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CITY OF LONDON
Update on Corporate
Energy Management
September 2013

REPORTS:

Past and Current Energy Management Activities

Culture of Conservation – The Next Steps

2011 Corporate Energy Consumption Report

2011 Energy Consumption and Greenhouse Gas Emissions (Ministry of Energy)

2012 Corporate Energy Consumption Report



London
CANADA



Energy Efficient LED Lights at J. Allyn Taylor Building, London, Ontario

CITY OF LONDON

Past and Current Corporate Energy Management Activities

September 2013



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CORPORATE ENERGY MANAGEMENT - UPDATE

Energy Management is a key component in managing facilities and infrastructure in today's economy. The City of London has provided leadership in energy conservation and sustainable energy for more than 15 to 20 years.

In compliance with the Green Energy Act and the Ontario Regulation 397/11, the City of London is required to report on their energy consumption and greenhouse gas (GHG) emissions annually beginning in 2013 and to develop and implement energy conservation and demand management (CDM) plans starting in 2014.

In the development of the 2013 submission and the 2014 CDM plan, the City recognized the importance to report the Ontario regulation requirements but to go one step further and capture past and current energy management activities to set the stage of where we stand today. This resulted in the development of a series of reports and initiatives that inter-relate to the development and support the future CDM Plan in 2014.



Energy Efficient LED Lights at Allan Taylor Building, London, Ontario

CITY OF LONDON **Past and Current Corporate Energy Management Activities**

September 2013



Past and Current Energy Management Activities

summarizes a selection of the significant energy management projects and supporting initiatives completed in recent years that have set the stage for the City of London's City of London Corporate CDM Plan due in June 2014

Culture of Conservation – The Next Steps

describes the engagement of City of London staff and stakeholders in energy

conservation initiatives. The need for an internal "Culture of Conservation" program is key to the development of the five-year energy conservation and demand management (CDM) plans to show commitment to reducing cost, conserving energy and reducing greenhouse gas generation and our environmental footprint.



Earth Hour 2013, City Hall, City of London

CITY OF LONDON **Culture of Conservation – The Next Steps**

September 2013





Solar Tree and Solar Panels at Tourism London, City of London

CITY OF LONDON
**2011 Corporate Energy
Consumption Report**

September 2013



2011 Corporate Energy Consumption Report provides a summary of the City of London's 2011 annual energy consumption and greenhouse gas (GHG) emissions for its operations. In addition to the reporting requirements mandated by the *Green Energy Act* and *Ontario Regulation 397/11*, information on all City of London energy consuming infrastructure (e.g., street lighting, parks) as well as fleet fuel use has been included to provide a complete picture of energy needs for municipal operations. It is important to note that this information does not include energy use by London's agencies,

boards, and commissions.

2011 Energy Consumption and Greenhouse Gas Emissions (Ministry of Energy) is a tabular report prepared for the Ministry of Energy to support the province's reporting requirements. Beginning in July of 2013, it became mandatory for municipalities to submit this report annually and make this report available to the public. A copy of the City of London's submission is publicly available and is accessible by the following link:



Energy Consumption and Greenhouse
Gas Emissions Reporting
Rapports de consommation d'énergie et
d'émission de gaz à effet de serre



CITY OF LONDON
**2011 Energy Consumption
and Greenhouse Gas
Emissions (Ministry of
Energy) Report**

September 2013



[2011 - Green Energy Act. 2009 O.Reg. 397/11 Submission](#)



Electrical infrastructure serving the city of London

CITY OF LONDON
**2012 Corporate Energy
Consumption Report**

September 2013



2012 Corporate Energy Consumption Report provides a summary of the City of London's 2012 annual energy consumption and GHG emissions for all operations. The document provides a total of all significant energy costs associated with City of London operations. In addition to the report requirements mandated by the *Green Energy Act* and *Ontario Regulation 397/11*, information on all energy consuming infrastructure (e.g., street lighting, sports fields) as well as fleet fuel has been included to provide a complete picture of energy needs for our municipal operations. Similar to the 2011 report, this information does not include energy use by London's agencies, boards and commissions.

Next Steps:

Corporate Energy Reporting – Ministry of Energy Requirements. With the preparation of the previous reports and measures, the City of London has set the stage for preparing a strategic plan to focus on corporate energy goals and objectives for energy conservation, energy efficiency, renewable energy, and energy demand management. This report will be called the Corporate CDM Plan and will fulfill the reporting requirements for the Ministry of Energy's Green Energy Act and the Ontario Regulation 397/11. Two reports are to be submitted by July 1, 2014.

2012 – Green Energy Act, 2009 O Reg. 397/11 Submission

The Energy Consumption and GHG Emissions Template for 2012 will be updated and provided to public agencies by the Ministry of Energy in order for them to comply with the reporting requirement component of Regulation 397/11 under the *Green Energy Act, 2009*.

2014 – City of London Corporate Energy CMD Plan

Regulation 397/11 under the *Green Energy Act, 2009* requires public agencies to develop Conservation and Demand Management (CDM) plans starting in 2014 that include:

- Reporting on annual energy consumption
- The public agency's goals and objectives for conserving and otherwise reducing energy consumption and managing its demand for energy
- Proposed measures under its CDM plan and the cost and saving estimates for these proposed measures
- A description of any renewable energy generation facilities and amount of energy produced on an annual basis



1 CORPORATE ENERGY MANAGEMENT OVERVIEW

The Corporation of the City of London leads by example when it comes to sustainable energy investments and initiatives. London's future sustainability depends on the implementation of best practices in energy management today.

Below, an overview of previous and current corporate energy management measures is provided. This will illustrate our current position in energy conservation and sustainable energy, and will create a benchmark that will assist in the preparation of the City of London's Corporate Energy Conservation and Demand (CDM) Plan, which will also meet the requirements of the *Green Energy Act* and the *Ontario Regulation 397/11* to have a CDM plan by July 2014.

1.1 HISTORY (1990 – 2008)

The City of London has undertaken energy conservation projects as far back as the early 1990s. A significant number of projects have been completed to date, and most of the quick payback energy projects have been completed. This has resulted in a relatively efficient municipal building and infrastructure stock. Four specific phases or periods of energy management and energy conservation activity have been identified over the last 15 to 20 years. These phases or periods can be summarized as follows:



Energy Efficient LED Lights at J. Allyn Taylor Building, Dundas and Wellington

Period	Energy Management Partner/Program	Major Achievements	Shortcomings	Outcome/Next Steps
1990-1995	Rose Technologies	Lighting Retrofit at City Hall – very successful.	No monitoring or tracking of electricity savings.	Pursue larger projects.
1998-2000	Rose/Vestar Project	Very large energy retrofit program comprised of 31 facilities. Completed most of the fast payback items. Over \$200,000 in energy savings estimated per year.	Challenges in monitoring and verification of actual savings.	Determined that comprehensive energy management program required including understanding of energy consumption at a more focused level.
2003-2005	Finn Study – Energy Audit Reports	Studied 9 facilities. Helped developed Energy Management Program.	Natural Resources Canada (NRCan) funding cut in half midstream which reduced return on investment.	Undertook capital work. Some completed by staff, some incorporated into Ameresco Phase I project
2005-2008	Development of Corporate Energy Management Program	Energy retrofits done on an ongoing basis. Asset Renewal/Energy Phase I implemented. Asset Renewal/Energy Phase II underway. Asset Renewal/Energy Phase III in Design. Centralized energy invoicing for Corporation 2005 to current detailed energy information now available (EnergyCAP).	Energy saving investments over the last 10 years has led to less opportunity to perform extensive energy only retrofits than originally anticipated. New focus is on asset renewal/energy combination projects.	Multi-year energy conservation initiatives under consideration Numerous projects pursued. energyMatters ideas developed and approach to widescale culture of conservation practices.

The current Corporate Energy Management Program was formalized in 2005 when the City of London approved Phase I of the Asset Renewal & Energy Study proposal submitted by Ameresco Canada. The proposal included asset renewal and energy feasibility studies of 50 sites and the implementation of asset renewal and energy accounting software (ReCAP and EnergyCAP). Together the studies revealed and recommended \$21.7 million worth of asset renewal and energy measures. The initial 50 study sites included audits of selected community centres, fire halls, administrative buildings, and operation centres which led to \$1.2 million in retrofit measures at eight of the 50 audit sites between 2005 and 2008.

In 2008, Ameresco Canada Inc. proposed Phase 2 of the Facility Renewal and Energy Retrofit Program. Ameresco received approval to proceed with a proposed \$3.0 million project, which encompassed retrofit measures at fourteen facilities identified in the original 50 audit sites identified in Phase One in 2005.

The analysis and reporting of the results of Corporate Energy Management activities throughout 2008-2011 were reduced due to staff vacancies and increased workload. The energy conservation benefits from all three phases of the asset renewal contract in 2008 with Ameresco continued and many of the energy related projects were completed based on the Ameresco report and contract. The projects identified were broken into Phases for implementation. Appendix A, B and C illustrate a complete list of projects completed by the Facilities Division between 2008 and 2011.

Period	Energy Management Partner/Program	Major Achievements	Shortcomings	Outcome/Next Steps
2008-2011	Asset Renewal/Energy Phase II Implemented Asset Renewal/Energy Phase III Design and Implementation	Energy retrofits done on an ongoing basis.	Due to Corporate Energy Management Vacancy, reporting is limited.	Completion of energy saving projects identified in previous phases.

In 2012, the combination of the need to meet the government requirements for energy management in municipalities and the desire of Council to demonstrate environmental leadership in municipal operations in its 2011-2014 Strategic Plan, presented an opportunity to revisit the management model for corporate energy management. A coordinating group was formed under a shared leadership and management model now known as the Energy Management and Conservation Team (EMCT) involving management staff from Environmental & Engineering Services, Facilities and Finance.

Primary Energy Use Area	Corporate Service Area	Responsibility
City Buildings	Finance & Corporate Services	Facilities
Operational "Utility" Facilities (W12A Landfill, water distribution, wastewater treatment, pumping stations)	Environmental & Engineering Services (EES) (Environment, Fleet & Solid Waste)	Environmental Programs on behalf of the Operational "utility"
Fleet & Equipment	EES (Environment, Fleet & Solid Waste)	Fleet & Operational Services
Street lights & Traffic Lights	EES (Roads and Transportation)	Roadway Lighting & Traffic Control
Agencies, Boards and Commissions (ABCs)	Some work done by Finance & Corporate Services	Individual ABCs. Some work done by Facilities

The opportunity to create and strengthen the Corporation's Energy Management platform has introduced a number of potential projects and incentives to reduce energy impacts to the City of London. In 2012 and 2013, numerous sites and projects have been identified for review and implementation.

Energy Management staff have conducted interviews with all City of London Service Areas on energy related projects to identify internal energy saving opportunities that impact the Corporation's annual energy consumptions. In these interviews, education and awareness for energy savings is a key message and target proposed. Energy Management staff provides commitment to work with each division, and review potential projects to assist in incentive opportunities, and best practices in the commitment to reduce our energy impacts.

Period	Energy Management Partner/Program	Major Achievements	Shortcomings	Outcome/Next Steps
2012 - 2013	Energy Audits – Retained Consultant Services from Ameresco Canada Rooftop Solar – Retained Consultant Services from Ameresco Canada	Energy Audit to assess capital electrical saving opportunities Review of 11 City Facilities for the capability to install Solar PV equipment on existing City of London infrastructure. Final report and action is pending	Review of 17 sites revealed numerous sites with possible energy saving opportunities. Applications to the OPA FIT 2 program for procurement of Solar PV equipment on City Facilities Final report and action is pending	Review sites and prioritize to initiate capital investment in best payback scenario. If approval received from the OPA, facilitate the installation of rooftop solar projects approved. Final report and action is pending

1.2 CURRENT ACTIVITIES

The Corporate Energy Management Program currently consists of six key focus areas:

- Tracking & Monitoring Energy Consumption
- Renewable Energy and Feasibility Projects
- Leadership in Energy and Environmental Design (LEED) Buildings
- Energy Conservation and Demand Management Projects
- Energy Procurement
- Creating a Corporate “Culture of Conservation”

2 TRACKING & MONITORING ENERGY CONSUMPTION

One of the biggest challenges faced by London staff, along with other municipalities in the initial stages of energy management initiatives, was the inability to track overall energy consumption and energy savings associated with energy retrofit projects.

In 2005, the Corporate Energy Management Program was formalized and included a framework to implement and monitor corporate energy. There was no system in place to record and analyze the volumes of energy consumption data from hundreds of utility bills received every month until the Corporate Energy Management Program procured software called EnergyCAP.



EnergyCAP gives the City of London the capability to:

- Capture utility bill and energy consumption in one location
- Monitor and verify actual energy consumption, cost reductions and projected savings from energy conservation projects
- Track current consumption and compile historical energy data to provide required progress reports for all facilities owned and operated by the City of London
- Centralize energy invoice processing from 16 areas to 1, allowing Energy Management to view and process all corporate energy invoices.

Using EnergyCAP has helped to identify opportunities to reduce costs, for example:

- Targeting inefficient facilities based on energy use per square foot. Energy audits have been commissioned on several inefficient facilities as a result.
- Generating energy analysis graphs and reports which are made available to managers of facilities.
- Identifying billing and metering errors.
- Identifying water main breaks in facilities through winter months, helping to avoid damage to structures and huge unchecked water bills.
- Optimizing utility bill payment processes.

- Assisting with energy budgeting and accruals. It has been used to forecast energy consumption and costs, with the data utilized during the budget process.

Using EnergyCAP, we currently maintain a database with the following information:

- Electricity, natural gas, steam, chilled water and potable water consumption and associated costs, dating back to 2005.
- Environment Canada weather data for the purpose of normalizing consumption patterns with changes in weather dating back to 2005.
- Benchmarking data such as energy intensity (energy use per square foot).



Interval Data Centre

London Hydro provides its Interval Data Centre software that assists with tracking and monitoring of various sites owned and operated by the City of London with interval metering.

This gives the City of London the capability to:

- Review total usage and peak demands in numerous profiles to assist with statistical data requirements for usage.
- The ability to compare electrical data historically by meter or account number to confirm inconsistencies.
- Monitor, verify and compare energy consumptions to billings.

The use of the Interval Data Centre helps to identify opportunities to reduce costs, for example, City staff used the Interval Data Centre to discover sites with Building Automation Systems (BAS) were operating on holidays when buildings were not occupied.



The Unionline software gives the City of London the capability to:

- Monitor natural gas consumptions for direct purchase consumption measurement for various City of London facilities.
- View recent and historical balancing transactions
- View and download direct purchases, current and historical invoices.

3 RENEWABLE ENERGY PROJECTS

In terms of an overall approach for supporting renewable energy, City staff recommends making direct investments in renewable energy projects at municipal facilities rather than the procurement of “green energy” from energy retailers (e.g., purchase offset credits).

The following are some examples of the renewable energy projects and feasibility studies that are currently underway and/or completed since last reported in 2009.

3.1 SOLAR GENERATION

Solar Tree Located at Tourism London

In 2010, the City of London installed a new 8.6 kilowatt (kW) solar photovoltaic system (PV) array system. This installation promotes the City of London's dedication to renewable energy and supports the visions of providing “Sustainable infrastructure”, and a “Green and Growing City” in the City of London Strategic Plan.



This system includes a 7 meter (23 feet) tall “solar tree” which includes PV panels on all 27 leaves, and three pole-mounted systems. The system was designed to generate around 10,000 kilowatt-hour per year, about one-third of the annual electricity needs for the Tourism London building at 696 Wellington Road. Taking advantage of the Ontario Power Authority's (OPA) microFIT program, the project will pay for itself within 20 years.

Year	Building Consumption		Solar Tree Production	
	Use (kWh)	Cost	Production (kWh)	microFIT Revenue
2011	36260	\$4,420	9660	\$8,680
2012	34200	\$4,200	10680	\$9,640

In the first two years of full operation, the solar PV system has generated 20,345 kilowatt-hours with microFIT revenue of over \$18,000.

Rooftop Solar Study

In 2012, The City of London with assistance of its energy partner, developed and proposed a strategy with respect to maximizing the opportunities for solar PV projects on City of London properties. The strategy included the recommendation to focus on larger rooftop projects eligible for the OPA Small Feed-In Tariff (FIT) for projects up to 500 kilowatts – under the revised, Fit 2.1 rules.

An engineering review of over 25 sites with the rooftop capability to install the PV systems was completed. Eleven out of 25 proposed sites were deemed suitable for rooftop solar.



The FIT 2.1 rules included a priority points grading system which ranked proposals in this highly competitive market segment. In order for applications to qualify for the maximum possible points, it was practical for the City to adopt the role of system host (landlord) rather than project owner. In early 2013, the City of London entered into roof lease agreements for municipal facilities with a joint venture between London Hydro and the London District Renewable Energy Cooperative (LDREC). The joint venture submitted in January 2013 to the OPA for approval.

In May 2013, it was learned that the proposed generating capacity associated with the very large number of OPA Small FIT submissions far exceeded the generating capacity on the grid that was set aside for this particular Small FIT window. In the process of determining the most eligible applications, the OPA rejected all 11 applications submitted by the joint venture based on the perceived risk associated with the property access rights noted in the roof lease agreements with the City of London - which included exit clauses - versus other submissions that contained no protection in this regard. The opportunity exists for the joint venture to resubmit all 11 applications to the OPA during the next small FIT application period to open in the fall 2013.

Solar Trackers

A number of ground mounted, automatic two-axis, solar tracking arrays have been installed through a partnership with London Hydro. The solar trackers are intended to promote the City of London and London Hydro's continued support of renewable energy technology. The Occupancy Agreements permitted London Hydro to install the solar tracking systems on municipal property with no financial cost for the City of London.

Currently, the partnership consists of four sites where solar (ground mounted) tracking arrays (10kW) are currently operational. These sites include:

- NW Corner of Hwy 401 & Wellington
- 1570 Oxford St West - Pollution Control Plant
- 1159 Adelaide St North Pollution Control Plant
- 5200 Highbury Ave S - SE Reservoir Pump Station

In 2012, London Hydro proposed to enter into an additional Occupancy Agreement for the installation of four ground mounted solar tracking array units at the Manning Drive Material Recovery Facility (MRF). Approval is still pending by the Ontario Power Authority (OPA). City Staff are establishing an environmental education centre at the Material Recovery Facility, and London Hydro's solar trackers will be an asset to this proposed centre.



Veterans Memorial Parkway Solar Lighting Project



In 2011, after an initial investment totalling \$1,000,000 by three levels of government, several elements of the Veterans Memorial Parkway Community Project were completed to include an Entrance feature at the 401, four Commemorative features between Gore Rd. and Bradley Ave., and tree and shrub plantings between the 401 and Hamilton Rd.

In 2012, a request to light up the commemorative features was submitted to the Parks Planning Division. In review, a proposal was accepted to install solar PV powered lighting at each of the commemorative features. Given their location, the review concluded that the price to install "off-grid" solar PV at each of the commemorative features provided a cost-effective solution compared to tying into the grid and metering for power at each location with monthly consumption bills.

Substantial completion was achieved in spring 2013 and the PV powered lighting at each of the commemorative features is operational.



3.2 GEOTHERMAL HEATING & COOLING

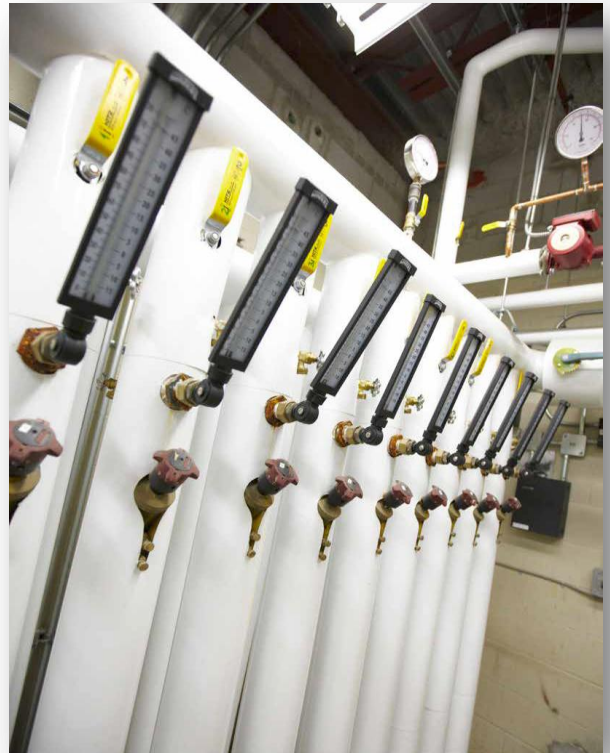
Exeter Road Operations Centre (EROC)

The City of London performed extensive renovations to the Exeter Road Operations Centre in 2010. The building retrofits incorporated many energy-efficient and renewable energy technologies. A geothermal heating and cooling system was incorporated into the retrofit project to take advantage of moderate ground temperatures to boost efficiency and reduce the operational costs of heating and cooling.

Fanshawe and Thames Valley Golf Courses

Based on the successful implementation of geothermal heating and cooling at EROC, the City is studying the installation of ground source heat pumps at the two golf course facilities. Results from the study are expected for 2013.

Early engineering estimates indicate the potential to reduce electricity demand by 15 percent at Fanshawe Golf Course, and to reduce demand by approximately 19 percent at Thames Golf Course.



3.3 WIND POWER

Wind Power at the Materials Recovery Facility

Due to its in-land location, London in general has limited ability to employ wind power generation. However, the City continues to explore the feasibility of wind power options at select locations. The City engaged Ameresco to carry out a pre-feasibility study on the use of micro-wind (under 10 kilowatt) turbines and small wind (10 kilowatt – 500 kilowatts) turbines at three City locations. The study indicated that micro-wind turbines are not financially feasible. However, the study did indicate that a “medium-scale” (300-800 kilowatt) wind turbine in a behind-the-meter, net metering application (i.e., without using the FIT program incentive) at the Materials Recovery Facility might be financially feasible. Current net metering rules limit the size to 500 kilowatt. Further studies, such as geotechnical, communication, and environmental impacts, are required in order to confirm feasibility. City staff will explore this option in 2014.

