Expenditures						
Cost	\$1,090	\$730	\$228	\$430	\$781	\$3,260
Savings	-218	-218	-245	-281	-353	-1,315
Grants and Incentives	-70	-592	-61	-185	-13	-921
Energy Supply Management						
Green Power	0	0	48	70	82	201
Natural Gas Hedging	-47	37	41	56	127	214
Bill Management	-103	-102	-971	-667	-90	-1,932
Totals	\$652	-\$145	-\$959	-\$577	\$535	-\$494

Note: Positive numbers are costs; negative numbers are savings. Includes just direct costs and savings, not indirect items from supporting other initiatives such as LEED buildings or the retrofit program at Housing York Inc.

- The cumulative savings of the Energy Program over the last five years totalled \$494,000 net of costs, which is noteworthy since most of the energy retrofits have paybacks longer than five years.
- Powerstream contributed \$403,000 in 2007 towards emergency generator demand response at the Aurora Sewage Pumping Station, leading to a one-time spike in the Grants and Incentives line item.
- Natural gas hedges through the Association of Municipalities of Ontario have lost money in four of the five past years as the market price of natural gas continued to trend down, however the purpose of natural gas hedging is to stabilize costs, not necessarily to save money. The Region has still saved \$335,000 on natural gas net of hedging in 2010 compared to 2006 because of the lower market rates.
- 2010 was a transition year in terms of higher costs from expanded retrofits and new initiatives, but with related savings and incentives still to accrue, and no big energy supply “wins”, however the results in 2011 are expected to return back to the long term trend line, such that annual savings will increasingly exceed annual costs.

- Bill management yielded significant gains in 2008 and 2009 through the early adoption of interval meters at water and wastewater facilities (but no savings were recorded in 2010 since the electric utility companies would have installed interval meters by that time regardless) and through large billing adjustments from Powerstream.

6. LOCAL MUNICIPAL IMPACT

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

7. CONCLUSION

Corporate electricity, natural gas consumption and per-capita energy costs have all declined slightly over the last five years. Per-capita greenhouse gas emissions have declined by 5% since 2006. Energy retrofits have resulted in \$1.3 million in aggregate savings over the last five years. Aggressive pursuit of grants and incentives contributed another \$0.9 million, while judicious application of energy supply management initiatives saved \$1.5 million.

Tempering the positive news, rising prices for electricity and vehicle fuel in 2010, and increased fuel consumption, escalated total energy cost to the Region by \$3.6 million (11%) compared to 2009. Planning activities currently underway related to energy and conservation reporting under the *Green Energy Act* will help to focus and commit all Regional Departments to defining and meeting reduction targets that Council can fully support.

For more information on this report, please contact Barry Crowe, Director, Property Services Branch at Ext. 1684.

The Senior Management Group has reviewed this report.

(The attachment referred to in this clause was included in the agenda for the June 9, 2011 Committee meeting.)