3.4 LANDFILL GAS

W12A Landfill

Since 2010, the City of London has proposed to develop a 2.4 megawatt landfill gas power plant at the W12A landfill site. Regional electricity transmission constraints prevented the City of London from obtaining a FIT contract during the first round of FIT contracts. However, recent information from the OPA suggests that transmission capacity may become available for the W12A Landfill site.



The OPA had delayed the implementation of their proposed “Large FIT” application process (for projects larger than 500 kilowatts) a number of times over the last two years, and the most recent information now indicates that the OPA will replace the “Large FIT” process (with its pre-defined power purchase prices) with a new competitive procurement process.

3.5 BIOENERGY

Environmental & Engineering Services continue to review numerous bioenergy project concepts to provide renewable energy sources for the City of London. Bioenergy can either be used directly or indirectly by being converted to energy in three ways: thermal, chemical and biochemical conversion.

Anaerobic Digestion of Sewage Sludge BioSolids

There has been private sector interest expressed in the potential use of biosolids and other organic feedstocks for biogas production in an anaerobic digester at the W12A landfill site. The proposed biosolid-based power generation project would likely need to pursue its own application separate from the landfill gas project, if the former OPA Feed-In Tariff (FIT) program rules apply in their new competitive procurement process. There is currently limited transmission capacity for additional power generation projects at the landfill site. City staff continue to monitor the progress with OPA and London Hydro.

Waste Heat Recovery from Sludge Incineration

In 2012, the Greenway Pollution Control Plant operations studied the feasibility of using an Organic Rankine-Cycle engine to generate electricity from the sludge incinerator's waste heat. Preliminary results estimate the potential to produce 800 kilowatts of electricity generation from this waste heat.

Wastewater Operations have submitted an Electricity Retrofit Incentive Program (ERIP) application to the OPA for funding a follow-up feasibility study. The heat recovery generator for Greenway application is currently on hold pending clarification of Technical Standards and Safety Authority (TSSA) requirements for full-time licensed operators, which have traditionally applied to steam boilers. TSSA requirements and next steps will be reviewed in 2013.



4 LEED BUILDINGS

The City of London makes use of the Canada Green Building Council's Leadership in Energy and Environmental Design (LEED) program to advance green building and sustainable community practices.

LEED promotes a holistic approach to sustainability by recognizing performance in five key areas of human and environmental health, which include sustainable site development, water efficiency, energy efficiency, materials selection, and indoor environmental quality. LEED Certification is based on the total point score achieved (combined with some mandatory prerequisites) in these five areas, following an independent review. There are four levels of LEED Certification: certified, silver, gold, and platinum.

The City of London continues to pursue LEED design principles, which are incorporated within the scope of all new City facilities and infrastructure upgrade projects. This does not mean that every single building will seek formal LEED certification, as the cost and effort for obtaining certification would not make sense for smaller projects.

4.1 NORTH LONDON COMMUNITY CENTRE.



The Stoney Creek Community Centre, a partnership between the City of London, London Public Library, and the YMCA, was the first LEED-Certified building to be designed and built by the City of London. This building has been designed to use 44 percent less energy and 53 percent less water than a similar building built to the Ontario Building Code. In 2012, the Stoney Creek Community Centre officially received its LEED Gold certification from the Canada Green Building Council.

The building includes:

- A green roof to reduce storm water runoff and air conditioning needs,
- Drain water heat recovery from showers, and
- Natural light to reduce the need for artificial light.

The Federation of Canadian Municipalities' Green Municipal Fund provided the City of London with \$2.3 million in grants and loans toward the construction of the facility.

Union Gas supported this project with incentives totalling approximately \$15,000. This was used to help install condensing boilers, condensing water heaters, and energy recovery wheels on two air handling units into this new, state of the art facility.

4.2 SOUTHEAST RESERVOIR PUMPING STATION



The new Southeast Reservoir Pumping station is designed to, and in the process of obtaining LEED Silver certification designation from the Canada Green Building Council. The design included measures to achieve a building with at least 25 percent less energy than a similar building built to the Building Code.

The Southeast Reservoir Pumping station includes:

- Sustainable site design in erosion & sediment controls, and dewatering during construction;
- Water use reduction measures in plumbing fixtures for water efficiency;
- The control and management of construction materials and resources;
- The use of renewable materials made from agricultural products, and the use of regionally manufactured materials; and
- A green roof to reduce storm runoff.



The application to the Canada Green Building Council was opened in 2005. The construction of the Southeast Reservoir Pumping station will conclude and is expected to be operational in 2013. The Certification requirements will be submitted upon substantial completion expected in late 2013, with the goal to achieve the LEED Silver designation from the Canada Green Building Council.

4.3 REGIONAL MATERIALS RECOVERY FACILITY

The Regional Materials Recovery Facility (MRF) was completed in October, 2011 after 18 months of construction. The facility was initially designed to meet the Leadership in Energy and Environmental Design (LEED) Silver Certification for its green design and construction. This 75,000 square foot (6,968 square metre) facility features an administration building, main processing area, weigh scales, and an equipment service building. During the certification process, it was determined that the LEED Silver certification was not achievable due to the inclusion of the numerous material handling areas identified during the certification scope review. Nevertheless, the City of London continued with the use of LEED Silver design criteria, such as:

- A green roof to reduce storm runoff and conditioning requirements
- The use of renewable material made out of environmental materials
- Storm water management ponds



The MRF remains an example of 'building to LEED standards' but not being eligible for certification due to the very unique circumstances of a recycling (processing) operation.

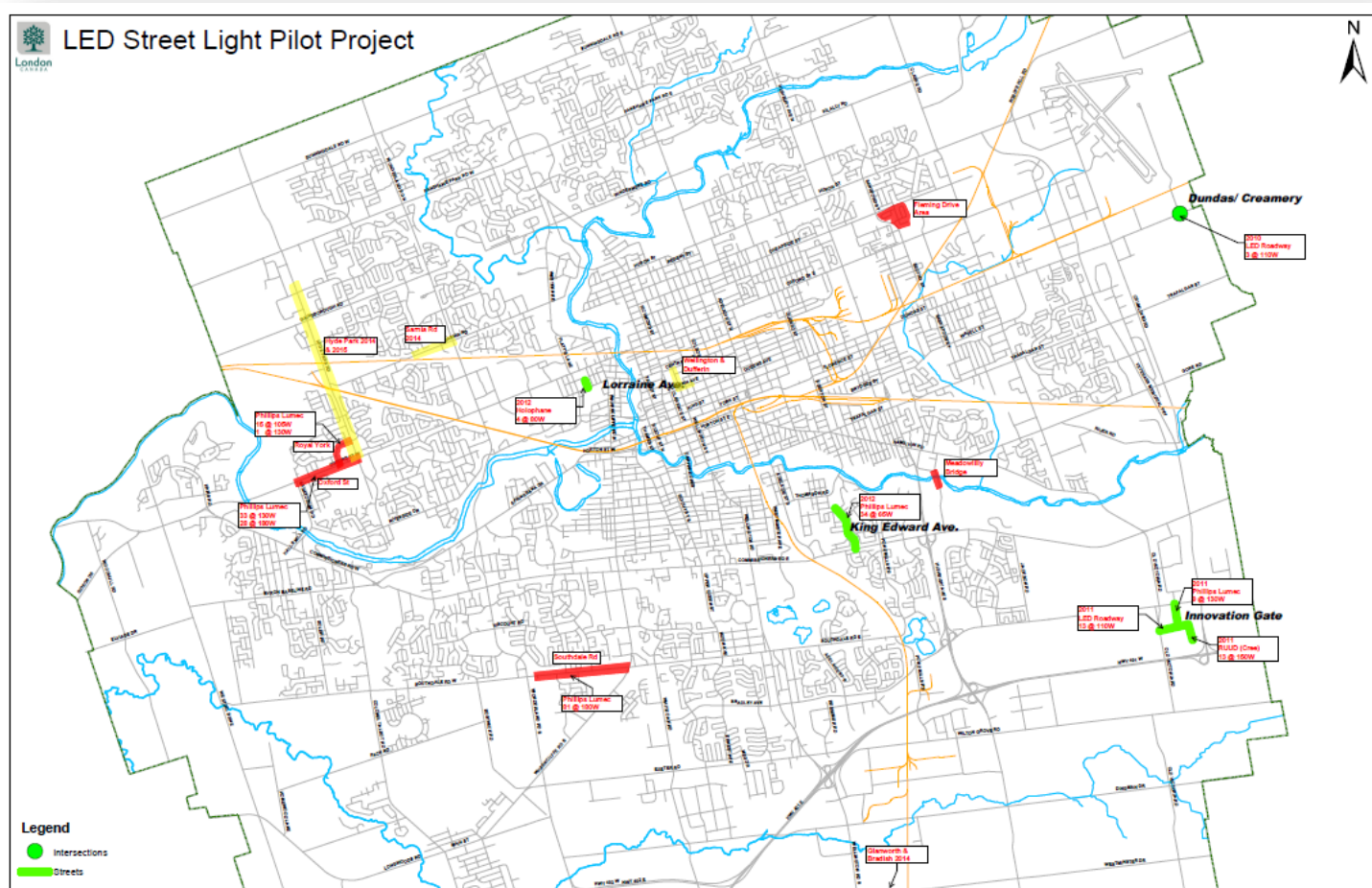
5 ENERGY CONSERVATION AND DEMAND MANAGEMENT PROJECTS

The City of London, as part of the Strategic Plan to provide a Green and Growing City, continues to explore energy management within every project. Energy conservation and demand management consists of corporate initiatives and projects that result in the reduction of energy consumption by proposing more efficient methods and technologies and/or technologies that shift power demand to off-peak periods.

The strengthening of our corporate energy management team has brought forward a number of conservation projects, and energy management staff also having the opportunity to weigh in and encourage energy-saving measures on upcoming designs and proposals throughout the corporation has proven to be beneficial.

All service areas are encouraged to participate in the promotion of a green and growing city and sustainable infrastructure for London's Strategic Plan.

5.1 ROADS AND TRANSPORTATION



Since 2009, the Roads and Transportation division for the City of London has been reviewing alternatives to the use of high pressure sodium (HPS) luminaires in the street lighting network, such as the use of LED street lights. One of the biggest challenges with the LED fixtures is finding products that meet engineering standards for lighting on roadways. Currently, there are few LED products that meet the standard without major retrofits of existing pole locations.

Between 2010 and 2012, the City of London initiated four LED street light pilot installations to evaluate their effectiveness and possible expansion of use in London. The four locations are highlighted in green in the LED Street Light Pilot Project map above which include:

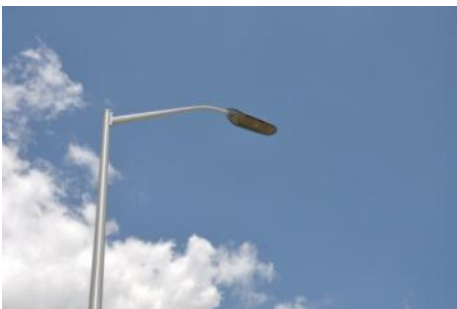
1. Creamery Road at Dundas Street

This rural intersection was fit with LED lighting on March 2010 as a pilot project. Lighting levels and performance continue to be monitored to determine real world performance, and to evaluate potential future applications in the City. At the time of install, the cost of LED fixtures was approximately three times that of HPS fixtures, which impacts the overall rate of return.



2. Innovation Park Phase III

In October 2011, Innovation Gate consists of LED street lights from three different manufacturers (Phillips Lumec, LED Roadway & RUUD) as a pilot project.



The three LED street lights met the photometric and heat dissipation requirements. The LED lighting is part of a new development area to again evaluate potential future applications in the City for new installation projects.

3. Lorraine Avenue.

Four Holophane LED street lights were installed in 2012 at the Lorraine Avenue location as part of the pilot project initiative.



4. King Edward Avenue.

In 2012, 34 LED Phillips Lumec street lights were installed to replace and retrofit existing HPS fixtures in a residential setting on King Edward Avenue.



Preliminary results conclude that the installations of all fixtures appear to be operating as expected. In efforts to continue in the direction of LED street light technology, designs and tenders of numerous road work upgrades in 2013 and projections to future projects to 2015 include LED street light technology. Roads & Transportation have initiated eight new LED Street Light projects to add to the LED Street Light Pilot Project, three designs in 2013 alone will include the replacement of over 150 HPS fixtures with new LED fixtures.

5.2 WASTE WATER TREATMENT PLANTS

The City of London operates six Wastewater Treatment Plants (WTPs) and 36 pumping stations to assist wastewater flow to plants from gravity sewers or force mains. Wastewater Operations' primary focus is the treatment of incoming sewage to meet legislative requirements set out by the Ministry of Environment. As operating costs, energy demands and commodity costs continue to climb, the evaluation of operating efficiencies, energy conservation methods, and demand management projects and initiatives become a key role to successful wastewater and treatment facilities.

Between 2010 and 2013, Wastewater Operations implemented a number of projects that fit within best practices of energy conservation and demand management initiatives. Some of these projects include:

- WTP wide, wastewater operations completed lighting retrofit upgrades with contributions from the OPA in the amount of approximately \$33,000 in incentives.

- At Greenway WTP, replaced a 40 tonne single stage cooling unit with two 20 tonne variable speed staged cooling units. This reduced the chiller energy requirements by almost half.
- At Greenway WTP, replaced old wound rotor-style motors with more efficient immersible-style motors.
- At Vauxhall WTP, repurposed surplus blowers from the sludge holding tank mixers to reduce energy use.
- At Vauxhall WTP, the sludge holding tank's existing mixer was upgraded to remove two 75 horsepower blowers and replace with two 5 horsepower mechanical mixers.
- At Pottersburg WTP, replaced a 1 million BTU boiler with 3 individual staged control units.



Wastewater Operations continue to make improvements and find efficiencies within their current operations. In 2013, Wastewater Operations have identified a number of additional projects including:

- The installation of sewage sludge dewaterers at the Greenway WTP. This installation was commissioned in June 2013, and is expected to eliminate the need to co-fire the sludge incinerator with natural gas, resulting in the potential to decrease natural gas consumptions by an estimated 75 percent. Given that this was the Corporation of the City of London's largest single user of natural gas, this project is expected to have a significant impact. Wastewater Operations have also applied for CDM funding from London Hydro and Union Gas to lower the project costs.

- A detailed Engineering study, approved as part of the process systems upgrade (PSU) program with the OPA, is complete for the Vauxhall Aeration Optimization study. The study is required for OPA incentive projects expected to achieve greater than 750MWh/year savings. A trial blower was offered as part of the study to verify saving potentials. London Hydro is monitoring the blower's electrical consumption. Initial findings estimate an approximate 900 MWh/year in savings – over \$100,000 per year. This study will act as a template for future incentive funding projects with the OPA for other City owned WTP plants with similar aeration optimization potentials. An application is currently submitted to the OPA under the PSU program for a blower replacement at Adelaide WTP. The blower replacement is also estimated to achieve greater than 750 MWh/year in yearly savings.

5.3 WATER ENGINEERING AND OPERATIONS

Elgin Middlesex Pumping Station (EMPS)

In fall 2013, the Southeast Reservoir Pumping Station (SERPS) is expected to be substantially complete and operational. Currently, water from the Elgin Middlesex Pumping Station (EMPS) is pumped by high pressure pumps directly to the City of London distribution system. Once SERPS is online, the current EMPS pumps that convey water directly to the City of London distribution system at high pressure will no longer be required.



Water Engineering is undertaking upgrades at EMPS for the replacement of Pumps 4 and 5 with more-efficient water pumps that are better sized for the new pumping requirements. This will result in substantial reductions of energy consumption at this site. The anticipated replacement will change the two 600hp pumps/motors with two 450hp pumps. Preliminary projections indicate an annual energy savings of 840,000kWh/year (over \$100,000/year) and a custom retrofit application to the OPA will be submitted for possible incentive funding in 2014.

5.4 SOLID WASTE MANAGEMENT

W12A Landfill Leachate Pumping Station and Force Main

In 2011, a strategy for reducing landfill odour and trucking costs was developed. The solution included the installation of the W12A Landfill leachate pumping station and force main to pump leachate to Greenway Pollution Control Plant, rather than trucking the leachate from W12A to Dingman Pumping Station.



The annual operating savings associated with the reduction of trucking of leachate are estimated at approximately \$280,000.

5.5 FACILITIES (DESIGN & CONSTRUCTION)

The Facilities Division is responsible for the design, construction, energy management/life cycle renewal works and maintenance of facilities operated by City of London Service Areas with the exception of Wastewater & Treatment and Water. The City of London maintains and operates over 95 sites, 225 building, 750 acres of property and approximately 250,000 square feet (23,200 square meters) of floor space.

Facilities is often invited to manage capital development projects for municipal organizations such as London Fire Services, London Police Service, London Public Library and Museum London.

In Appendix D, Facilities have provided a listing of all 2011/2012 projects that had an energy conservation component associated with them. The projects identified from 2011/2012 were not necessarily large stand-alone energy conservation projects, but rather contribute incrementally to the corporate energy conservation and demand management results. Appendix D also puts into context Facilities participation in the energy conservation efforts and the positive results serve to promote the pursuit of further energy saving opportunities and incentives.

The following are highlights of a number of recently completed projects by Facilities that contribute to energy conservation initiatives.

Centennial Hall - Condensate Heat Recover Project

The Centennial Hall condensate heat recover project was completed to take advantage of a 'waste' heat source that was already present in Centennial Hall. The building is heated using hot water which in itself is heated via steam from the local district energy plant, while the building's domestic hot water heaters use electricity. Previous to the project, the hot condensate generated by the steam converter was dumped down the drain.



The new system was designed to recover some of the heat from the hot condensate and use it to pre-heat the cold water supply to the electric hot water heaters. This pre-heating of the cold water supply to the electric hot water heater reduces the load, resulting in electrical savings. The condensate heat recovery system has been operating successfully since the end of 2009.

The approximate cost to the condensate heat recovery was \$45,000 (part of a \$90,000 overall project) with an approximate annual electric savings of 24,450 kWh (over \$3,000).



High- Efficiency Lighting

In 2012, the City of London continued to explore LED and induction lighting for parking lots and municipally owned facilities. These projects have proven to be cost effective projects with quick return of investments.

Arena facilities owned and operated by the City of London continue to be subject to lighting retrofit projects with new, high efficiency T5 High Output (T5HO) fluorescent lighting systems installed – replacing the

existing, inefficient metal halide lighting.

In 2012, four locations were upgraded to provide better lighting. A complete lighting retrofit using T5HO lighting and dimming systems allow instant on/off plus instant dimming lighting levels for varying activities.



The four area pads' electricity consumption savings vary based on the previously installed lighting systems that they replaced. As an added benefit, the replacement fixtures offer higher quality light and reduced maintenance costs. The lights were installed and active in the fourth quarter of 2012. In a nine month comparison (a typical operational season for the ice pad), combined, the four arenas saved approximately 215, 000 kWh of energy and approximately \$16,000 compared from the previous year.

Monitoring the lighting projects over the next 12 months will provide a better overall percentage in cost reductions as nine months is an extremely short window. In the initial nine months, Glen Cairn looked to be

underperforming. The discovery of this unexpected result gave the Energy Management team the opportunity to review the activities that took place in the arena during the nine month window, it was determined that the energy consumption anomaly coincided with some maintenance work that happened in November 2011.

The City continues to develop business cases for high efficiency interior lighting and lighting controls in various municipal buildings and include lighting measures that comply with the saveONenergy incentive program for additional grants and funding.

The four ice rink lighting retrofit projects have been submitted for funding offered through the saveONenergy incentive program.

The continued quick payback and return of investment associated with lighting retrofit projects proves their effectiveness as energy conservation projects. The City of London continues to review capital assets identifies opportunities where lighting upgrades can be completed - making our building inventory more efficient operationally.



Rechargeable Ice Edgers

Facilities, Parks & Recreation and Fleet Services began a review in 2012 on the use of rechargeable Ice Edgers for our arena facilities. Ice edging is one of the many necessary tasks for artificial ice maintenance. The standard ice edger consists of an internal combustion gasoline engine which drives the ice shaping blade. Due to the exhaust fumes generated by the gasoline engines, it is necessary to operate the arena's large exhaust air fan during and after the ice edging.

The rechargeable ice edgers, when considered on their own, represent additional electrical load. However, this power consumption is more than offset by the avoided electricity associated with not operating the exhaust fan when using the rechargeable ice edgers. This initiative does not fit within the OPA's retrofit program incentive categories, but it represents significant energy savings nevertheless.



In addition to the energy savings, the operations of rechargeable ice edgers represent a peak demand savings, since the ice surface refrigeration plant can continue to idle (while the edging is completed) to overcome the building heat losses rather than needing to ramp up to overcome the significant heat losses associated with ventilation air.



In 2012, Facilities engaged Ameresco to evaluate the existing condition of the facility, and provide a range of sustainable energy options at a number of Community Pools which included the Canada Games Aquatic Centre. The study for the Canada Games Aquatic centre revealed:

- Much of the mechanical and electrical equipment serving the pool and spectator area is reaching the end of its anticipated service life and requires replacement and
- The existing air handling system serving the pool does not provide enough ventilation to meet current design standards. Implementation of the proposed HVAC system upgrades would allow for proper ventilation of the area and would significantly improve the indoor air quality.

The study recommends the following energy saving measures:

- new lighting in pool and spectator area

- new hot water heater with a high efficiency condensing system
- new high efficiency pool pumps with variable-frequency drives
- pool drain heat recovery system
- combined heat and power energy generation
- new high efficiency condensing boilers
- Building Automation System
- LED Parking lot lighting
- new change room make-up air (MUA) with integral energy recovery
- new high efficiency roof mount air handling units for spectator area
- new Packaged Rooftop Units (RTUs) serving administration offices and community rooms
- replace pool air handling equipment outdoor energy recovery



There are incentive dollars available from both the OPA and Union Gas to assist with implementation of the energy conservation measures identified, and the measures presented in this report would significantly contribute to improving comfort for staff and patrons, reducing operating costs, and providing London residents with a reliable and highly efficient facility for another 20 years.

Implementing these energy measures is expected to result in:

- Over 40% reduction in overall energy usage (electricity and natural gas) at the Canada Games Aquatic Centre; and
- Over 42% reductions in facility greenhouse gas emissions.

This project is currently in the Design Development stage. Funding for Phase II of this project will be subject to further review during Council's preparation of the 2014 Municipal budget.

Facilities Upcoming Projects

In 2013, Facilities is currently reviewing a number of energy projects. To date some high level projects include:

- cost benefit analysis at Nichols arena relating to new technology that allows for cooler flood water use in ice building and resurfacing, which could reduce utility consumption and equipment wear and tear.
- Lighting (T12) replacement reviews at McMahon Boathouse and Museum London.
- Reviewing opportunities at Centennial Hall for dressing room area HVAC upgrades; and
- Victoria Park bandshell heat/domestic hot water recovery.

5.6 FLEET SERVICES

Green Fleet Initiatives

The City's Fleet Services Division is responsible for over \$45 million in municipal fleet and equipment assets. Services include vehicle and equipment purchases and disposals, maintenance and service, as well as fuel management and refuelling stations. Fleet vehicles and equipment support 29 City of London service areas and provide various services to indirect clients including Library Board, Tourism London, Fire and Police. The fleet consists of over 1250 units ranging from hand held equipment like string trimmers, to light passenger vehicles, to heavy off road equipment like graders and backhoes. As a large consumer of energy, Fleet Services continues to research technology that reduces both energy consumption and its environmental impacts.



Fleet Services have tracked fuel use in vehicles since 2004 to better understand and implement fuel savings opportunities and how to reduce environmental impacts. This included the introduction and procurement of Hybrid vehicles and Smart Cars, which used around 40 percent less fuel on average compared to other light-duty passenger vehicles used in the fleet. On average, this has saved over 5,500 litres of fuel per year and reduced greenhouse gas emissions by 12 tonnes per year.

Today, the current City of London “Green Fleet” Roster consists of:



City of London “Green Fleet” Roster

Vehicles / Equipment Type	Number of units in service
Hybrid SUV	20
Hybrid Car	8
Smart Cars	2
Vehicles using E10	201
Vehicles using B5 biodiesel blend	37
Total Green Fleet	268
Total Vehicles & Equipment using fuel	546
Green Fleet Percentage of overall fleet	49%

In 2011 Fleet Services started using biodiesel which consists of a blend of 5 percent biodiesel with 95 percent conventional diesel. The use of biodiesel has demonstrated significant environmental benefits. In 2011, London's fleet used 618,000 litres of biodiesel, which reduced greenhouse gas emissions by 87 tonnes. In 2012, London's fleet used 745,000 of biodiesel, which calculated to approximately 103 tonnes of GHG emissions.

In the commitment to the reduction of emissions, Fleet Services are updating an Action Plan which focuses on future reduction strategies for fuel consumption, use of alternate fuels and review of reduction technology such as low emission vehicles and equipment. The action plan provides an aggressive approach to the following objectives:

- The reduction of GHG emissions at a rate of 10 percent over the next two years
- The reduction of fuel consumption by 5 percent by 2014
- To maintain London as a leader in “Green Fleet” initiatives by continuing to work with Fleet Challenge Ontario and advancing green fleet initiatives and programs, and
- London will be in a position to apply for an E3 (Environment, Energy, and Excellence) rating for their accomplishments in 2013/2014.

In order for Fleet Services to achieve this approach, a vehicle and equipment emission reduction strategy will be implemented. The strategy consists of five measurable target areas which include the review of computerized fuel management systems, preventative maintenance programs, the procurement of fuel efficient and “right fit” vehicles and equipment, the use of Hybrid, Electric Vehicles, alternative fuel vehicles, and vehicle and driver performance monitoring training programs.

Electric Vehicles and Charging Stations

Fleet Services continues to approach new and upcoming technology. Currently the City of London is reviewing the pending purchase of our first electric vehicle to the fleet in 2013. The City of London is currently investing into electric vehicle infrastructure by piloting an installation project for electric vehicle charging stations. In March, 2013 the Charging London pilot project was launched with three EV charging locations installed in three public accessible parking lots in the City of London.

In reviewing potential locations for the EV charging stations, City staff took in to account the following factors:

- Public accessibility
- Proximity to popular destinations
- Promotional opportunities, and
- Availability for use by potential future City of London fleet EV's

The City Hall Lower Level Parking garage was selected, as this location could be used by both a future City of London fleet EV as well as the public. The ChargePoint EV Charging Station was selected for trial in this parking lot due to its ability to provide this dual service.

Budweiser Gardens was selected as the trial for the Sun Country Highway EV Charging Station. This public accessible lot serves the public attending Budweiser Gardens during entertainment and sports venues, but also provides monthly public parking to employees of local businesses surrounding this facility and hourly parking for visitors to downtown local businesses. This multi-use opportunity coupled with proximity to the popular destination of Budweiser Gardens made this lot an excellent location to provide an EV Charging Station.



Covent Garden Market is also another popular destination within London which has monthly public parking to employees and hourly parking for visitors. The Covent Garden Market Parking Garage was selected to trial the General Electric EV charging station in this parking lot due to its availability to the public and proximity to popular destinations.

6 ENERGY PROCUREMENT

The City of London uses energy procurement strategies in an effort to mitigate the cost of energy. Since 2005, summaries of our accounts indicate that our electrical procurement strategy has helped to avoid over \$6 million in accumulated electricity costs versus the use of the Provincial Government's Regulated Price Plan (RPP).

**Summary of London Accounts:
WattsWorth Recommended Strategy vs. RPP**

Year	Average Cost of Electricity (\$MWh)	Regulated Price Plan (RPP)	Electricity Savings as a Percentage	Average RPP Costs Paid by the City of London
2005	\$51.42	\$55.69	8.3%	\$440,000
2006	\$53.03	\$63.14	19.1%	\$1,036,000
2007	\$54.35	\$62.03	14.1%	\$771,000
2008	\$53.50	\$59.99	12.1%	\$687,000
2009	\$59.68	\$65.71	10.1%	\$654,000
2010	\$64.81	\$72.61	12.0%	\$800,300
2011	\$68.53	\$77.33	12.8%	\$988,400
2012	\$73.66	\$81.77	11.0%	\$876,000
Totals	\$59.87	\$67.28	12.5%	\$6,250,000

Note: The City's Large Accounts do not qualify for the RPP as of 2010. The data is provided only for context and reference.

The significance of the amount of avoided costs obtained by the City of London as measured against the RPP has resulted in many other Ontario municipalities joining with London's energy procurement advisor (Wattsworth Analysis Inc.) and creating a larger buying pool of municipalities. Also of interest is that Local Authority Services (LAS), operated under the Association of Municipalities of Ontario (AMO), began operating a comparable program for municipalities based, in part, on the success of the program that London had enlisted in back in 2005.

In addition to procurement strategies, Wattsworth provides projections in commodity price forecasts for electricity and natural gas. This assists the City of London to project long term budgetary considerations in preparation for budget projections. Currently, projections indicate rate change increases for the next five years for electricity and natural gas contracts. These projections in market forecasts give the City of London the opportunity to prepare for increased operating costs and to develop additional measures to mitigate some of these financial impacts.

Rate Changes Year over Year

Year	Electricity	Natural Gas
2014	6.6%	5.3%
2015	6.7%	5.5%
2016	6.8%	5.8%
2017	7.0%	6.1%
2018	7.2%	6.5%

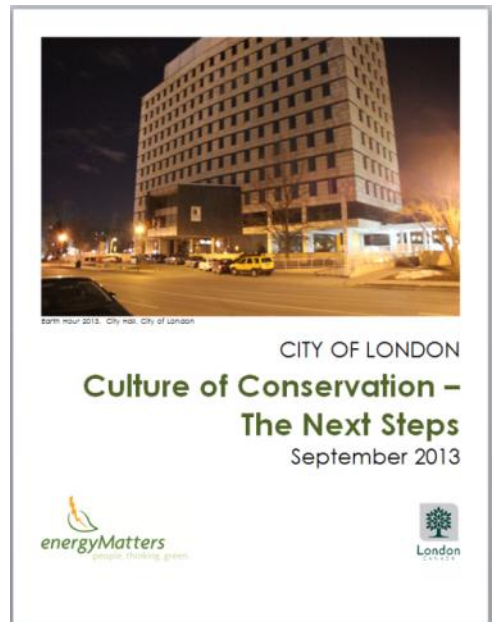
7 CREATING A CORPORATE “CULTURE OF CONSERVATION PROGRAM”

In the past, there have been many programs that the City of London participated in to focus on energy conservation. The City of London developed a corporate energy program to embrace a culture of conservation called *energyMatters*.



The *energyMatters* program was developed to engage staff on their participation and impacts towards corporate energy. With Regulation 397/11 legislation introduced by the Provincial Government, it has opened the opportunity to enhance and update the existing *energyMatters* program to help achieve and assist with our five-year energy conservation and demand management (CDM) plans.

The updates to the *energyMatters* program and further details are featured in the City of London Culture of Conservation Program – The Next Steps document September 2013. The revised program is primarily focussed on City of London staff to promote the key principles “A Green and Growing City” and “A Sustainable Infrastructure” identified in the City of London's Strategic Plan. The plan challenges staff to participate and commit to their role of energy conservation. Engaging City of London staff in energy conservation initiatives, combined with improvements to facilities, can reduce costs of City services/operations and assist in achieving conservation targets.



As energy and fuel costs rise, combined with ongoing desire to minimize property tax increases, due diligence from staff for measureable energy conservation will assist with meeting budget challenges. Simple measures such as change in behavior, change in operation procedures, and change in the “lack of ownership” perceptions help contain energy costs.

8 INCENTIVE FUNDING FOR CORPORATE ENERGY PROJECTS

The City of London has been very active in pursuing grants and incentives that are made available by provincial & federal governments, London Hydro, Union Gas and The Federation of Canadian Municipalities (FCM). The incentive programs offer incentive funding for controlling and reducing electricity demand by replacing energy-wasting equipment or to pursue new construction that exceed provincial building codes and standards which in turn assist the City of London in targets to reduce annual electricity costs and GHG production.



saveONenergy™
RETROFIT PROGRAM



In 2009, the City of London received over \$700,000 in incentive funding. In 2011, the City actively pursued a variety of grants and received an additional \$315,000 and an additional \$51,000 was received by end of year 2012. This totals over \$1 million in incentive funding since 2006.

Currently in 2013, the City of London is actively searching for further incentive opportunities. The EMCT have nominated numerous projects for review and continue to work with service areas in promoting the incentive funding available in proposed projects. Currently the EMCT have identified approximately \$100,000 in incentive funding in 2013 to date.

Appendix E provides a breakdown of applications and incentives received from 2010, along with an overview of projected and in-process incentive applications. Special acknowledgement should go to London Hydro's conservation and demand management activities and Union Gas' enersmart programs for the assistance and funding provided to these Energy Efficiency and conservation activities.

9 OTHER ENERGY CONSERVATION AND RELATED INITIATIVES

Identified below are a few of the other higher profile energy efficiency and conservation measures undertaken by the City of London:

9.1 WATER ENGINEERING AND CONSERVATION

Water engineering is committed to ensuring financially and environmentally sustainable water supply to meet the needs of London's consumers. By maintaining a modern, fully developed water system, the City will ensure that all its customers can rely on a water supply that is safe, plentiful, and renewable.

In 2010, the Water Engineering division created a water efficiency program. The program identified a strategy to decrease the long term costs associated with water treatment and

distribution system operations. With effective water efficiency planning, a municipality can provide energy savings, chemical use reduction, and greenhouse gas emission reductions. The program was developed to meet legislative requirements while maintaining industry best practices in conservation, efficiency, and environmental stewardship.



In July 2012, the City's Water Engineering area started a campaign showing the need for a new funding model for its water and wastewater services, a model that is fair and equitable, sustainable and affordable. The City of London needed a funding model that would ensure financial stability for our water system, promote conservation, and support economic development and job retention. Within the strategy was a mix of focus groups, marketing campaigns, website updates, a town hall meeting, coupled with education and awareness programs. Once council approved the new model a large citywide information campaign was started, with in this campaign every rate payer was sent a dye pack and explanation on how to perform a leak test on their toilet, with an end goal of water efficiency and conservation.



www.london.ca/julian

City facility assessments and updates are identified in the program as a key element to the water efficiency strategy to ensure that the municipality is the community leader in water conservation. This component of the program helps other City services by reducing the utility costs for water and sewer in addition to energy costs for heating water. Most City buildings are being updated with the most current water efficient fixtures on the market. However, an assessment of all City parks and facilities will be undertaken to ensure that the City's water use practices are setting the standard for the community.

As part of the Water Efficiency program, in past years Water Engineering have completed:

- A leak detection program
- Education and awareness program
 - Marketing and water use analysis
 - Customer surveys to establish customers baseline habits
- Rate structure change with higher conservation rates
- Impeller/pump analysis at the Arva Pumping Station
- City wide hydraulic model to help learn more about the system
- Establishment of an outdoor residential home water and energy audit.

In the future, Water Engineering will be:

- Expanding on the existing leak detection program City-wide
- Examining pumping station procedures when the Southeast Reservoir and Pumping Station comes on line
- Further refinement or marketing campaigns to reduce water use
- Expand the residential water/energy audit

10 ENVIRONMENTAL PROGRAMS ASSISTING IN CORPORATE CONSERVATION

The City of London has many environmental programs and initiatives designed to provide information to save water and energy and provide focus on key initiatives driven by education and awareness programs. These initiatives are key in the promotion of energy management.

10.1 RETHINK ENERGY LONDON

The Rethink Energy London program was launched in 2010 to assist in setting goals and priorities that will influence the future of the city for years to come. The project created an avenue to increase public awareness, encourage stakeholder action, seek input on sustainable energy actions and highlight the role of green jobs and the green economy in London.



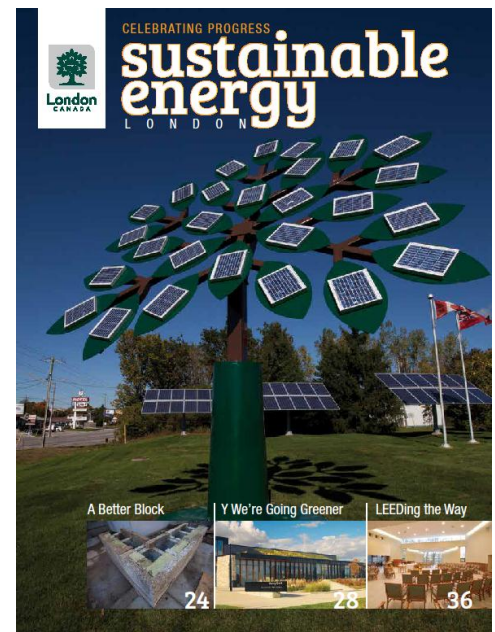
The information provided from the Rethink Energy London program affected the decisions and planning efforts directly related to our Corporate Energy footprint. Rethink Energy London provided an avenue for the community to partake in discussions on what is needed to move forward on topics such as sustainable energy, climate change, and air quality issues at community and corporate levels.

The information collected from the Rethink Energy London program assisted the City of London with the publication of the [Celebrating Progress Sustainable Energy London 2013](#). It is important for the City of London to lead by example on sustainable energy. The Celebrating Progress publication draws attention to city-wide projects focussing on sustainable energy. London's energy stakeholders have been engaged for years on energy conservation, energy efficiency, and renewable energy projects.

The publication serves as an important promotional piece for London's future in sustainable energy projects. The publication helps to promote and highlight examples of sustainable energy projects that have been completed throughout the City of London. These projects include examples of:

1. Harnessing the sun
2. Tapping into the Earth's energy
3. Capturing the wind
4. Changing the way we move
5. Using less energy
6. Leading the way

The publication is intended to re-engage the Rethink Energy London program by obtaining commitments and recommendations for more sustainable energy actions to create a new Community Energy Action Plan. The Community Energy Action Plan will bring together related issues like energy conservation, energy security, renewable energy, air quality, greenhouse gas emission reduction strategies, job creation and economic development. The plan will focus on short term actions that are achievable and set sights on longer term actions required for 2030.



10.2 MAYORS SUSTAINABLE ENERGY COUNCIL (MSEC)



Since 2007, the Mayor's Sustainable Energy Council (MSEC) has been working with local energy experts to promote, encourage and support the development and implementation of practical research and initiatives, technologies, and investment in the area of sustainable energy, including energy conservation, efficiency, and alternative energy for the sustainable

economic and environmental benefit and use of London and surrounding region. To assist in these activities, MSEC launched its Energy Saver website london.ca/energysaver to connect residents and businesses with information and incentives for energy efficiency, energy conservation, and renewable energy activities.

MSEC consists of numerous professionals in the public and private sectors within London that volunteer their time and expertise to promote initiatives of sustainable energy and conservation.

10.3 CORPORATE TRANSPORTATION DEMAND MANAGEMENT INITIATIVES

Through several commuter-focused initiatives, employees are encouraged to leave the car at home and take transit, carpool, ride, or walk to work. The benefits include healthier employees, less traffic on London roads, and a Corporation that leads by example. Initiatives include providing bike parking and shower and change room facilities, *London Carpools* – a carpool ridematch service, and providing information on transit and cycling. Initiatives are also tied to employee wellness and physical activity programs.



11 CORPORATE ENERGY SAVINGS AND COST AVOIDANCE

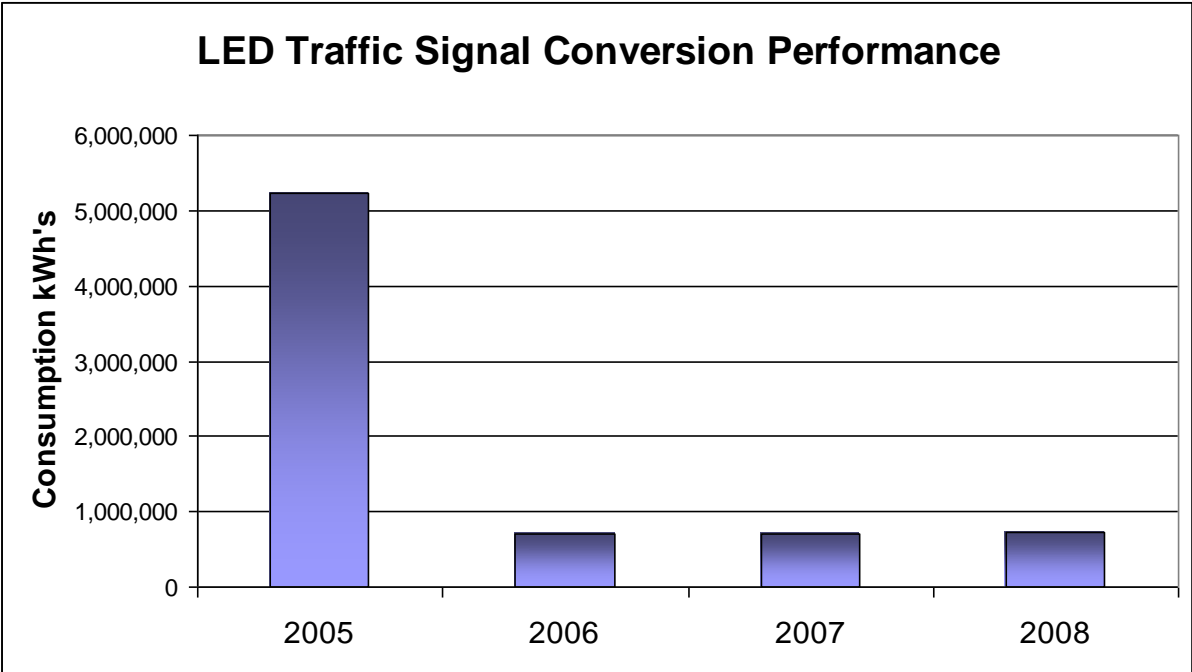
Prior to 2007

One of the biggest challenges that faced the City of London and its Corporate Energy Management Program for the first, 15 years, was the inability to track overall energy consumption and energy savings associated with energy retrofit projects. Monitoring and reporting systems for individual buildings and other mechanical systems were very limited. Therefore, the ability to produce comprehensive results was not possible.

Consultations with other municipalities have shown that insufficient data has been one of the biggest challenges in tracking energy consumption and savings realized from conservation projects. London's past practices included ad-hoc tracking by staff using spreadsheets, and limited reporting through accounting software. Fortunately this changed for London around 2005 and by 2007 comprehensive data was available.

The downside for London is that the best base year for preparing annual comparisons is 2007. This results in energy conservation projects implemented by the City of London prior to 2007 are not part of the data analysis and no ‘credit’ is given associated with projects that reduced energy consumption and associated costs prior to 2007. This indicates that London, being an early adopter of energy conservation initiatives, does not receive the full credit for measures taken earlier than the 2007 base year and also makes it difficult to compare with other municipalities that have just recently launched into these initiatives in the last five years.

For example, London switched to light-emitting diode (LED) traffic signals in 2005. They saved over 4,500 megawatt-hours (MWh) of electricity per year. The traffic signal electricity cost before the LED conversion was \$432,000. The electricity cost for the first year after the LED conversion was \$58,000. It also resulted in an emission reduction of over 1,100 tonnes of greenhouse gases per year



The City of London has many examples that fall into this category.