SUMMARY DATA TABLE

Summary Data Table for 2010 York Region Corporate Energy Report

Component	Cost					Volume Measure	Energy Consumption					Emission Factor (kg per unit volume)	Greenhouse Gas Emissions (tonnes CO ₂ e)				
	2006	2007	2008	2009	2010		2006	2007	2008	2009	2010		2006	2007	2008	2009	2010
Electricity – Environmental Services	\$6,523,469	\$6,181,727	\$6,454,390	\$6,093,474	\$6,304,891	kWh	64,293,414	62,367,321	64,913,482	64,203,549	63,105,690	0.21	13,502	13,097	13,632	13,483	13,252
Electricity – Comm. Serv. & Housing	\$1,389,620	\$1,429,184	\$1,340,603	\$1,379,209	\$1,487,589	kWh	13,434,616	14,451,739	13,991,074	13,840,655	13,642,878	0.21	2,821	3,035	2,938	2,907	2,865
Electricity – Transportation Services	\$1,290,118	\$1,324,145	\$1,354,091	\$1,371,202	\$1,383,260	kWh	11,029,767	11,501,405	11,285,770	11,286,410	10,954,291	0.21	2,316	2,415	2,370	2,370	2,300
Electricity – all other owned & net leased	\$1,693,350	\$1,473,244	\$1,411,344	\$1,689,187	\$1,886,756	kWh	16,933,381	15,092,654	15,125,712	17,138,269	17,380,000	0.21	3,556	3,169	3,176	3,599	3,650
Electricity – gross leased & 3rd-party operated	\$618,600	\$603,900	\$601,600	\$593,600	\$631,600	kWh	6,000,000	6,000,000	6,000,000	6,000,000	6,000,000	0.21	1,260	1,260	1,260	1,260	1,260
Electricity – loss factor adjustment						kWh	737,000	722,000	735,000	742,000	733,000	0.21	155	152	154	156	154
Electricity – green power credit			\$48,356	\$69,984	\$82,248	kWh			-1,696,712	-2,455,575	-2,885,905	0.21	0	0	-356	-516	-606
Natural gas – Comm.Serv. & Housing	\$525,471	\$543,336	\$517,143	\$557,176	\$417,185	cu.m.	1,202,964	1,228,936	1,184,408	1,278,456	1,028,243	1.90	2,286	2,335	2,250	2,429	1,954
Natural gas – all other owned & net leased	\$969,581	\$1,227,033	\$955,251	\$850,855	\$649,510	cu.m.	1,971,061	2,610,672	2,121,574	2,139,282	2,138,802	1.90	3,745	4,960	4,031	4,065	4,064
Natural gas – gross leased & 3rd-party operated	\$282,600	\$276,600	\$267,200	\$247,200	\$202,100	cu.m.	600,000	600,000	600,000	600,000	600,000	1.90	1,140	1,140	1,140	1,140	1,140
Water – Comm.Serv. & Housing	\$279,928	\$294,785	\$310,367	\$367,186	\$387,816								0	0	0	0	0
Water – Other Buildings	\$198,102	\$286,242	\$328,174	\$353,192	\$351,829								0	0	0	0	0
Vehicle Fuel – Transit fleet (diesel)	\$12,706,560	\$13,191,408	\$17,082,352	\$12,771,970	\$15,429,646	litres	13,446,095	13,769,737	14,188,000	14,629,978	15,569,774	2.69	36,170	37,041	38,166	39,355	41,883
Vehicle Fuel – Transit biodiesel credit			\$3,150	\$5,844	\$6,272	litres			-315,013	-584,385	-627,157	2.66	0	0	-836	-1,552	-1,665
Vehicle Fuel – Police fleet (gasoline)	\$2,711,544	\$2,836,500	\$3,269,916	\$2,642,988	\$2,862,191	litres	3,123,899	3,123,899	3,123,899	3,158,982	3,136,588	2.50	7,810	7,810	7,810	7,897	7,841
Vehicle Fuel – EMS diesel ambulance fleet	\$357,757	\$412,098	\$516,169	\$354,312	\$441,168	litres	375,828	427,505	427,861	396,440	454,973	2.69	1,011	1,150	1,151	1,066	1,224
Vehicle Fuel – EMS gasoline ambulance fleet	\$39,508	\$43,679	\$47,625	\$19,405	\$92,386	litres	41,145	44,757	40,327	20,979	87,157	2.35	97	105	95	49	205
Vehicle Fuel – EMS other diesel fleet				\$33,521	\$13,719	litres				38,941	14,542	2.73	0	0	0	106	40
Vehicle Fuel – EMS other gasoline fleet	\$106,213	\$133,326	\$112,239	\$84,411	\$140,010	litres	114,788	137,687	99,109	94,161	138,969	2.50	287	344	248	235	347
Vehicle Fuel – Dept. HDD fleet	\$164,108	\$227,110	\$313,139	\$217,468	\$236,083	litres	194,365	274,745	311,906	270,928	264,528	2.69	523	739	839	729	712
Vehicle Fuel – Dept. LDD fleet	\$2,740	\$2,435	\$4,234	\$1,694	\$5,789	litres	3,071	2,617	3,541	2,100	5,962	2.73	8	7	10	6	16
Vehicle Fuel – Dept. HDG fleet	\$36,353	\$61,905	\$81,095	\$71,512	\$54,215	litres	41,726	73,151	79,041	92,158	60,816	2.35	98	172	186	217	143
Vehicle Fuel – Dept. LDG fleet	\$268,475	\$334,978	\$377,721	\$325,585	\$440,381	litres	304,020	369,345	372,386	392,221	474,499	2.50	760	923	931	981	1,186
Vehicle Fuel – ENV emergency generators	\$45,478	\$90,558	\$97,172	\$41,649	\$63,269	litres	100,083	113,197	121,465	51,097	92,580	2.69	269	304	327	137	249
Vehicle Fuel – employee mileage (gas)	\$1,687,769	\$1,682,240	\$1,817,227	\$1,880,878	\$1,995,010	litres	330,800	329,700	342,500	354,500	376,000	2.50	827	824	856	886	940
Totals	\$31,897,344	\$32,656,433	\$37,310,558	\$32,023,502	\$35,564,923								78,641	80,982	80,378	81,005	83,154

Notes

1. Electricity, natural gas and water use is tracked via in-house Energy and Environmental Management System (EEMS) software based on actual utility bills. The exception is gross leased and 3rd-party operated facilities, where the Region does not receive utility bills, and are instead estimated based on typical per-square-foot consumption figures for each facility type.
2. Fleet vehicle fuel is tracked by the Region's contractors for Transit fleet, by York Region Police for the Police fleet, by the EMS department for the EMS fleet and by Transportation Services for all other fleet vehicles. A new integrated fleet maintenance application is being implemented for all fleets in 2011, that will include detailed fuel tracking.
3. Diesel fuel for Environmental Services emergency generators is tracked by the Finance Department and does not include a year-end adjustment for fuel remaining in storage.

4. Use of employee vehicles for business purposes is based on mileage claims and an estimated typical passenger vehicle efficiency of 9.8 litres per 100 km.
5. Electricity emission factor is from the National Inventory Report 1990-2008: Greenhouse Gas Sources and Sinks in Canada (2010), Table A13-7 for Ontario in 2005. Natural gas emission factor is from the same report, Table A8-1. Vehicle emission factors are from the same report, Table A8-11.
6. Biodiesel emission credit is an average of 6 biodiesel types specified in *GHGenius* Version 3.12b, NRCAN, 2008. Assumes tailpipe emissions only, and no input emissions.