2007 to 2012 (Six Year Period)

With the ability to track the overall energy consumption since 2007, the City of London has the ability to use 2007 as a baseline to calculate the cost avoidance achieved.

In terms of service delivery to Londoners, corporate energy use per person dropped by 10 percent from 2007 levels. This reduction can be attributed to recent energy conservation measures and facility upgrades, as well as above-average winter temperatures in 2012 that reduced the need for building heat. These energy savings required a financial investment which produces both annual savings (true savings) and an accumulating avoided future cost (money that would have been spent under a ‘business as usual’ model)

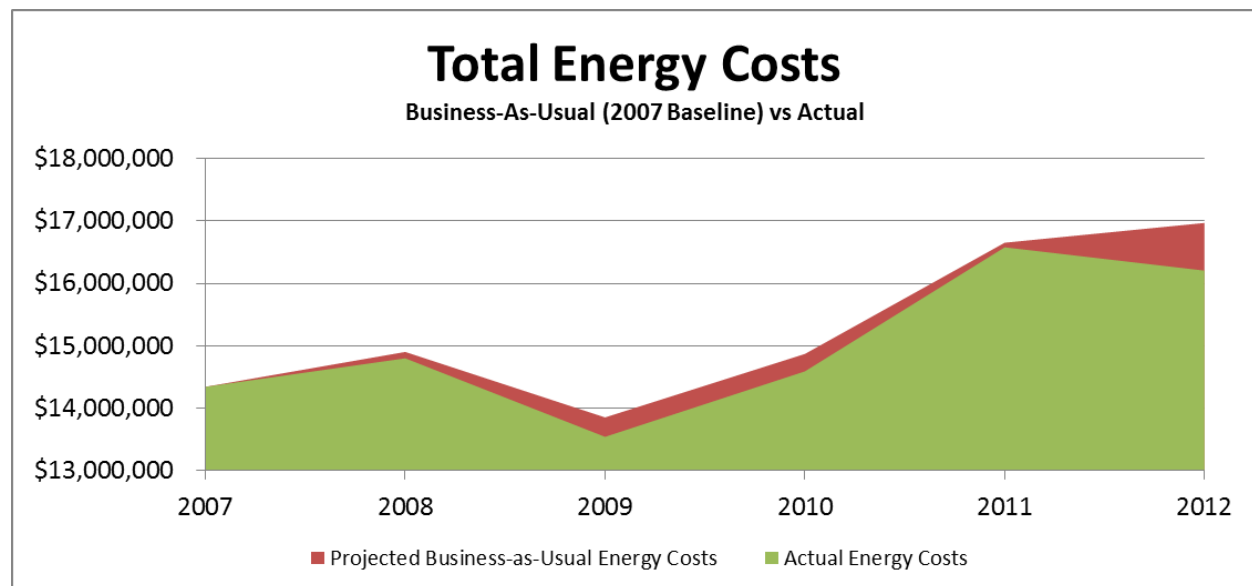
Energy Costs Per Capita by Service Area 2007-2012

Energy Consumption (ekWh) by Commodity per person	2007		2012		Change since 2007		2007-2012 Avoided Costs
					Variance	% Change	
Electricity	305		294		(11)	-3.6%	\$ (434,000)
Natural Gas	165		125		(40)	-24.2%	\$ (282,000)
Steam	10		7		(3)	-28.7%	\$ (42,000)
Chilled Water	5		5		(0)	-1.5%	\$ (3,000)
Diesel Fuel	57		56		(0)	-0.7%	\$ (13,000)
Gasoline	19		19		0	1.4%	\$ 11,000
Total City Of London	561		507		(54)	-9.6%	(\$763,000)

Other observations:

- Energy costs in 2012 were \$750,000 less than they would have been if the City still used energy at 2007 levels. This number would be even higher if compared against the year 2000.
- The City has accumulated more than \$1.5 million in avoided energy costs so far since 2007 due to improved energy efficiency in service delivery and capital investments.
- Between 2007 and 2012, the City spent between \$300,000 to \$600,000 per year in operating costs associated with energy management staff, feasibility studies, and other consulting costs.
- In this same period, the City spent between \$250,000 and \$1 million per year in capital investments related to energy-efficiency projects. These investments create energy savings every year over the life of the investment
- Energy cost for each commodity increases each year. Therefore, sustained energy reductions become more important each year as each unit of energy consumed becomes more expensive with rising energy prices.

Estimating Avoided Energy Costs



12 ECONOMIC DEVELOPMENT AND BUSINESS OPPORTUNITIES

In addition to the corporate energy cost savings associated with corporate energy management activities, these projects also generate economic development and business activity in London. Examples of this include:

- Energy retrofits of municipal buildings are primarily carried out by London area service providers, and can also generate demand for London area suppliers of energy-saving products. These product and service providers can then use the experience gained from municipal projects to the benefit of London area businesses and institutions.
- Green municipal building projects, such as the Stoney Creek Community Centre, provide opportunities for London area product and service providers to increase their capacity to deliver these products and services to other London area businesses and institutions.
- Technology demonstration projects, such as LED lighting trials on London roadways and parking lots, allows this technology to be tested in local conditions against existing standards often based on older technologies. This helps to bring new technology to the London area, either by providing London area product and service providers with experience in utilizing this new technology or by bringing new product and service providers to London to serve our market.
- Concepts, technology and business strategies developed and/or tested in London represent export opportunities in North America, Mexico and South America.
- Municipal renewable energy projects provide London area product and service providers with experience in undertaking projects that help to expose unexpected challenges, such as transmission grid constraints and technology standards developed for older technologies, that can then be addressed and/or taken into account for future projects. This activity will represent a number of different business opportunities and/or community opportunities.
 - The City of London's lease of land to London Hydro for the installation of ground-mounted solar power systems (solar trackers) at the Oxford PCP, Adelaide PCP, the new South East Reservoir, and the Materials Recovery Facility have helped London Hydro raise the profile of solar power within London.
 - Proposed leasing of rooftops on a number of City buildings to a joint-venture partnership between London Hydro and the London District Renewable Energy Cooperative that would install rooftop solar power projects under the Ontario Power Authority (OPA) Feed-in-Tariff (FIT) program represent both financial opportunities for the City (e.g., proposed rooftop lease payments), opportunities for London area product and service providers, and community co-op participants.
 - A new provincial competitive procurement process for larger renewable electricity projects is expected to open in early 2014 and the City will be re-submitting its application for a 2.4 megawatt power plant using landfill gas as the energy source

to create electricity. This activity will represent a number of different business opportunities and/or community opportunities.

- The City of London is working with London Hydro to explore the use of innovative Organic Rankine Cycle technology to recover waste heat at the Greenway Wastewater Treatment Plant in a “behind-the-meter” electricity load displacement application. This project requires the provincial Technical Standards and Safety Authority to revise outdated requirements mandating full time operators for this innovative technology.
- Numerous energy conservation and sustainable energy projects are underway at Western University and Fanshawe College, and municipal facilities can continue to act as a test site for a number of these projects, in partnership with London Hydro, Union Gas and many local, regional and international businesses.
- The London Economic Development Corporation (LEDC) is a partnership between the City of London and the private sector. The goal is to attract new investments and expand existing investments in London. LEDC has a CleanTech Sector overview that it makes available to interested companies with respect to energy conservation and sustainable energy opportunities, and municipal facilities can continue to act as a test site for product and service providers looking to break in to the Ontario and Canadian marketplace. http://www.ledc.com/_pdf/Manufacturing/Cleantech.pdf .
 - It is worth noting that in July 2013 many ‘Small FIT’ projects (less than 500 kW generating capacity) were awarded in London as part of the FIT process. This will represent opportunities for London area product and service providers.

13 AGENCIES, BOARDS AND COMMISSIONS

Many Boards and Commissions have also undertaken sustainable energy initiatives; however, this report outlines only City of London activities.

14 WHAT'S NEXT...

The Past and Current Energy Management Activities document sets the stage and identifies the City's current role in energy management. The City of London has proven leadership in energy conservation and sustainability.

In the creation of the Corporate Energy Conservation and Demand Management Plan, it is important to note, obtaining commitment is key to a successful CDM Plan. The corporation's adoption of the City of London Strategic Plan 2011-2014, highlights our commitment to fiscal responsibility to a green and growing City, and a sustainable infrastructure.

The City of London will continue with the process of creating a Corporate Energy Conservation and Demand Management Plan to follow our strategic plan responsibilities as well as meet the regulations set out by the Green Energy Act and the Ontario Regulation

397/11 for July 2014. An internal stakeholder and consultation process will take place to develop targets and plans to assist in the five year CDM plan. The plan will focus on the continued short term initiatives achievable and set sights on longer term actions supporting energy conservation and demand management.

APPENDIX A

AMERESCO PHASE I



CITY OF LONDON 2007-08 Facility Renewal and Energy Related Projects

	Building	Description of Study Scope	Measure Type	Projected Savings	Electrical Energy Savings (kWh)	Natural Gas Savings (m3)	Percent Complete	Completion Date	Comments
1	AJ Tyler Operations Centre	Expand existing direct digital control system to include stand alone controls on rooftop equipment and set back in garage areas	Controls	\$1,871	12,473	1,559	100%	30-Apr-08	Extended scope included the addition of VVT controls to the training area to improve temperature control and overall comfort in this area
2	AJ Tyler Operations Centre	Replace exterior doors in Barricade building, tire shop and building #2.	Envelope	\$189		473	100%	11-Jan-08	Reduced scope to include only the Barricade Building (Bldg #19). Move remaining budget to AJ Tyler Boiler Replacement
4	AJ Tyler Operations Centre	Replace Rooftop HVAC Unit in Training Area A	HVAC	\$381	3,810		100%	15-May-08	Cost shown is half of total project cost to replace both units. ERV Unit to be installed by April 30
5	AJ Tyler Operations Centre	Replace Rooftop HVAC Unit in Training Area B	HVAC	\$381	3,810		100%	15-May-08	
	AJ Tyler Operations Centre	Install new cast aluminum condensing boiler	HVAC	\$1,042		2,805	100%	26-Nov-07	Renewal measure
6	Centennial Hall	Miscellaneous Lighting retrofit	Lighting	\$1,550	15,500		100%	28-Mar-08	
8	Centennial Hall	Replace compressor and dryer serving pneumatic control system	Controls	\$150	1,500		100%	28-Mar-08	
9	City Hall	Lighting retrofit of remaining incandescent and metal halide fixtures	Lighting	\$710	7,100		100%	28-Mar-08	
10	City Hall	Replace windows in Council chambers with double pane energy efficient style complete with new aluminum frames	Envelope	\$956		2,390	100%	28-Feb-08	Extended scope includes asbestos abatement and related fees (sampling, air clearance testing, etc.).
11	Fire Hall #1	Install light meters to control the second and third floor perimeter lighting operation during daytime	Lighting	\$239	2,390		100%	30-Apr-08	Project Completed April 23, 2008
12	Fire Hall #1	Weather-stripping of the garage doors	Envelope	\$216		540	100%	31-Jan-08	
	Fire Hall #1	Upgrade boiler plant	HVAC	\$3,850		9,625	100%	24-Oct-08	Boilers started up on Oct 24, 2008. Boiler control switched to BAS on Nov 28, 2008
15	Fire House #9	Replace exterior doors complete with new frames, hardware and weatherstripping	Envelope	\$194		485	100%	30-Nov-07	
17	Civic Gardens	Install new cast aluminum condensing boilers	HVAC	\$9,241		23,103	100%	22-Oct-07	
18	Civic Gardens	Install new direct digital control system with WAN Interface and standardized graphics	Controls	\$1,331		3,328	100%	30-Nov-07	
19	London Museum	Peak load chiller	HVAC	\$0			100%	30-Apr-08	Extended scope includes additional costs for threaded joints in lieu of welding
21	Medway CC	Lighting retrofit of remaining incandescent and metal halide fixtures	Lighting	\$0			100%	04-Mar-08	Scope reduced. There were only 4 incandescent fixtures in the facility that were replaced

APPENDIX B

AMERESCO PHASE II



CITY OF LONDON Phase II Facility Renewal and Energy Related Projects

	Building	Measure Type	Description of Study Scope	Projected Savings	Projected Electrical Energy Savings (kWh)	Projected Natural Gas Savings (m3)	Percent Complete	Completion Date	Comments
1	AJ Tyler Operations Centre	Windows	Replace second floor east windows	\$766	2,553	1,277	100%	30-Jan-09	Construction complete
2	AJ Tyler Operations Centre	Roof	Replace roofing in Area B and C	\$1,758	5,880	2,930	100%	20-Mar-09	Construction complete
4	Byron Pool	Roof	Redesign the roof from flat roof to a peaked roof	\$240	2,400	0	100%	29-May-09	Construction complete
5	Carling Arena and CC	Lighting	Replacement of Arena lighting with fluorescent fixtures.	\$10,800	108,000	0	100%	5-Sep-08	Construction Complete
7	CHOCC	Roof	Roof across the front and roof lower core	\$850	2,833	1,417	100%	20-Nov-09	Construction Complete
8	Centennial Hall	Air Systems	Replace electric rooftop unit serving the east addition with new gas fired unit.	\$0	0	0	100%		Design is complete. Drawings and specs have been turned over to City
9	Centennial Hall	Boiler Plant	Replace four hot water pumps and condensate return system for steam heating system	\$2,445	24,450	0	100%	27-Nov-09	Construction Complete
13	Elsie Perrin William Estate	Domestic Hot Water	Install new high efficiency gas fired hot water tank complete with plumbing piping to replace electric system	\$189	0	423	100%	13-Jan-09	Construction Complete
15	Grosvenor Lodge	Boiler Plant	Install new condensing boiler in main house to replace existing	\$1,086	0	2,715	100%	30-Oct-08	Construction Complete
17	London Museum	Chiller Plant	New Chillers and Control system recommissioning.	\$36,283	241,887	30,236	100%	1-Apr-09	Construction Complete
18	Stronach Arena	Roof	Replace East roof section	\$908	0	2,270	100%	10-Feb-09	Construction Complete
20	EROC	HVAC	Geothermal Heat Pump System for Admin Area	\$20,434	204,340	0	100%	10-Feb-09	Energy savings based on comparison to existing Rooftop system
22	Tourism London	Solar	Supply and install 8.5kW solar PV system. System includes a "solar tree" sculpture that resembles the City of London logo.	\$8,662	10,800	0	100%	05-Oct-10	Construction Complete
23	London Museum	Studies	Lighting Audit and Condition Studies	\$0	0	0	100%	12-Feb-09	Lighting study is complete and has been submitted to Brian Meehan and Bill Campbell

APPENDIX C

AMERESCO PHASE III



CITY OF LONDON Phase 3 Facility Renewal and Energy Related Projects

	Building	Measure Type	Description of Study Scope	Projected Savings	Projected Electrical Energy Savings (kWh)	Projected Natural Gas Savings (m3)	Percent Complete	Completion Date	Comments
1	AJ Tyler	Windows	Replace Remaining windows on 2nd floor	\$ 4,725		11,813	100%	04-Dec-09	Construction Complete
1	AJ Tyler	Study	Review HVAC System for 2nd Floor				100%		
	Canada Games Aquatic Centre	Study	Building Condition Study with focus on energy conservations and renewable energy technology				100%	30-Apr-12	Study complete
	CHOCC	Interior Renovations	CHOCC Interior Renovations (see CHOCC project summary for additional details)	\$ 18,400	92,458	22,880	100%	30-Oct-09	Construction Complete
6	Kiwanis Senior Centre	Controls	New direct digital control system with WAN connection and stadardized graphical interface	\$ 3,389	13,867	5,005	100%	04-Nov-10	Construction Complete

APPENDIX D

FACILITIES - PROPOSED ENERGY REDUCTION PROJECTS 2011-2013

2011	INSTALL REMOTE LIGHT SWITCH	NORTH PARK
2011	INSTALL REMOTE LIGHT SWITCH	STONEBROOK RECREATION PARK
2011	CHOC DYSON DRYERS	WOLSELEY PARK COMMUNITY CENTRE
2011	CH WATERLESS URINALS	CITY HALL
2011	AJT BOARDROOM LIGHTS	AJT
2011	OVERHEAD GARAGE DOORS	AJT BUILDING 16
2012	FARQUHARSON NEW LIGHTS ENG	FARQUHARSON PARK ICE PAD
2012	LAMBETH NEW LIGHTS	LAMBETH CENTENNIAL PARK ICE PAD
2012	SILVERWOODS NEW LIGHTS	SILVERWOODS PARK ICE PAD
2012	GLEN CAIRN NEW LIGHTS	GLEN CAIRN RESOURCE PARK ICE PAD
2012	NEW LIGHTS IN GYM	KIWANIS SENIOR CENTRE
2012	CH NEW PARKING LIGHTING	CITY HALL
2012	CITY PARKS LIGHTING REPORT	CITY HALL
2012	GARAGE LIGHTING UPGRADES	CITY HALL
2012	WORKS IDENTIFIED IN ENERGY AUD	CITY HALL
2012	DEARNESS ADD OZONE TO LAUNDRY	DEARNESS HOME
2012	ARGYLE INSULATE WALLS	ARGYLE PARK
2012	OAKRIDGE INSULATE WALLS	OAKRIDGE PARK ARENA
2012	FARQUHARSON INSULATE WALLS	FARQUHARSON PARK
2012	FANSHAWE NEW GSHP	FANSHAWE GOLF COURSE
2012	THAMES INSTALL NEW GSHP GAS FE	THAMES VALLEY GOLF COURSE
2012	LAMBETH PARKING LOT LIGHTING	LAMBETH CENTENNIAL PARK
2012	FH12 PARKING LOT LIGHTING	FIRE HALL 12
2012	KIWANIS PARKING LOT LIGHTING	RIVERSIDE PARK
2012	DEARNESS REPLACE LIGHT WITH LED	DEARNESS HOME
2012	KIWANIS SC REGEN ENERGY PILOT	RIVERSIDE PARK
2012	AOC WASH BAY REPLACE LIGHTS	ADELAIDE OPERATION CENTRE
2012	NL LIGHTING AUTOMATION	NORTH PARK
2012	LAMBETH SOCCER LIGHTS	LAMBETH CENTENNIAL PARK
2012	ENERGYCAP TO JDE INTEGRATION	CITY HALL
2012	EROC INSULATE WALLS	EROC OPERATION CENTRE BUILDING 2
2012	FMCC CGM STUDY	COVENT GARDEN PARK
2012	BATTERY ICE EDGER 1	LAMBETH
2012	BATTERY ICE EDGER 2	SILVERWOODS
2012	BATTERY ICE EDGER 3	STRONACH
2012	BATTERY ICE EDGER 4	OAKRIDGE
2012	BATTERY ICE EDGER 5	ARGYLE
2012	BATTERY ICE EDGER 6	FARQUHARSON
2012	CGM ASSET ENERGY STUDY	COVENT GARDEN PARKING GARAGE

2012	EAST LIONS UPGRADE LIGHTING	EAST LIONS PARK
2012	NICHOLS ICE MAKING TEST	EARL NICHOLS PARK ICE PAD
2012	FGC WIND MILL STUDY	FANSHAWE GOLF COURSE
2013	NLOCC DYSON DRYERS	WOLSELEY PARK COMMUNITY CENTRE

APPENDIX E

INCENTIVE FUNDING CHART

Organization	Program	Year	Funding Amount	Comments	Status
		2010			
London Hydro	ERIP	2010	\$7,560	Stronach - Lighting	Received
London Hydro	ERIP	2010	\$4,026	Argyle - Lighting	Received
London Hydro	ERIP	2010	\$7,560	Kinsmen - Lighting	Received
London Hydro	ERIP	2010	\$11,916	Nichols - Lighting	Received
London Hydro	ERIP	2010	\$3,924	Oakridge - Lighting	Received
			\$34,986	Total Received	Received
			\$34,986	Total for 2010	Total
		2011			
Union Gas	Enersmart - prescriptive	2011	\$250	Firehall # 12 - ERV	Received
Union Gas	Enersmart - prescriptive	2011	\$100	CHOCC - ERV	Received
Union Gas	Enersmart - prescriptive	2011	\$250	Firehall # 14 - ERV	Received
Union Gas	Enersmart - prescriptive	2011	\$300	Nichols Arena - 3 DWH's	Received
Union Gas	Enersmart - prescriptive	2011	\$200	Oakridge Arena - 2 DWH's	Received
Union Gas	Enersmart - prescriptive	2011	\$200	Silverwoods Arena - 2 DWH's	Received
			\$1,300	Total Received	Received
			\$1,300	Total for 2011	Total
		2012			
London Hydro	Retrofit Program	2012	\$15,100	City Hall Parking Garage Lightng Upgrades	Received
Union Gas	Enersmart - prescriptive	2012	\$1,200	AJ Tyler Operations - Condensing Boiler	In Process
Union Gas	Enersmart - prescriptive	2012	\$800	AJ Tyler Operations - HRV's	In Process
			\$15,100	Total Received	Received
			\$2,000	Total in Process	In Process
			\$17,100	Total for 2012	Total
		2013			
London Hydro	Retrofit Program	2013	\$704	POA - Parking Lot Light Upgrades	Complete
London Hydro	Retrofit Program	2013	\$620	Fire Hall # 12 - Parking Lot Light Upgrades	Complete
London Hydro	Retrofit Program	2013	\$920	Boathouse - Lighting Upgrades	In Process
London Hydro	Retrofit Program	2013	\$4,200	Lambeth Arena - Lighting Upgrades	Complete
London Hydro	Retrofit Program	2013	\$3,255	Centennial Hall - Lighting Upgrades	Complete
London Hydro	Retrofit Program	2013	\$2,850	Kinsmen Arena -RTU	Complete
London Hydro	Retrofit Program	2013	\$4,600	Argyle Arena - HVAC 1, 2, 3	In Process
London Hydro	Retrofit Program	2013	\$1,500	East Lions - Lighting Upgrades	Complete
Union Gas	Enersmart - prescriptive	2013	\$300	Fire Station # 6 - Infrared Heaters	Received
Union Gas	Enersmart - prescriptive	2013	\$0	AJ Tyler Operations	In Process
Union Gas	Enersmart - prescriptive	2013	\$0	Westminster	In Process
Union Gas	Enersmart - prescriptive	2013	\$900	Vauxhall PCP	Application
Hydro One	Retrofit Program	2013	\$80,000	EMPS	Application
London Hydro	Retrofit Program	2013	\$3,280	Nichols - Cool Flood (SmartICE)	In Process
enernoc	Demand Response	2013	\$1,400	Earl Nichols Arena	Complete
			\$14,829	Total Received	Received
			\$89,700	Total in Process	In Process
			\$104,529	Total for 2013	Total
			\$66,215	Total Received	
			\$91,700	Total In Process	
			\$157,915	Total in Incentives	



Earth Hour 2013. City Hall, City of London

CITY OF LONDON

Culture of Conservation – The Next Steps

September 2013



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CORPORATE ENERGY MANAGEMENT - UPDATE

Energy Management is a key component in managing facilities and infrastructure in today's economy. The City of London has provided leadership in energy conservation and sustainable energy for more than 15 to 20 years.

In compliance with the Green Energy Act and the Ontario Regulation 397/11, the City of London is required to report on their energy consumption and greenhouse gas (GHG) emissions annually beginning in 2013 and to develop and implement energy conservation and demand management (CDM) plans starting in 2014.

In the development of the 2013 submission and the 2014 CDM plan, the City recognized the importance to report the Ontario regulation requirements but to go one step further and capture past and current energy management activities to set the stage of where we stand today. This resulted in the development of a series of reports and initiatives that inter-relate to the development and support the future CDM Plan in 2014.



Energy Efficient LED Lights at Taylor Building, London, Ontario

CITY OF LONDON **Past and Current Corporate Energy Management Activities**

September 2013



Past and Current Energy Management Activities

summarizes a selection of the significant energy management projects and supporting initiatives completed in recent years that have set the stage for the City of London's City of London Corporate CDM Plan due in June 2014

Culture of Conservation – The Next Steps

describes the engagement of City of London staff and stakeholders in energy

conservation initiatives. The need for an internal "Culture of Conservation" program is key to the development of the five-year energy conservation and demand management (CDM) plans to show commitment to reducing cost, conserving energy and reducing greenhouse gas generation and our environmental footprint.



Earth Hour 2013 - City Hall, City of London

CITY OF LONDON **Culture of Conservation – The Next Steps**

September 2013





Solar Tree and Solar Panels at Tourism London, City of London

CITY OF LONDON
**2011 Corporate Energy
Consumption Report**

September 2013



2011 Corporate Energy Consumption Report provides a summary of the City of London's 2011 annual energy consumption and greenhouse gas (GHG) emissions for its operations. In addition to the reporting requirements mandated by the *Green Energy Act* and *Ontario Regulation 397/11*, information on all City of London energy consuming infrastructure (e.g., street lighting, parks) as well as fleet fuel use has been included to provide a complete picture of energy needs for municipal operations. It is important to note that this information does not include energy use by London's agencies,

boards, and commissions.

2011 Energy Consumption and Greenhouse Gas Emissions (Ministry of Energy) is a tabular report prepared for the Ministry of Energy to support the province's reporting requirements. Beginning in July of 2013, it became mandatory for municipalities to submit this report annually and make this report available to the public. A copy of the City of London's submission is publicly available and is accessible by the following link:



Energy Consumption and Greenhouse
Gas Emissions Reporting
Rapports de consommation d'énergie et
d'émission de gaz à effet de serre



CITY OF LONDON
**2011 Energy Consumption
and Greenhouse Gas
Emissions (Ministry of
Energy) Report**

September 2013



[2011 - Green Energy Act, 2009 O.Reg. 397/11 Submission](#)



Electrical infrastructure serving the city of London

CITY OF LONDON
**2012 Corporate Energy
Consumption Report**

September 2013



2012 Corporate Energy Consumption Report provides a summary of the City of London's 2012 annual energy consumption and GHG emissions for all operations. The document provides a total of all significant energy costs associated with City of London operations. In addition to the report requirements mandated by the *Green Energy Act* and *Ontario Regulation 397/11*, information on all energy consuming infrastructure (e.g., street lighting, sports fields) as well as fleet fuel has been included to provide a complete picture of energy needs for our municipal operations. Similar to the 2011 report, this information does not include energy use by London's agencies, boards and commissions.

Next Steps:

Corporate Energy Reporting – Ministry of Energy Requirements. With the preparation of the previous reports and measures, the City of London has set the stage for preparing a strategic plan to focus on corporate energy goals and objectives for energy conservation, energy efficiency, renewable energy, and energy demand management. This report will be called the Corporate CDM Plan and will fulfill the reporting requirements for the Ministry of Energy's Green Energy Act and the Ontario Regulation 397/11. Two reports are to be submitted by July 1, 2014.

2012 – Green Energy Act, 2009 O Reg. 397/11 Submission

The Energy Consumption and GHG Emissions Template for 2012 will be updated and provided to public agencies by the Ministry of Energy in order for them to comply with the reporting requirement component of Regulation 397/11 under the *Green Energy Act, 2009*.

2014 – City of London Corporate Energy CMD Plan

Regulation 397/11 under the *Green Energy Act, 2009* requires public agencies to develop Conservation and Demand Management (CDM) plans starting in 2014 that include:

- Reporting on annual energy consumption
- The public agency's goals and objectives for conserving and otherwise reducing energy consumption and managing its demand for energy
- Proposed measures under its CDM plan and the cost and saving estimates for these proposed measures
- A description of any renewable energy generation facilities and amount of energy produced on an annual basis



CULTURE OF CONSERVATION – PROGRAM ENHANCEMENT

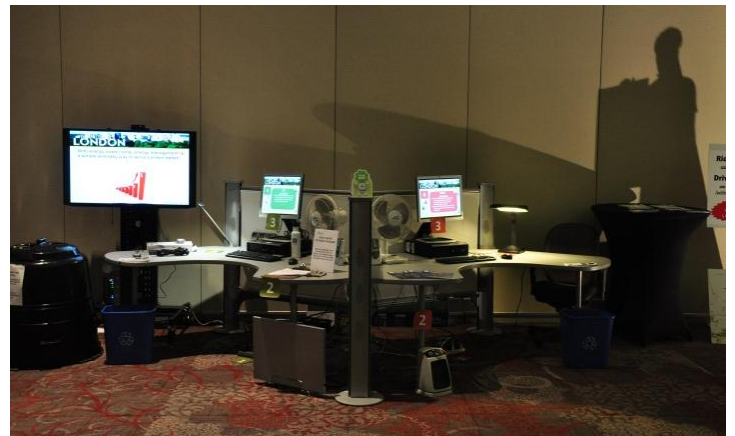
Engaging City of London staff and stakeholders in energy conservation initiatives is a challenging, rewarding and proven method of achieving conservation targets. With energy costs on the rise, Londoners expect their government to lead the way.

In the past, there have been many programs that the City of London participated in to focus on energy conservation. The City of London developed a corporate energy program to embrace a culture of conservation called **energyMatters, people. thinking. green.**

The *energyMatters* program was developed to engage staff in conserving energy with energy saving tips and overviews on what roles employees can take to save energy. The program was accepted and promoted. However, the program stalled in 2011-2012 due to the Corporate Energy Management position being vacant.

Legislation by the Provincial Government has opened the opportunity to enhance and update the existing *energyMatters* program to help achieve requirements towards Regulation 397/11 under the *Green Energy Act, 2009*. The need for an internal "Culture of Conservation" program is a key role to the development of the five-year energy conservation and demand management (CDM) plans required by the *Green Energy Act* to show commitment to energy conservation in the eyes of the public. The future Corporate Energy Conservation and Demand Management (CDM) Plan for the Ontario Ministry of Energy is to be prepared and completed by June 2014.

The re-launch of the *energyMatters* program was presented during the Employee Event held in March of 2013. Environmental Programs provided a booth with a side-by-side comparison of an energy-inefficient workstation versus an energy-efficient workstation. City of London staff that attended the event were receptive to the information being offered, and the event was an overall success in the re-introduction to the *energyMatters* program and promotion of energy management within the workplace.



The next steps to the existing *energyMatters* program described below will assist to inspire employee behaviours that reduce corporate energy consumption, increase public awareness of corporate conservation activities, and strengthen the employee commitment to energy conservation.

STEP 1: PLAN THE EFFORT OF THE “CULTURE OF CONSERVATION” PROGRAM

The following three activities will be undertaken to develop the updated plan and represent actions for the Culture of Conservation program:

1. Solicit input from employees to assist in the re-development of the program. This will create a baseline on awareness and give staff the opportunity to assist in the development of content that is informative to personal concerns. Tasks will include:
 - Employee surveys - link to fill out a survey on baseline attitudes
 - Email account for suggestions.
 - Corporate Communications assistance in the development and deliverables of the program and launch.

This information will assist to identify the desired behaviours/actions of staff and assist in the consideration on how to motivate employees to take action moving forward.

2. Development of motivational themes, messages and slogans. The review of current content and programs to redevelop and re-engage the “energyMatters” content and program. New or revised content to include:
 - Tie into City of London’s Strategic Plan to relate to the key principles of “A Green and Growing City” and “A Sustainable Infrastructure”
 - Compilation of simple energy performance data that staff and the public can relate to.
 - Develop 10-15 minute presentation containing specific key messages and objectives to the program to promote to staff:
 - Introduce the Energy Management Program and highlight components to the strategy. A “Lead by Example” approach in relation to our Corporate Strategic Plan, and
 - Introduce program goals and objectives
3. Obtain upper management support for the program. This role will be achieved by:
 - Endorsement by the City Manager and Senior Leadership Team (SLT)
 - Endorsement by Finance, establish a primary energy performance target to maintain total corporate energy costs at, for example, 0% increase for 2014, based on consumption data as a baseline.

STEP 2: ENHANCEMENT OF THE “CULTURE OF CONSERVATION” PROGRAM

The existing *energyMatters* program, gives the City of London the opportunity to enhance and expand on a current program to help meet the objectives identified in the legislative requirements of the *Green Energy Act*. In the enhancement of the program, communication channels and materials are required to be developed to include:

1. The use of communications channels to convey the information will consist of:
 - Posters placed at City workplaces and public facilities to announce program initiatives.
 - Redesign of Internet/Intranet to house newsletters, fact sheets, message from senior leadership/champions endorsing the program, identify "Champions", and the availability to contact Energy Management with suggestions/opinions.
 - Exhibits – to incorporate charts/diagrams to show energy trends
 - Video – Short videos/interviews of willing participants and champions in energy conservation.
2. Continuous efforts and updates to the program are required to sustain the program. This may include:
 - Work with Human Resources in providing an introduction to new employees on the *energyMatters* culture of conservation program. In the future, it could be a short information video, PowerPoint presentation, introduction by Corporate Energy staff or awareness handbook/memo indicating website location and access to information.
 - Implement or review opportunities to recognize employee accomplishments
 - Ongoing recruitment of new members.
3. Simple and "quick win" deliverable actions that City of London employees can take part in to provide assistance in a broader educational and awareness approach to conservation. These measures include:

Motion Sensor Power Bar Pilot Project

The simple and obvious method to conserve energy is to simply turn it off! The motion sensor power bar is a simple approach for those who forget to turn it off. The pilot program focus would be to purchase energy-efficient motion sensor power bars in bulk and exchange internally to City employees for old inefficient power bar users.

Incentive funding from London Hydro to reduce the initial unit rate cost, and statistics have been provided to prove payback within one year of the initial costs is achievable based on the reduction in power consumptions.



Space Heater Pilot Project

During the cold winter months, the shoulder seasons, and even in hot summer months when the air conditioning is on, portable space heaters for personal comfort continue to appear in work areas everywhere. The City of London does not encourage the use of portable space heaters in the workplace. However, health and safety have created a policy to allow them.

From an energy perspective, the pilot project would focus on the replacement of personal portable space heater units with more efficient technology by introducing radiant heat pads or motion sensor space heaters as opposed to the use of traditional space heaters. Traditional electrical space heaters use approximately 1500 watts to run, and are uncontrolled which means people can leave them operating inefficiently if they forget to turn them off. Electricity is also the most expensive way to provide heat. If left on overnight, one space heater would use almost \$5 per day of electricity. Multiply that by hundreds of space heaters and hundreds of days, and the costs quickly add up.

New technology allows for better controls and less electricity consumption. Radiant Heat Pads (150 watts) or motion sensor space heaters (400-800 watts) require less electricity to run and result in paybacks within one year based on energy savings.

Participation Acknowledgement

To recognize participation of the motion sensor or space heater pilot project (or other similar initiatives), a “green certified” participation placard will be issued to the employee to post at their workstation, promoting their participation and acceptance in energy conservation at work. This visual tool is used to spark conversation internally and to create discussions about what you can do to conserve.

Post-it Note Campaign

Working with Facilities, a Post-it Note campaign at City Hall as a pilot project would have overnight building custodial staff, who notice unnecessary equipment left on,



leaving a gentle reminder “Post-it Note” courtesy of the *energyMatters* initiative, asking users to turn off equipment when not in use. This inexpensive and friendly reminder approach has proven effective in other organizations here in London, such as the London Health Sciences Centre.

4. The Culture of Conservation program will assist key service areas to develop or enhance specific workplace initiatives contributing to the overall conservation achievements in late 2013 to early 2014. These key service areas will include:

City of London Arenas Energy Challenge

Parks and Recreation have developed an energy challenge to raise the awareness of saving energy in City of London Arenas. The challenge encourages staff at each arena to try and save energy, while staying within operational guidelines. The *energyMatters* campaign will be used to assist Parks and Recreation in this challenge to help promote, encourage and look for additional opportunities to expand this energy challenge to other key areas within the corporation.

Fleet Services Idling Program

The City of London is committed to being environmentally responsible as a key result for Londoners in our strategic plan. This focus on the development of a “green culture” has led the Fleet Services to establish a number of initiatives, policies and programs that align and support this motivation. One such program targeted for the end of 2013 or early 2014 is a stronger approach to fleet idling reduction that will encompass a clearly defined expectation, awareness and feedback programs for improved driver behaviour, and established roles and responsibilities. The added benefit to an idling reduction program will support our environmental results by lowering emissions, preserve our fleet assets, lowers repair cost, and lastly will save money on fuel by reducing unnecessary consumption.

Early next year the enhanced awareness and implementation pieces will roll out that will encompass mandatory training, driver feedback, and vehicle and equipment tracking systems to identify learning opportunities. The Fleet Services team in conjunction with the Environmental Programs team will monitor and analyse the results.

STEP 3: EVALUATION OF RESULTS AND POST LAUNCH INITIATIVES

It is important to evaluate and report results to the program. The Intranet will be used to highlight success on the program’s effectiveness and enthusiasm of staff.

The Evaluation of Results of the program will include:

- Obtain employee feedback on the program's effectiveness through discussions and surveys.
- Document energy savings where measurable data can be obtained to measure employee achievements.

STEP 4: CORPORATE ENERGY (CDM) PLAN

In order to meet legislative requirements by the Province, the "Culture of Conservation" employee engagement program is a key component to the finalization of the Corporate Energy Conservation and Demand Management (CDM) Plan. City of London employee's participation and acceptance of a conservation program is a key element to the success of a CDM plan. The evaluation and results of this internal program will assist the City of London to prepare our targets and goals for the future CDM plan required to be completed in June 2014.



Solar Tree and Solar Panels at Tourism London, London, Ontario

CITY OF LONDON

2011 Corporate Energy Consumption Report

September 2013



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CORPORATE ENERGY MANAGEMENT - UPDATE

Energy Management is a key component in managing facilities and infrastructure in today's economy. The City of London has provided leadership in energy conservation and sustainable energy for more than 15 to 20 years.

In compliance with the Green Energy Act and the Ontario Regulation 397/11, the City of London is required to report on their energy consumption and greenhouse gas (GHG) emissions annually beginning in 2013 and to develop and implement energy conservation and demand management (CDM) plans starting in 2014.

In the development of the 2013 submission and the 2014 CDM plan, the City recognized the importance to report the Ontario regulation requirements but to go one step further and capture past and current energy management activities to set the stage of where we stand today. This resulted in the development of a series of reports and initiatives that inter-relate to the development and support the future CDM Plan in 2014.



Energy Efficient LED Lights at Taylor Building, London, Ontario

CITY OF LONDON

Past and Current Corporate Energy Management Activities

September 2013



Past and Current Energy Management Activities

summarizes a selection of the significant energy management projects and supporting initiatives completed in recent years that have set the stage for the City of London's City of London Corporate CDM Plan due in June 2014

Culture of Conservation – The Next Steps

describes the engagement of City of London staff and stakeholders in energy

conservation initiatives. The need for an internal "Culture of Conservation" program is key to the development of the five-year energy conservation and demand management (CDM) plans to show commitment to reducing cost, conserving energy and reducing greenhouse gas generation and our environmental footprint.



Earth Hour 2013. City Hall, City of London

CITY OF LONDON

Culture of Conservation – The Next Steps

September 2013





Solar Tree and Solar Panels at Tourism London, City of London

CITY OF LONDON
**2011 Corporate Energy
Consumption Report**

September 2013



2011 Corporate Energy Consumption Report provides a summary of the City of London's 2011 annual energy consumption and greenhouse gas (GHG) emissions for its operations. In addition to the reporting requirements mandated by the *Green Energy Act* and *Ontario Regulation 397/11*, information on all City of London energy consuming infrastructure (e.g., street lighting, parks) as well as fleet fuel use has been included to provide a complete picture of energy needs for municipal operations. It is important to note that this information does not include energy use by London's agencies,

boards, and commissions.

2011 Energy Consumption and Greenhouse Gas Emissions (Ministry of Energy) is a tabular report prepared for the Ministry of Energy to support the province's reporting requirements. Beginning in July of 2013, it became mandatory for municipalities to submit this report annually and make this report available to the public. A copy of the City of London's submission is publicly available and is accessible by the following link:



Energy Consumption and Greenhouse
Gas Emissions Reporting
Rapports de consommation d'énergie et
d'émission de gaz à effet de serre



CITY OF LONDON
**2011 Energy Consumption
and Greenhouse Gas
Emissions (Ministry of
Energy) Report**

September 2013



[2011 - Green Energy Act, 2009 O.Reg. 397/11 Submission](#)



Electrical infrastructure serving the city of London

CITY OF LONDON
**2012 Corporate Energy
Consumption Report**

September 2013



2012 Corporate Energy Consumption Report provides a summary of the City of London's 2012 annual energy consumption and GHG emissions for all operations. The document provides a total of all significant energy costs associated with City of London operations. In addition to the report requirements mandated by the *Green Energy Act* and *Ontario Regulation 397/11*, information on all energy consuming infrastructure (e.g., street lighting, sports fields) as well as fleet fuel has been included to provide a complete picture of energy needs for our municipal operations. Similar to the 2011 report, this information does not include energy use by London's agencies, boards and commissions.

Next Steps:

Corporate Energy Reporting – Ministry of Energy Requirements. With the preparation of the previous reports and measures, the City of London has set the stage for preparing a strategic plan to focus on corporate energy goals and objectives for energy conservation, energy efficiency, renewable energy, and energy demand management. This report will be called the Corporate CDM Plan and will fulfill the reporting requirements for the Ministry of Energy's Green Energy Act and the Ontario Regulation 397/11. Two reports are to be submitted by July 1, 2014.

2012 – Green Energy Act, 2009 O Reg. 397/11 Submission

The Energy Consumption and GHG Emissions Template for 2012 will be updated and provided to public agencies by the Ministry of Energy in order for them to comply with the reporting requirement component of Regulation 397/11 under the *Green Energy Act, 2009*.

2014 – City of London Corporate Energy CMD Plan

Regulation 397/11 under the *Green Energy Act, 2009* requires public agencies to develop Conservation and Demand Management (CDM) plans starting in 2014 that include:

- Reporting on annual energy consumption
- The public agency's goals and objectives for conserving and otherwise reducing energy consumption and managing its demand for energy
- Proposed measures under its CDM plan and the cost and saving estimates for these proposed measures
- A description of any renewable energy generation facilities and amount of energy produced on an annual basis



1 CORPORATE ENERGY CONSUMPTION – GETTING STARTED...

The 2011 Energy Consumption Report complements the City of London's 2011 annual energy consumption and greenhouse gas (GHG) emissions for its operations required by the Green Energy Act Ontario Regulation 397/11. In addition to the Act requirements, this report includes information on fleet fuel use and all City of London infrastructure to provide a complete picture of energy needs for municipal operations. It is important to note that this information does not include energy use by London's agencies, boards, and commissions.

The report provides a summary of the annual energy consumption and GHG emissions for current 2011 operations complete with comparable historical data for electricity, natural gas, district energy (steam & chilled water), and fuel (diesel & gasoline).

This information will help assist with setting goals to contain and/or reduce the financial and environmental impacts of energy use in corporate facilities and operations.

2 CORPORATE ENERGY CONSUMPTION OVERVIEW

The 2011 Corporate Energy Consumption Report provides a summary of the City of London's 2011 annual energy consumption and GHG emissions for all operations. The document provides a total of all significant energy costs associated with City of London operations. In addition to the report requirements mandated by the *Green Energy Act and Ontario Regulation 397/11*, information on all energy consuming infrastructure (e.g., street lighting, sports fields) as well as fleet fuel has been included to provide a complete picture of energy needs for our municipal operations.

City of London activities include building operations, traffic signals and street lighting, water supply, wastewater & treatment; and vehicle fleet, which all require energy to operate. The City of London uses 2007 as a baseline, due to the fact that this is the first set of utility data within the EnergyCap software to track, monitor and capture data for tracking purposes and to help form our baseline calculations.

Highlights from this report include:

- The Corporation spent approximately \$16.4 million on energy in 2011, an increase of 12 percent from 2010. Electricity represents approximately 72 percent of corporate energy costs, and most of the increase is associated with increase in both electricity use and price that year.
- The Corporation consumed approximately 200 million “equivalent” kilowatt-hours (ekWh) of energy, an increase of 1 percent from 2010.

- Energy-related greenhouse gas emissions were 30,000 tonnes in 2011, a reduction of 32 percent from the baseline year of 2007. This is mainly due to the reduced use of coal-fired power plants to generate electricity in Ontario.

Methods of Measurement

The City of London procured software in 2007 to log monthly utility bills for our municipally-owned and administered buildings and facilities. The EnergyCap software has the capability to track, monitor and capture data to assist the City of London with reporting consumption and providing historical data.

Fleet data is provided from its software system Petrovend which is used for tracking vehicle fuelling at City of London Operation Centres.

Limitations of Measurement

The annual energy consumption and greenhouse gas emissions for the City of London do not include our Agencies, Boards & Commissions, nor does it include energy consumed in leased office space where the utility costs are incorporated in the leasing agreements.

Annual transportation fuel consumption and GHG emissions for the City of London do not include fuel consumption and emissions produced from the use of personal vehicles, railway or air travel for work related tasks by staff or by contracted services by the City of London.

3 CORPORATE ENERGY ANNUAL SUMMARY

In 2011, the City of London's corporate energy summary is categorized by consumption and the total cost of annual energy procured by commodity. Currently the City of London is capable of tracking annual electricity, natural gas, steam, chilled water, diesel and gasoline consumptions and costs. This allows the City of London to show the variances in costs associated to consumption.

The City of London has averaged the 2012 energy consumptions and cost data in comparison to London's population. This allows the City to demonstrate and relay to Londoners the energy consumed in relationship to service delivery provided by the corporation.

3.1 TOTAL CORPORATE ENERGY CONSUMPTION

With the use of EnergyCap software, the City of London has the ability to breakdown and report annual energy consumption by the commodity and by Service Area.

3.1.1 ENERGY CONSUMPTION BY COMMODITY

Table 1 – Consumption by Commodity Comparison 2010-2011

Energy Consumption (ekWh)	2010	2011	Variance	% Change
Electricity	108,758,000	111,804,000	3,046,000	3%
Natural Gas	55,161,000	53,265,000	(1,896,000)	-3%
Steam	3,552,000	2,921,000	(631,000)	-18%
Chilled Water	1,938,000	2,256,000	318,000	16%
Diesel Fuel	21,667,000	21,472,000	(195,000)	-1%
Gasoline	6,917,000	6,944,000	27,000	0%
Total City Of London	197,993,000	198,662,000	669,000	0%

In 2011, the City of London's total energy consumption and percentage of usage defined by commodity remained virtually unchanged and consistent with the usage captured in 2010 as shown in Table 1.

Figure 1 – Total Energy Consumption by Commodity

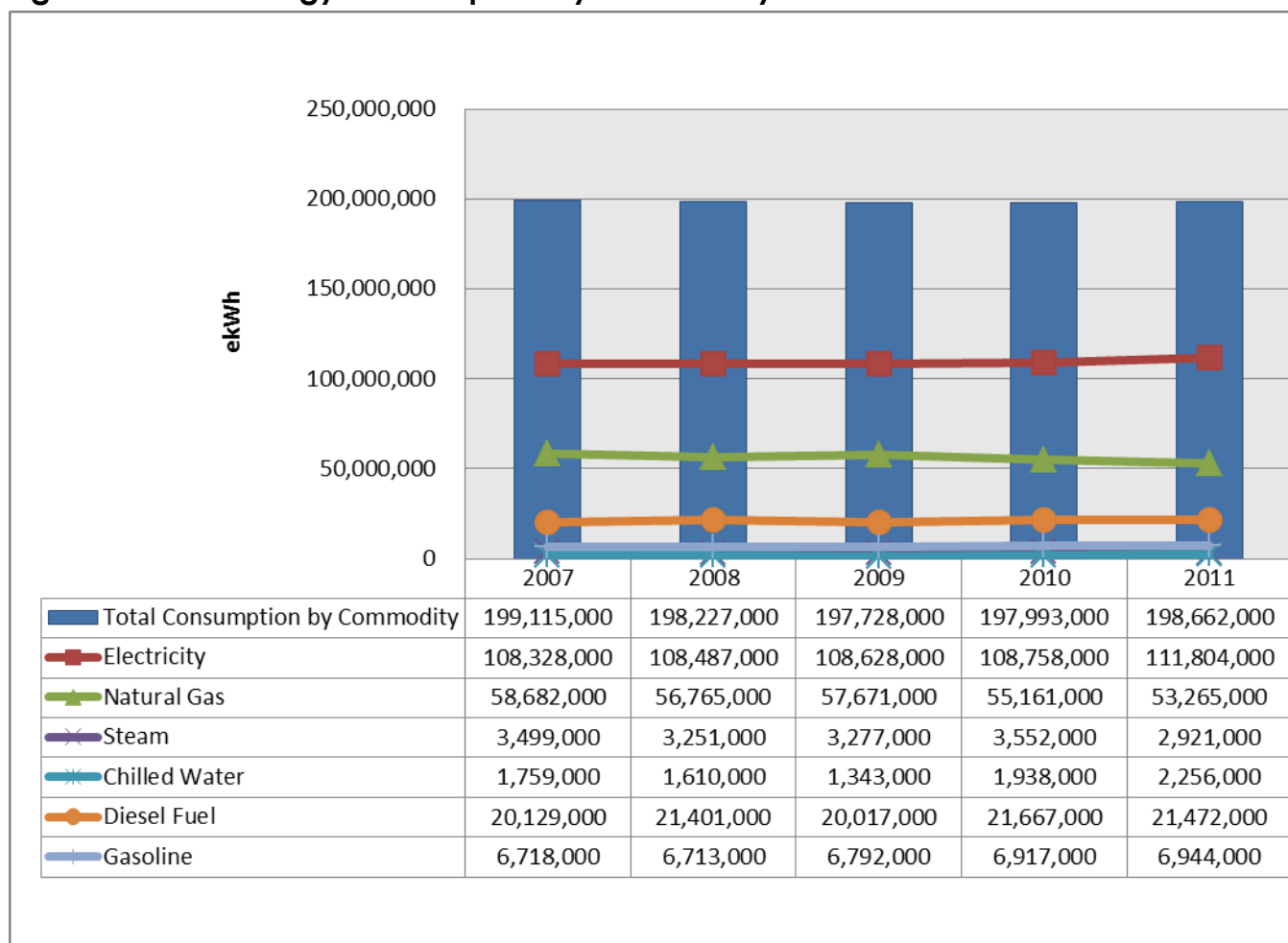


Figure 1 is a representation of the energy consumption (ekWh) for the overall commodity usage every year since 2007.

The commodity consumption trend indicates that consumptions have remained relatively unchanged for the City of London for the past five years. During that period, London's population increased by about three percent, which means that corporate energy efficiency (in terms of energy used per person in London) improved by approximately three percent over this period.

It is also important to note that differences in annual weather conditions will also impact energy needs, as this will impact building air conditioning and space heating needs as well as pumping and treatment requirements for water supply and wastewater.

In Table 2 below, further detailed energy consumptions by commodity compared to 2007 values, along with percentage of changes.

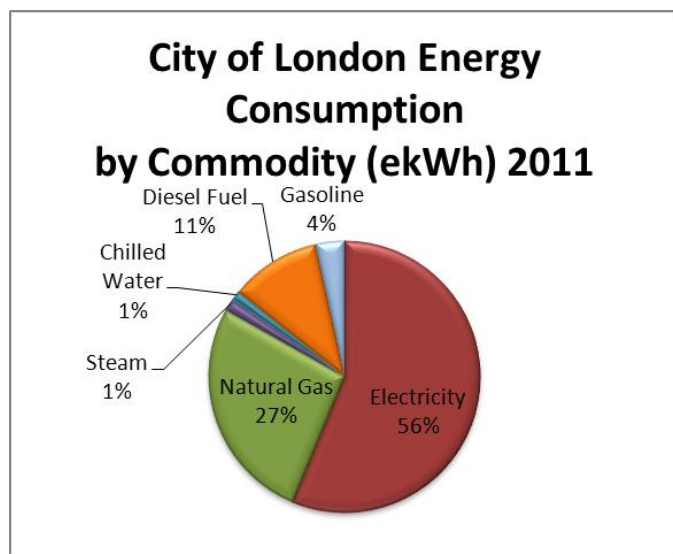
Table 2 – Energy Consumption by Commodity 2007-2011

Energy Consumption (ekWh)	2007	2011	Variance	% Change
Electricity	108,328,000	111,804,000	3,476,000	3%
Natural Gas	58,682,000	53,265,000	(5,417,000)	-9%
Steam	3,499,000	2,921,000	(578,000)	-17%
Chilled Water	1,759,000	2,256,000	497,000	28%
Diesel Fuel	20,129,000	21,472,000	1,343,000	7%
Gasoline	6,718,000	6,944,000	226,000	3%
Total City Of London	199,115,000	198,662,000	(453,000)	0%

In 2011 the City of London has:

- Reduced natural gas consumption by 9% compared to 2007.
- Reduced steam consumption by 17% compared to 2007.
- Increased electricity consumption by 3% compared to 2007.
- The total combined consumption is virtually unchanged compared to 2007.

In summary:



- Electricity represents the majority of the Corporation's energy consumption, accounting for 56% of overall needs
- Natural gas consumption accounts for 27% of overall energy needs
- Diesel is the most prominent fuel used within the City's vehicle fleet, given the large number of heavy-duty vehicles the City of London operates.

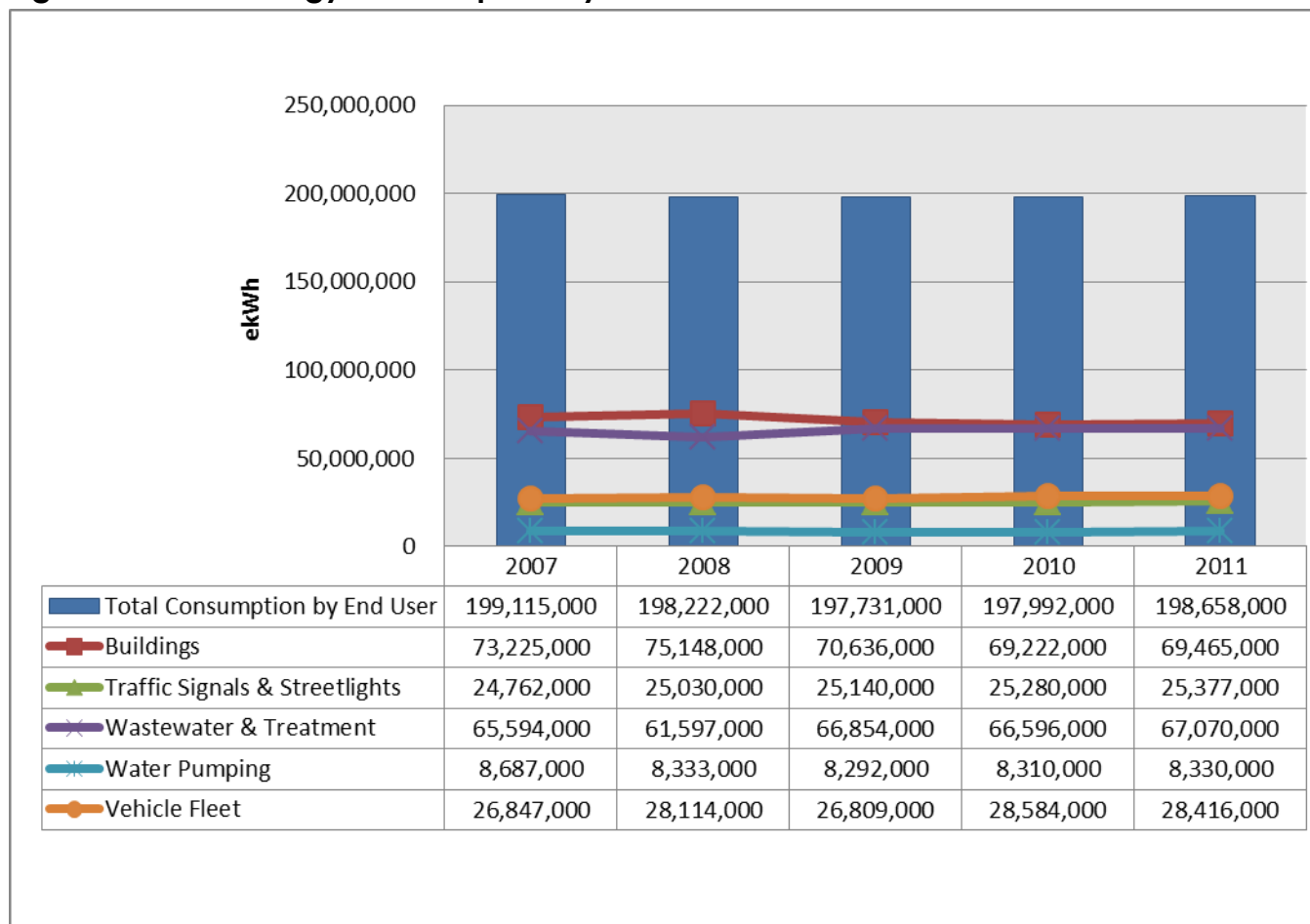
3.1.2 ENERGY CONSUMPTION BY SERVICE AREA

Table 3 – Consumption by End User Comparison 2010-2011

Energy Consumption (ekWh)	2010	2011	Variance	% Change
Buildings	69,222,000	69,465,000	243,000	0%
Traffic Signals & Streetlights	25,280,000	25,377,000	97,000	0%
Wastewater & Treatment	66,596,000	67,070,000	474,000	1%
Water Pumping	8,310,000	8,330,000	20,000	0%
Vehicle Fleet	28,584,000	28,416,000	(168,000)	-1%
Total City Of London	197,992,000	198,658,000	666,000	0%

In comparison to 2010, the City of London's total energy consumption by end user remained virtually unchanged as shown in Table 3. By separating by service area, this gives the City of London the ability to see where energy consumptions are being used and target areas for future improvements.

Figure 2 – Total Energy Consumption by Service Area



The total energy consumption by commodity illustrated in Figure 2 represents the overall energy consumption (ekWh) by end user since 2007.

The commodity trend indicates the total consumptions by service areas have remained relatively unchanged for the City of London for the past five years. The statistics show that

some end users have achieved reductions since 2007, while some end users continue to grow in consumption.

In Table 4 below, further detailed energy consumption by service area in comparison to 2007 values is shown, along with percentage of changes.

Table 4 – Energy Consumption by Service Area 2007-2011

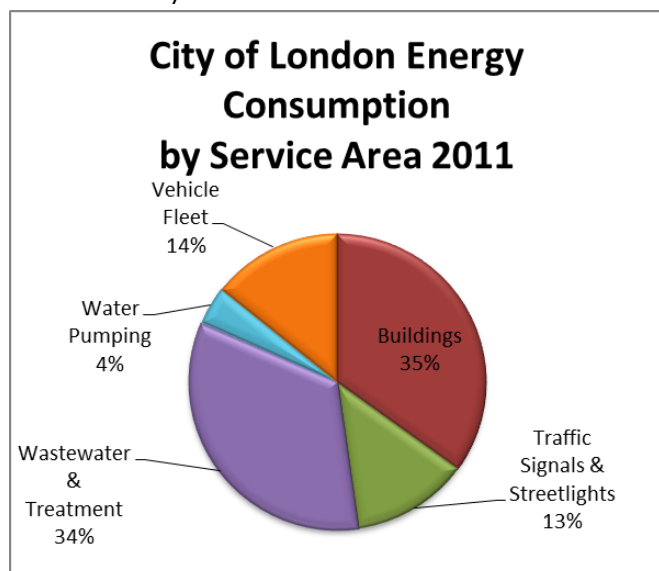
Energy Consumption (ekWh)	2007	2011	Variance	% Change
Buildings	73,225,000	69,465,000	(3,760,000)	-5%
Traffic Signals & Streetlights	24,762,000	25,377,000	615,000	2%
Wastewater & Treatment	65,594,000	67,070,000	1,476,000	2%
Water Pumping	8,687,000	8,330,000	(357,000)	-4%
Vehicle Fleet	26,847,000	28,416,000	1,569,000	6%
Total City Of London	199,115,000	198,658,000	(457,000)	0%

In 2011 the City of London service area, since 2007:

- Decreased in building consumption by 5%.
- Decreased in water pumping energy consumption by 4%.
- Increased wastewater & treatment consumption by 2%
- Increased fleet fuel consumption by 6%.

As noted earlier, total combined consumption is virtually unchanged compared to 2007.

In summary:



- Buildings (35%) and Wastewater & Treatment (34%) hold the highest percentage of demand for energy consumption for the City of London.
- Vehicle Fleet (14%) and Traffic Signals & Streetlights (13%) contribute to significant demand for energy consumptions.
- Water Pumping (4%) is the lowest end user contributor in energy consumption demands for the City of London.

3.1.3 TOTAL CORPORATE ENERGY CONSUMPTION PER CAPITA BY SERVICE AREA

The City of London's corporate energy consumption contributes to serving the public, businesses and visitors to London. The consumption reported is significant to the services provided to the community. London continues to grow in population, and increased services are required to support that growth. It is important to capture energy usage per

capita to demonstrate the City of London's achievements in energy reductions while continued growth occurs in London.

Table 5 –Energy Consumption Per Capita 2010-2011

Energy Consumption (ekWh) by Service Area	Change from Past Year			
	2010	2011	Variance	% Change
Buildings	69,222,000	69,465,000	243,000	0.4%
Traffic Signals & Streetlights	25,280,000	25,377,000	97,000	0.4%
Wastewater & Treatment	66,596,000	67,070,000	474,000	0.7%
Water Pumping	8,310,000	8,330,000	20,000	0.2%
Vehicle Fleet	28,584,000	28,416,000	(168,000)	-0.6%
Total City Of London	197,992,000	198,658,000	666,000	0.3%
London's Population	364,000	366,200	2,200	0.6%
Energy Use (ekWh) per person	544	542	(1)	-0.3%

In 2011 the City of London's energy per person remained virtually unchanged from 2010, illustrated in Table 5 above. With a population increase of approximately 2,200 people, the unchanged percentage suggest that corporate initiatives, programs and projects counterbalanced the impacts to additional increases of demand for energy due to London's growth:

- The City of London's population increased by approximately 1 percent in 2011
- Corporate energy use per person remained virtually unchanged from 2010

Table 6 –Energy Consumption Per Capita 2007-2011

Energy Consumption (ekWh) by Service Area	Change since 2007			
	2007	2011	Variance	% Change
Buildings	73,225,000	69,465,000	(3,760,000)	-5.1%
Traffic Signals & Streetlights	24,762,000	25,377,000	615,000	2.5%
Wastewater & Treatment	65,594,000	67,070,000	1,476,000	2.3%
Water Pumping	8,687,000	8,330,000	(357,000)	-4.1%
Vehicle Fleet	26,847,000	28,416,000	1,569,000	5.8%
Total City Of London	199,115,000	198,658,000	(457,000)	-0.2%
London's Population	355,000	366,200	11,200	3.2%
Energy Use (ekWh) per person	561	542	(18)	-3.3%

The City of London's population has grown by 3 percent (11,200 people) since 2007. Table 6 above indicates the corporate energy consumption per capita since the data was calculated in 2007. Five years of data shows continued improvement of corporate energy use per capita with an overall reduction of approximately 3 percent in 2011 compared to 2007.

3.1.4 TOTAL CORPORATE ENERGY CONSUMPTION SUMMARY

Through conservation projects and through Corporate Energy Management practices the City of London has maintained minimal consumption increases within the past five years without impacts to existing and new services. This minimal increase of less than one percent in commodity use suggests that corporate initiatives currently in place to reduce

consumption on existing and new infrastructure act as a counterbalance to the additional increases of demand for energy due to London's growth.

3.2 TOTAL CORPORATE ENERGY COSTS

With the use of EnergyCap software, the City of London has the ability to breakdown and report annual energy costs by the commodity and by End User.

In 2011, the City of London (not including Agencies, Boards & Commissions) spent approximately \$16,577,000 on energy. This represents about two percent of the City of London's operating budget for 2011.

3.2.1 ENERGY COSTS BY COMMODITY

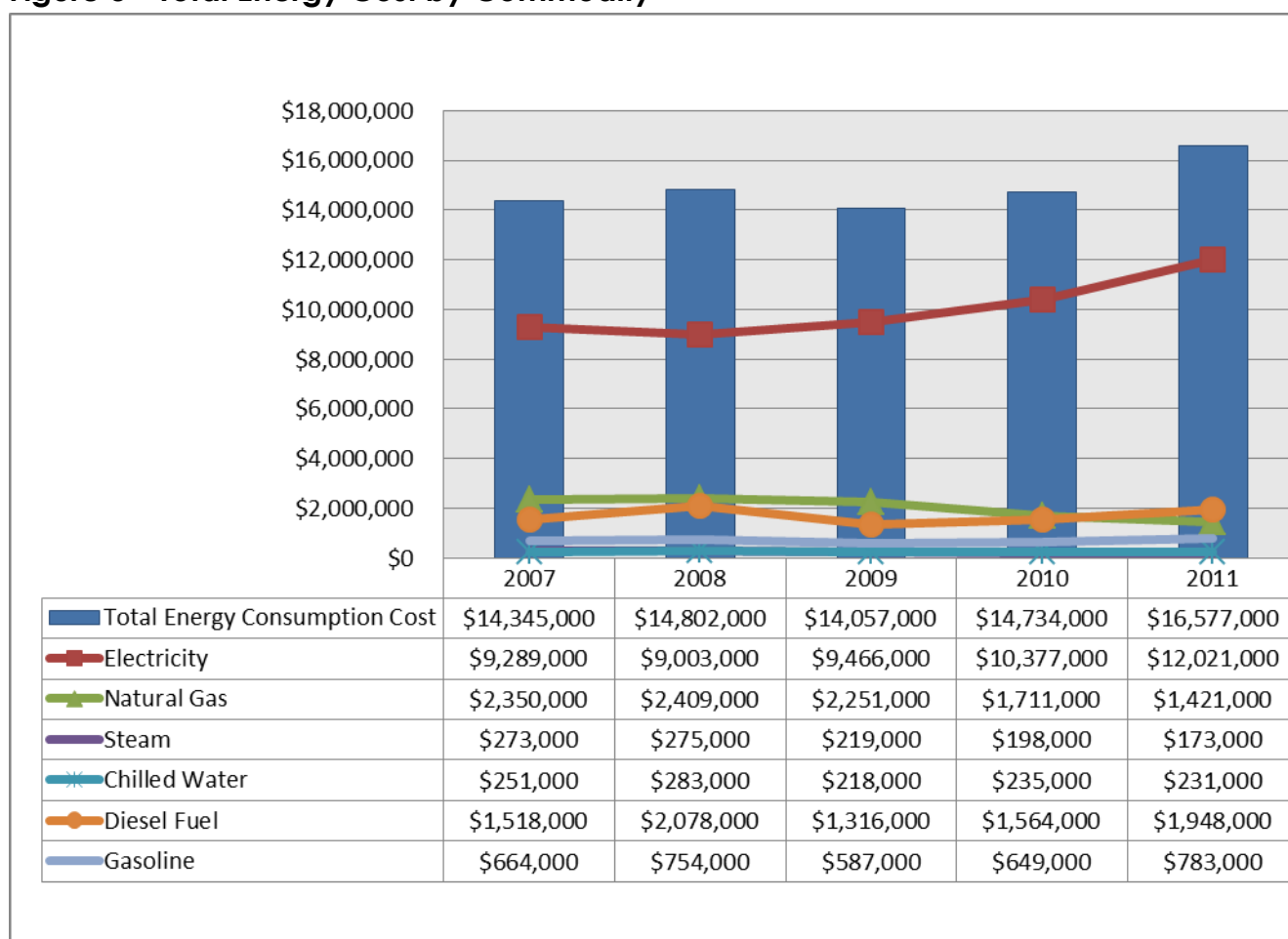
Table 7 – Energy Costs by commodity Comparison 2010-2011

	2010	2011	Variance	% Change
Electricity	\$ 10,377,000	\$ 12,021,000	\$ 1,644,000	16%
Natural Gas	\$ 1,711,000	\$ 1,421,000	\$ (290,000)	-17%
Steam	\$ 198,000	\$ 173,000	\$ (25,000)	-13%
Chilled Water	\$ 235,000	\$ 231,000	\$ (4,000)	-2%
Diesel Fuel	\$ 1,564,000	\$ 1,948,000	\$ 384,000	25%
Gasoline	\$ 649,000	\$ 783,000	\$ 134,000	21%
Total City Of London	\$ 14,734,000	\$ 16,577,000	\$ 1,843,000	13%

In 2011, the City of London's total energy costs by commodity climbed by approximately 13 percent from 2010 as illustrated in Table 7.

In 2011, the increased cost of electricity, gasoline, and diesel fuel contributed to the significant increase in the City of London's operating costs. The 13 percent increase equates to \$1.8 million increase to the cost for energy in 2011.

Figure 3 - Total Energy Cost by Commodity



The total energy cost by commodity illustrated in Figure 3 is a representation of the energy overall cost by commodity per year since 2007.

The cost by commodity trend indicates the costs for energy continue to rise for the City of London. Contributing to these additional expenditures, electricity costs and fuel costs have increased due to market rates. The cost for natural gas has declined since 2009 associated to market value, whereas steam, chilled water and gasoline costs remain relatively consistent since 2007.

In Table 8 below, further detailed energy consumption by commodity are compared to 2007 values, along with the percentage of changes.

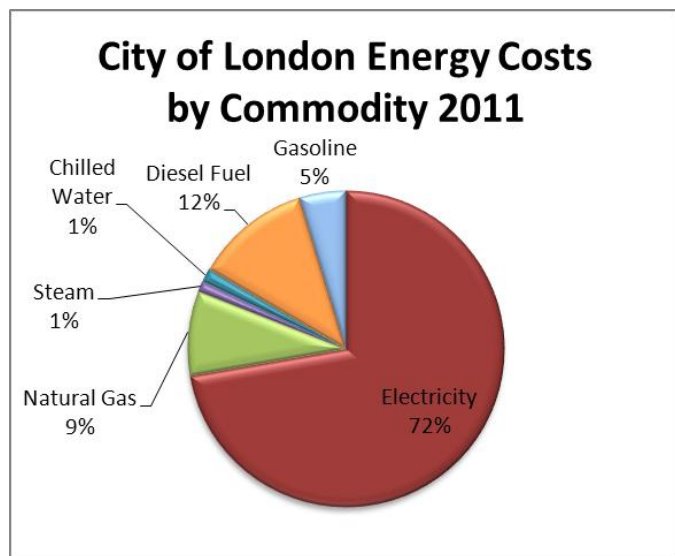
Table 8 – Energy Costs by Commodity 2007-2011

	2007	2011	Variance	% Change
Electricity	\$ 9,289,000	\$ 12,021,000	\$ 2,732,000	29.4%
Natural Gas	\$ 2,350,000	\$ 1,421,000	\$ (929,000)	-39.5%
Steam	\$ 273,000	\$ 173,000	\$ (100,000)	-36.6%
Chilled Water	\$ 251,000	\$ 231,000	\$ (20,000)	-8.0%
Diesel Fuel	\$ 1,518,000	\$ 1,948,000	\$ 430,000	28.3%
Gasoline	\$ 664,000	\$ 783,000	\$ 119,000	17.9%
Total City Of London	\$ 14,345,000	\$ 16,577,000	\$ 2,232,000	15.6%

In 2011 the City of London has seen:

- Reduced natural gas and steam costs by approximately 40% compared to 2007
- Increased electricity and gasoline costs upwards of 28% compared to 2007.
- The total combined costs are noticeably higher today (by 15%) compared to 2007.

In summary:



- Electricity represents the majority of the Corporation's energy costs, accounting for 72% for 2011
- Natural gas consumption accounts for 9% of overall energy costs
- Diesel is the most prominent fuel used within the City's vehicle fleet, given the large number of heavy-duty vehicles the City of London operates.

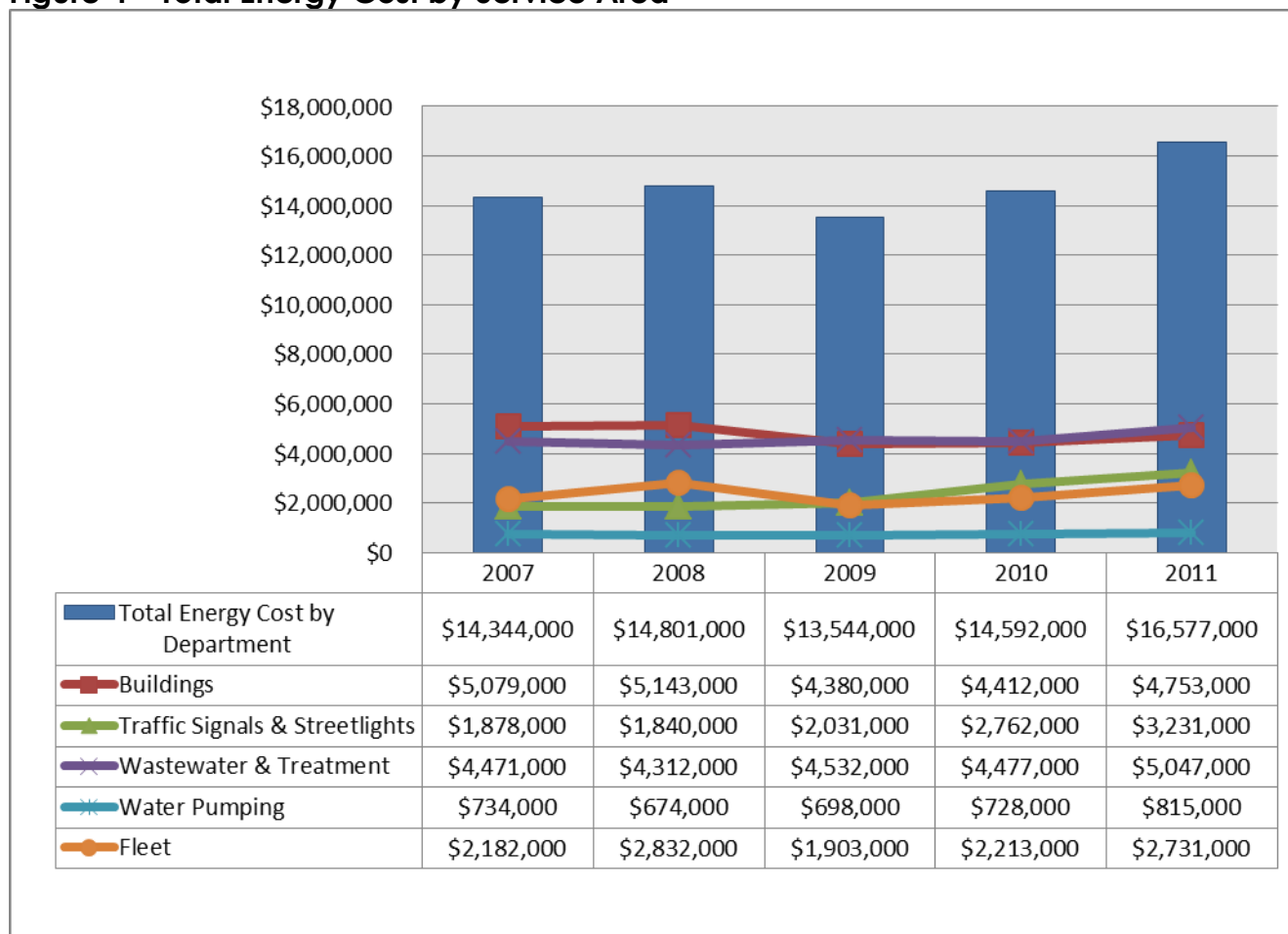
3.2.2 ENERGY COSTS BY SERVICE AREA

Table 9 – Energy Costs by Service Area Comparison 2010-2011

	2010	2011	Variance	% Change
Buildings	\$ 4,412,000	\$ 4,753,000	\$ 341,000	8%
Traffic Signals & Streetlights	\$ 2,762,000	\$ 3,231,000	\$ 469,000	17%
Wastewater & Treatment	\$ 4,477,000	\$ 5,047,000	\$ 570,000	13%
Water Pumping	\$ 728,000	\$ 815,000	\$ 87,000	12%
Vehicle Fleet	\$ 2,213,000	\$ 2,731,000	\$ 518,000	23%
Total City Of London	\$ 14,592,000	\$ 16,577,000	\$ 1,985,000	14%

In 2011, the City of London's total energy costs by service area increased by approximately 14 percent from 2010 consumptions as identified in Table 9.

Figure 4 – Total Energy Cost by Service Area



The total energy cost by service area illustrated in Figure 4 is a representation of the energy overall cost by service area per year since 2007.

The cost by service area trend indicates that costs for energy continue to rise for the City of London in 2011. All service areas saw increases in energy costs.

In Table 10 below, further detailed energy costs by service area in comparison to 2007 values is shown, along with the percentage of change.

Table 10 – Energy Costs by service Area 2007-2011

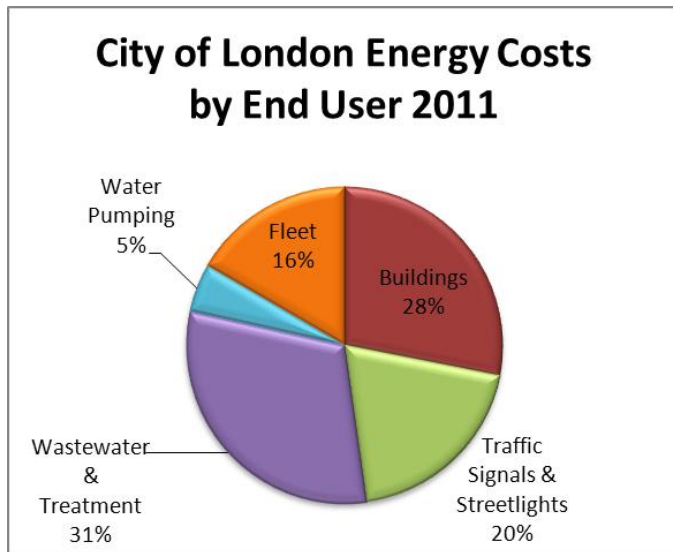
	2007	2011	Variance	% Change
Buildings	\$ 5,079,000	\$ 4,753,000	\$ (326,000)	-6%
Traffic Signals & Streetlights	\$ 1,878,000	\$ 3,231,000	\$ 1,353,000	72%
Wastewater & Treatment	\$ 4,471,000	\$ 5,047,000	\$ 576,000	13%
Water Pumping	\$ 734,000	\$ 815,000	\$ 81,000	11%
Vehicle Fleet	\$ 2,182,000	\$ 2,731,000	\$ 549,000	25%
Total City Of London	\$ 14,344,000	\$ 16,577,000	\$ 2,233,000	16%

In 2011 the City of London service areas have seen:

- Decreased building energy costs by 6% compared to 2007
- Increased traffic signals & streetlight costs by 72% compared to 2007 due to mandatory provincial changes to how electricity used for street lighting is priced

- The total combined energy costs by end user are 16% higher today compared to 2007

In summary:



- Wastewater pumping and treatment represents the majority of the Corporation's energy costs by end user, accounting for 31% for 2011
- Buildings account for 28% of overall end user energy costs
- Street lighting & traffic signals are the third highest contributor in energy consumed by end user at 20%

3.2.3 ENERGY COSTS PER CAPITA

The operation, maintenance and services provided by the City of London contribute to the overall cooperate energy costs associated to serving the public, businesses and visitors of London.

Table 11 – Energy Costs Per Capita 2010-2011

Energy Costs by Service Area	2010	2011	Change from Past Year Variance	% Change
Buildings	\$ 4,412,000	\$ 4,753,000	\$ 341,000	7.7%
Traffic Signals & Streetlights	\$ 2,762,000	\$ 3,231,000	\$ 469,000	17.0%
Wastewater & Treatment	\$ 4,477,000	\$ 5,047,000	\$ 570,000	12.7%
Water Pumping	\$ 728,000	\$ 815,000	\$ 87,000	12.0%
Fleet	\$ 2,213,000	\$ 2,731,000	\$ 518,000	23.4%
Total City Of London	\$ 14,592,000	\$ 16,577,000	\$ 1,985,000	13.6%
London's Population	364,000	366,200	2,200	0.6%
Energy costs per person	\$ 40	\$ 45	\$ 5.18	12.9%

In 2011 the City of London saw increased energy costs by approximately 13 percent compared to 2010. Table 11 reflects the corporate energy costs per capita by service area for the City of London. The increased cost and consumption of energy commodities in 2011 resulted in a significant increase in cost to the City of London.

- The City of London's population increased by approximately 1 percent
- Corporate energy costs per person increased by 13 percent.

Table 12 – Energy Costs Per Capita 2007-2011

Energy Costs by Service Area	2007	2011	Change since 2007	
			Variance	% Change
Buildings	\$ 5,079,000	\$ 4,753,000	\$ (326,000)	-6.4%
Traffic Signals & Streetlights	\$ 1,878,000	\$ 3,231,000	\$ 1,353,000	72.0%
Wastewater & Treatment	\$ 4,471,000	\$ 5,047,000	\$ 576,000	12.9%
Water Pumping	\$ 734,000	\$ 815,000	\$ 81,000	11.0%
Fleet	\$ 2,182,000	\$ 2,731,000	\$ 549,000	25.2%
Total City Of London	\$ 14,344,000	\$ 16,577,000	\$ 2,233,000	15.6%
London's Population	355,000	366,200	11,200	3.2%
Energy costs per person	\$ 40	\$ 45	\$ 4.86	12.0%

The City of London's population has grown by 3 percent (11,200 people) since 2007. Table 12 above indicates the corporate energy costs per capita by service area in comparison to 2007. 5 years of commodity data shows continued energy cost increases for corporate energy with an overall increase of 12 percent energy use per capita from 2007.

3.2.4 TOTAL CORPORATE ENERGY COST SUMMARY

Total corporate energy costs continue to increase, with the price of electricity in Ontario being the major contributor. However, corporate energy management practices by the City of London to include cost avoidance measures through procurement, building retrofits, and other conservation measures assist in continued efforts to reduce the amounts of energy to help avoid the market cost increase.

4 CORPORATE GREENHOUSE GAS EMISSIONS

In 2011, the City of London's corporate greenhouse gas emissions can be summarized by commodity and by the end user. Based on the City of London's current use of electricity, natural gas, steam chilled water, diesel and gasoline consumptions and costs, greenhouse gas emissions can be calculated. The total greenhouse gas consumption reflects the public agencies operations and can be measured annually to compare with consumption data from records in 2007. This allows the City of London to show variances in greenhouse gas emissions over five years.

4.1 TOTAL CORPORATE GREENHOUSE GAS EMISSIONS BY COMMODITY

In 2011, the City of London's energy-related greenhouse gas emissions by commodity decreased by 32 percent from 2007. All commodities calculated have shown reductions to greenhouse gas emissions in 2011. The majority of the reduction to the greenhouse gas emissions in 2011 was associated with provincial action to replace coal-fired power plants with cleaner electricity generation such as refurbished nuclear and expanded generation from natural gas, hydro-electric, and renewables. This resulted in a 15 percent average reduction in 2011 compared to 2010 emissions.

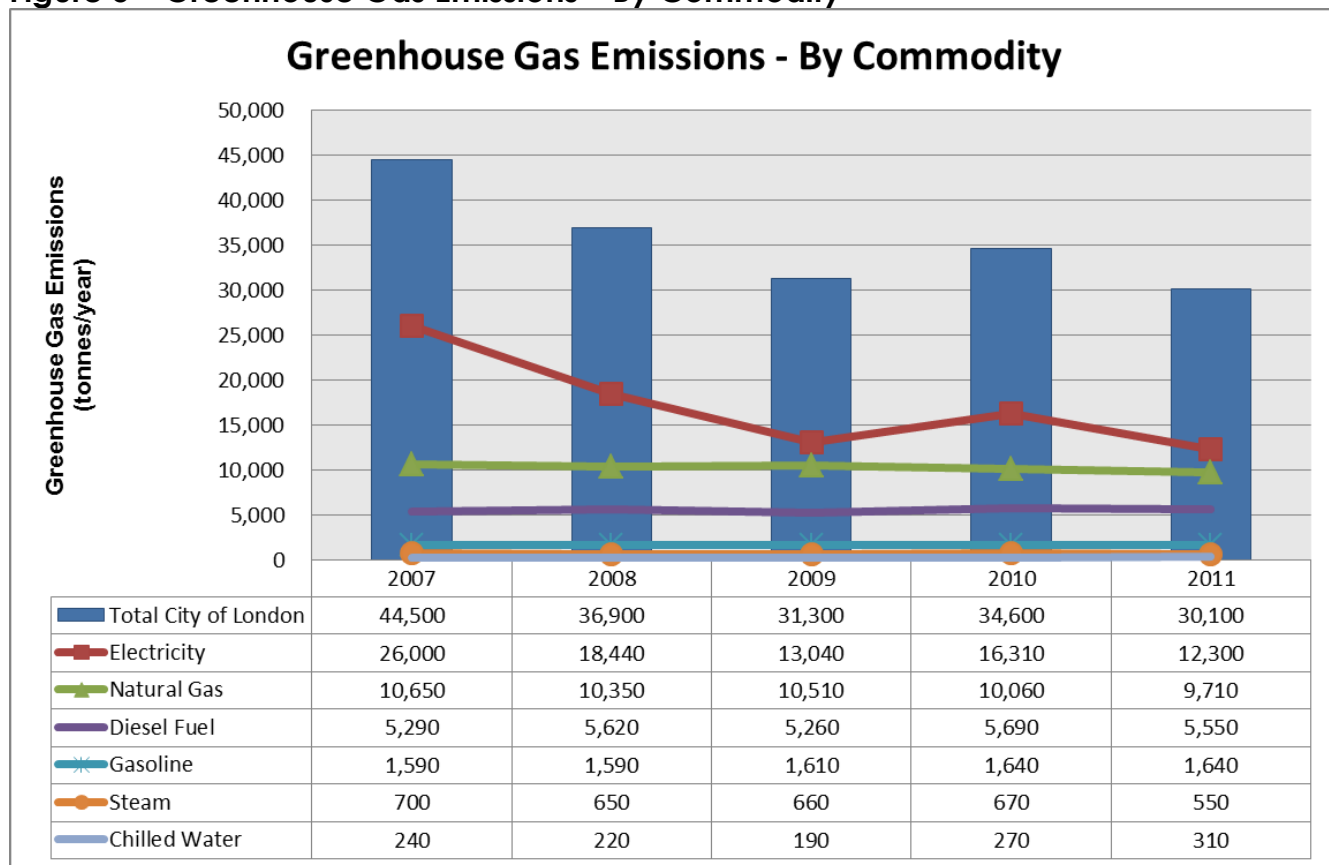
Table 13 –Greenhouse Gas Emissions by Commodity 2007-2011

GHG Emissions – By Commodity (tonnes/year)				Change from Past Year		Change since 2007	
	2007	2010	2011	Difference (tonnes)	Percentage Change	Difference (tonnes)	Percentage Change
Electricity	26,000	16,310	12,300	(4,010)	-33%	(13,700)	-53%
Natural Gas	10,650	10,060	9,710	(350)	-4%	(940)	-9%
Diesel Fuel	5,290	5,690	5,550	(140)	-3%	260	5%
Gasoline	1,590	1,640	1,640	-	0%	50	3%
Steam	700	670	550	(120)	-22%	(150)	-21%
Chilled Water	240	270	310	40	13%	70	29%
Total City of London	44,500	34,600	30,100	(4,500)	-15%	(14,400)	-32%

In 2011, the City of London reduced GHG emissions by 15 percent due to provincial action to replace coal-fired power plants with cleaner electricity.

The total GHG emissions by commodity illustrated in Figure 5 below is a representation of GHG emission reductions since 2007.

Figure 5 – Greenhouse Gas Emissions – By Commodity



Overall by commodity, since 2007 the City of London has reduced its energy related carbon footprint by over 32 percent. The corporation continues to search for innovative and collective ways to reduce greenhouse gas emissions from energy use.

4.2 TOTAL CORPORATE GREENHOUSE GAS EMISSIONS BY SERVICE AREA

The City of London achieved significant GHG reductions in 2011 due to Provincial action to replace coal power generation with cleaner power generation sources. All service area's reduced GHG emissions in 2011 with a total decrease of 15 percent compared to 2010. (It should be noted that the total does not include landfill gas emissions. These are identified as part of Community greenhouse gas generation estimates.)

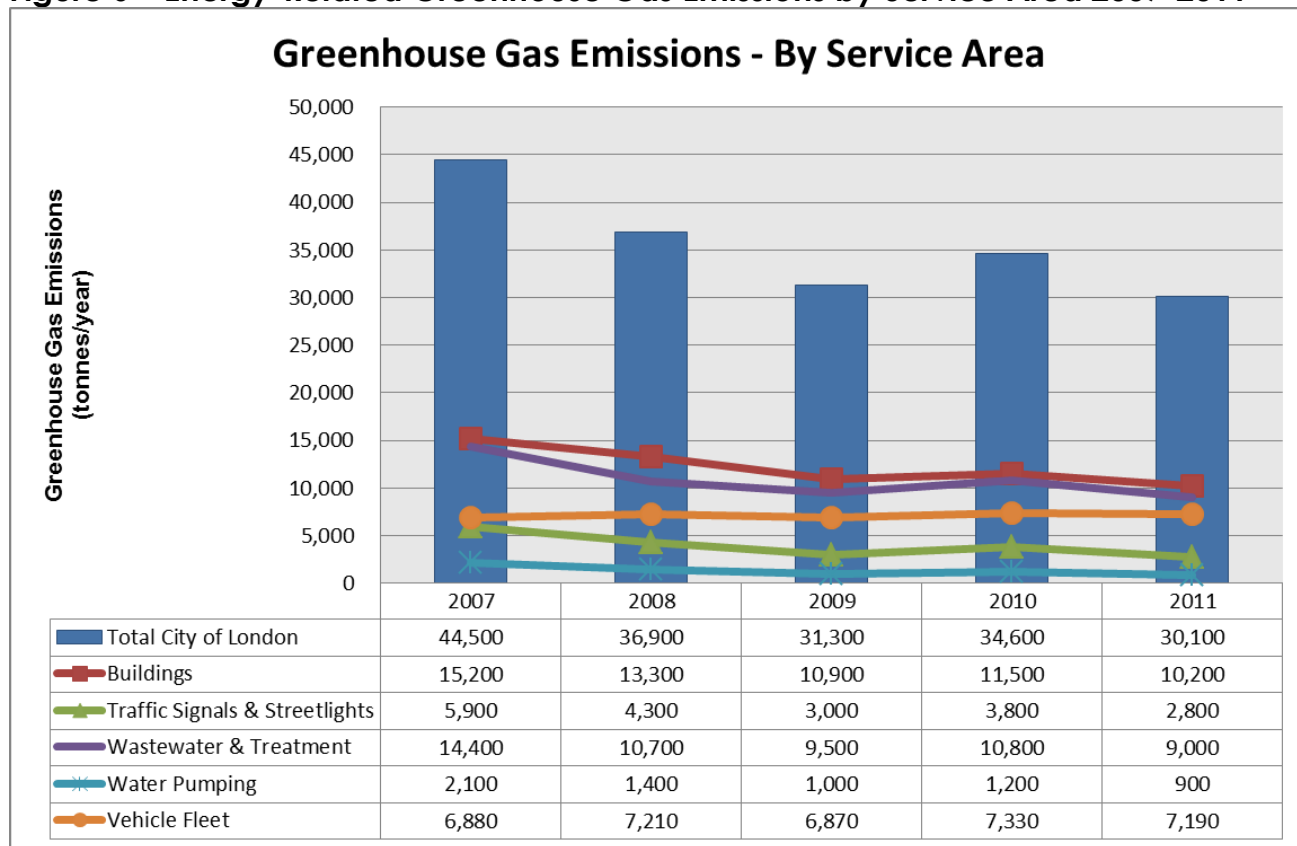
Table 14 below represents trends for all service areas for the City of London since the baseline year of 2007.

Table 14 – Greenhouse Gas Emissions by Commodity 2007-2011

GHG Emissions – By End Use (tonnes/year)				Change from Past Year		Change since 2007	
	2007	2010	2011	Difference (tonnes)	Percentage Change	Difference (tonnes)	Percentage Change
Buildings	15,200	11,500	10,200	(1,300)	-13%	(5,000)	-33%
Traffic Signals & Streetlights	5,900	3,800	2,800	(1,000)	-23%	(3,100)	-53%
Wastewater & Treatment	14,400	10,800	9,000	(1,800)	-17%	(5,400)	-38%
Water Pumping	2,100	1,200	900	(300)	-21%	(1,200)	-57%
Vehicle Fleet	6,880	7,330	7,190	(140)	-2%	310	5%
Total City of London	44,500	34,600	30,100	(4,500)	-15%	(14,400)	-32%

The total GHG emissions by service area illustrated in Figure 6 below is a representation of the GHG emission reductions by service area since 2007.

Figure 6 – Energy-Related Greenhouse Gas Emissions by Service Area 2007-2011



Overall since 2007 the City of London has reduced its energy related carbon footprint by over 32 percent (not including landfills). The corporation continues to search for innovative and collective ways to reduce GHG emissions from energy use.



MINISTRY OF ENERGY >

Energy Consumption and Greenhouse
Gas Emissions Reporting

Rapports de consommation d'énergie et
d'émission de gaz à effet de serre



CITY OF LONDON

2011 Energy Consumption and Greenhouse Gas Emissions (Ministry of Energy) Report

September 2013



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In the development of the 2013 submission and the 2014 CDM plan, the City recognized the importance to report the Ontario regulation requirements but to go one step further and capture past and current energy management activities to set the stage of where we stand today. This resulted in the development of a series of reports and initiatives that inter-relate to the development and support the future CDM Plan in 2014.



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Earth Hour 2013, City Hall, City of London

CITY OF LONDON

Culture of Conservation – The Next Steps

September 2013





CITY OF LONDON
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[2011 - Green Energy Act, 2009 O.Reg. 397/11 Submission](#)



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2012 – Green Energy Act, 2009 O Reg. 397/11 Submission

The Energy Consumption and GHG Emissions Template for 2012 will be updated and provided to public agencies by the Ministry of Energy in order for them to comply with the reporting requirement component of Regulation 397/11 under the *Green Energy Act, 2009*.

2014 – City of London Corporate Energy CMD Plan

Regulation 397/11 under the *Green Energy Act, 2009* requires public agencies to develop Conservation and Demand Management (CDM) plans starting in 2014 that include:

- Reporting on annual energy consumption
- The public agency's goals and objectives for conserving and otherwise reducing energy consumption and managing its demand for energy
- Proposed measures under its CDM plan and the cost and saving estimates for these proposed measures
- A description of any renewable energy generation facilities and amount of energy produced on an annual basis



1 ENERGY CONSUMPTION AND GREENHOUSE GAS EMISSIONS REQUIREMENTS

Beginning in July of 2013, the Ministry of Energy created a tabular document to support the province's mandatory reporting requirements. Municipalities are responsible under the Green Energy Act Regulation 397/11 to report annual energy consumptions and greenhouse gas emissions beginning in 2013 to assist in the development and implementation of the five-year energy conservation and demand management (CDM) plans starting in 2014.

All municipalities in Ontario are required to report. The regulation (Appendix A) outlines the specific operations for which the public agency is required to report on energy use and greenhouse gas emissions. The list provided by the Ministry of Energy recognizes designated operations and the large number and variety of buildings/facilities that are high energy users. For Municipalities, the following operations apply:

TYPE OF PUBLIC AGENCY	OPERATION
Municipality	<ol style="list-style-type: none">1. Administrative offices and related facilities, including municipal council chambers2. Public libraries3. Cultural facilities, indoor recreation facilities and community centres including art galleries, performing arts facilities, auditoriums, indoor sports arenas, indoor ice rinks, indoor swimming pools, gyms and indoor courts for playing tennis, basketball or other sports4. Ambulance stations and associated offices and facilities5. Fire stations and associated offices and facilities6. Police stations and associated offices and facilities7. Storage facilities where equipment or vehicles are maintained, repaired or stored8. Buildings/facilities or facilities related to the treatment or pumping of water or sewage9. Parking garages

Source: Ministry of Energy

The template provided by the Ministry of Energy is to be completed on or before July 1 each year starting in 2013. The data reported in 2013 is for the 2011 calendar year (January 1 to December 31, 2011). A report for each following year is due on July 1 of each successive year, thereafter.

2 CITY OF LONDON ENERGY CONSUMPTION REPORT

The 2011 Energy Consumption and Greenhouse Gas Emissions (Ministry of Energy) is a tabular report prepared for the Ministry of Energy to support the province's reporting requirements. Beginning in July of 2013, it is mandatory for municipalities to submit this report annually and make this report available to the public. A copy of the City of London's submission is publicly available and is accessible by the following link. The submission is best viewed by using the zoom feature.

[2011 - Green Energy Act. 2009 O.Reg. 397/11 Submission](#)



ServiceOntario

e-Laws

[Français](#)**ONTARIO REGULATION 397/11**

made under the

GREEN ENERGY ACT, 2009

Made: August 17, 2011

Filed: August 23, 2011

Published on e-Laws: August 25, 2011

Printed in *The Ontario Gazette*: September 10, 2011**ENERGY CONSERVATION AND DEMAND MANAGEMENT PLANS****Definitions****1.** In this Regulation,

“municipal service board” means,

- (a) a municipal service board or joint municipal service board established or continued under the *Municipal Act, 2001*,
- (b) a city board or joint city board established or continued under the *City of Toronto Act, 2006*, or
- (c) a joint board established in accordance with a transfer order made under the *Municipal Water and Sewage Transfer Act, 1997*; (“commission de services municipaux”)

“post-secondary educational institution” means a university in Ontario, a college of applied arts and technology in Ontario or another post-secondary educational institution in Ontario, if the university, college or institution receives an annual operating grant; (“établissement d’enseignement postsecondaire”)

“public hospital” means,

- (a) a hospital within the meaning of the *Public Hospitals Act*, or
- (b) the University of Ottawa Heart Institute/Institut de cardiologie de l’Université d’Ottawa; (“hôpital public”)

“school board” means a board within the meaning of the *Education Act*. (“conseil scolaire”)

Application**2.** Sections 4, 5 and 6 apply only to public agencies prescribed by section 3.

Public agencies

3. The following are prescribed as public agencies for the purposes of the Act:

1. Every municipality.
2. Every municipal service board.
3. Every post-secondary educational institution.
4. Every public hospital.
5. Every school board.

Energy conservation and demand management plans

4. (1) A public agency shall prepare, publish, make available to the public and implement energy conservation and demand management plans or joint plans in accordance with sections 6 and 7 of the Act and with this Regulation.

(2) An energy conservation and demand management plan is composed of two parts as follows:

1. A summary of the public agency's annual energy consumption and greenhouse gas emissions for its operations.
2. A description of previous, current and proposed measures for conserving and otherwise reducing the amount of energy consumed by the public agency's operations and for managing the public agency's demand for energy, including a forecast of the expected results of current and proposed measures.

Summary of annual energy consumption and greenhouse gas emissions

5. (1) Subject to subsection (2), a summary of the public agency's annual energy consumption and greenhouse gas emissions must include a list of the energy consumption and greenhouse gas emissions for the year with respect to each of the public agency's operations that are set out in Table 1 of this Regulation for the type of public agency to which the public agency belongs and that are conducted in buildings or facilities the public agency owns or leases that,

- (a) are heated or cooled and in respect of which the public agency is issued the invoices and is responsible for making the payments for the building or facility's energy consumption; or
- (b) are related to the treatment or pumping of water or sewage, whether or not the building or facility is heated or cooled, and in respect of which the public agency is issued the invoices and is responsible for making the payments for the building or facility's energy consumption.

(2) If only part of a building or facility where an operation is conducted is heated or cooled, the public agency's summary referred to in subsection (1) must only include energy consumption and greenhouse gas emissions for the part of the building or facility where the operation is conducted that is heated or cooled.

(3) The public agency's summary referred to in subsection (1) must be prepared using the form entitled "Energy Consumption and Greenhouse Gas Emissions Template" that is available from the Ministry and must include the following information and calculations for each of the public agency's operations:

1. The address at which the operation is conducted.

2. The type of operation.
3. The total floor area of the indoor space in which the operation is conducted.
4. A description of the days and hours in the year during which the operation is conducted and, if the operation is conducted on a seasonal basis, the period or periods during the year when it is conducted.
5. The types of energy purchased for the year and consumed in connection with the operation.
6. The total amount of each type of energy purchased for the year and consumed in connection with the operation.
7. The total amount of greenhouse gas emissions for the year with respect to each type of energy purchased and consumed in connection with the operation.
8. The greenhouse gas emissions and energy consumption for the year from conducting the operation, calculating,
 - i. the annual mega watt hours per mega litre of water treated and distributed, if the operation is a water works,
 - ii. the annual mega watt hours per mega litre of sewage treated and distributed, if the operation is a sewage works, or
 - iii. per unit of floor space of the building or facility in which the operation is conducted, in any other case.

(4) If a public agency conducts, in the same building or facility, more than one operation set out in Table 1 of this Regulation for the type of public agency to which the public agency belongs, it shall make a reasonable allocation of the amount of energy purchased and consumed for the year among each of those operations.

(5) In preparing its annual Energy Consumption and Greenhouse Gas Emission Template, a public agency may exclude its energy consumption and greenhouse gas emissions relating to its temporary use of an emergency or back-up generator in order to continue operations.

(6) On or before July 1, 2013, every public agency shall submit to the Minister, publish on its website and intranet site, if it has either or both, and make available to the public in printed form at its head office the public agency's Energy Consumption and Greenhouse Gas Emission Template for operations conducted in 2011.

(7) On or before July 1 of each year after 2013, every public agency shall submit to the Minister, publish on its website and intranet site, if it has either or both, and make available to the public in printed form at its head office the public agency's Energy Consumption and Greenhouse Gas Emission Template for operations conducted in the year following the year to which the last annual Template related.

(8) The following information, if applicable, must also be submitted, published and made available to the public with every Energy Consumption and Greenhouse Gas Emission Template:

1. If the operation is a school operated by a school board,
 - i. the number of classrooms in temporary accommodations at the school during the

year, and

ii. whether there is an indoor swimming pool in the school.

2. If the public agency is a public hospital, whether a facility operated by the public hospital is a chronic or acute care facility, or both.

Energy conservation and demand management measures

6. (1) On or before July 1, 2014, every public agency shall publish on its website and intranet site, if it has either or both, and make available to the public in printed form at its head office,

- (a) the information referred to in subsection 6 (5) of the Act with respect to each of the public agency's operations set out in Table 1 of this Regulation for the type of public agency to which the public agency belongs;
- (b) the information referred to in paragraph 2 of subsection 4 (2) of this Regulation with respect to each of the public agency's operations set out in Table 1 of this Regulation for the type of public agency to which the public agency belongs; and
- (c) the following information:
 - (i) information on the public agency's annual energy consumption during the last year for which complete information is available for a full year,
 - (ii) the public agency's goals and objectives for conserving and otherwise reducing energy consumption and managing its demand for energy,
 - (iii) the public agency's proposed measures under its energy conservation and demand management plan,
 - (iv) cost and saving estimates for its proposed measures,
 - (v) a description of any renewable energy generation facility operated by the public agency and the amount of energy produced on an annual basis by the facility,
 - (vi) a description of,
 - (A) the ground source energy harnessed, if any, by ground source heat pump technology operated by the public agency,
 - (B) the solar energy harnessed, if any, by thermal air technology or thermal water technology operated by the public agency, and
 - (C) the proposed plan, if any, to operate heat pump technology, thermal air technology or thermal water technology in the future,
 - (vii) the estimated length of time the public agency's energy conservation and demand management measures will be in place, and
 - (viii) confirmation that the energy conservation and demand management plan has been approved by the public agency's senior management.

(2) In addition to publishing and making available the required information with respect to the operations mentioned in clauses (1) (a) and (b), a public agency may also publish information with respect to any other operation that it conducts.

(3) On or before July 1, 2019 and on or before every fifth anniversary thereafter, every

public agency shall publish on its website and intranet site, if it has either or both, and make available to the public in printed form at its head office all of the information that is required to be published and made available under subsection (1), the Energy Consumption and Greenhouse Gas Emission Template that is required to be submitted and published on or before July 1 of that year and the following information:

1. A description of current and proposed measures for conserving and otherwise reducing energy consumption and managing its demand for energy.
2. A revised forecast of the expected results of the current and proposed measures.
3. A report of the actual results achieved.
4. A description of any proposed changes to be made to assist the public agency in reaching any targets it has established or forecasts it has made.

(4) If a public agency initiated energy conservation measures or energy demand management measures before July 1, 2014, the public agency may also include in its first plan information on the results of those measures.

TABLE 1

Column 1	Column 2	Column 3
Item	Type of public agency	Operation
1.	Municipality	1. Administrative offices and related facilities, including municipal council chambers.
		2. Public libraries.
		3. Cultural facilities, indoor recreational facilities and community centres, including art galleries, performing arts facilities, auditoriums, indoor sports arenas, indoor ice rinks, indoor swimming pools, gyms and indoor courts for playing tennis, basketball or other sports.
		4. Ambulance stations and associated offices and facilities.
		5. Fire stations and associated offices and facilities.
		6. Police stations and associated offices and facilities.
		7. Storage facilities where equipment or vehicles are maintained, repaired or stored.
		8. Buildings or facilities related to the treatment or pumping of water or sewage.
		9. Parking garages.
2.	Municipal service board	1. Buildings or facilities related to the treatment or pumping of water or sewage.
3.	Post-secondary educational institution	1. Administrative offices and related facilities.
		2. Classrooms and related facilities.
		3. Laboratories.
		4. Student residences that have more than three storeys or a building area of more than 600 square metres.
		5. Student recreational facilities and athletic facilities.
		6. Libraries.
		7. Parking garages.
4.	School board	1. Schools.
		2. Administrative offices and related facilities.
		3. Parking garages.
5.	Public hospital	1. Facilities used for hospital purposes.
		2. Administrative offices and related facilities.

Commencement

7. This Regulation comes into force on the later of January 1, 2012 and the day it is filed.

Français

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Electrical infrastructure serving the city of London

CITY OF LONDON

2012 Corporate Energy Consumption Report

September 2013



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- A description of any renewable energy generation facilities and amount of energy produced on an annual basis



1 CORPORATE ENERGY CONSUMPTION – GETTING STARTED...

The 2012 Energy Consumption Report complements the City of London's 2011 annual energy consumption and greenhouse gas (GHG) emissions for its operations required by the Green Energy Act Ontario Regulation 397/11. In addition to the Act requirements, this report includes information on fleet fuel use and all City of London infrastructure to provide a complete picture of energy needs for municipal operations. It is important to note that this information does not include energy use by London's agencies, boards, and commissions.

The report provides a summary of the annual energy consumption and GHG emissions for current 2012 operations complete with comparable historical data for electricity, natural gas, district energy (steam & chilled water), and fuel (diesel & gasoline).

This information will help assist with setting goals to contain and/or reduce the financial and environmental impacts of energy use in corporate facilities and operations.

2 CORPORATE ENERGY CONSUMPTION OVERVIEW

The 2012 Corporate Energy Consumption Report provides a summary of the City of London's 2012 annual energy consumption and GHG emissions for all operations. The document provides a total of all significant energy costs associated with City of London operations. In addition to the report requirements mandated by the *Green Energy Act and Ontario Regulation 397/11*, information on all energy consuming infrastructure (e.g., street lighting, sports fields) as well as fleet fuel has been included to provide a complete picture of energy needs for our municipal operations.

Similar to 2011, this information does not include energy use by London's agencies, boards and commissions.

- The Corporation spent approximately \$16.2 million on energy, a decrease of 2 percent from 2011. Electricity represents approximately 75 percent of corporate energy costs.
- The Corporation consumed approximately 190 million “equivalent” kilowatt-hours (ekWh) of energy, a decrease of 6 percent from 2011.
- In terms of service delivery to Londoners, corporate energy use per person dropped by 10 percent from 2007 levels. This reduction can be attributed to recent energy conservation measures and facility upgrades, as well as above-average winter temperatures in 2012 that reduced the need for building heat. These energy savings required a financial investment which produces both annual savings (true savings) and an accumulating avoided future cost (money that would have been spent under a 'business as usual' model):

- Energy costs in 2012 were \$750,000 less than they would have been if the City still used energy at 2007 levels. This number would be even higher if compared against the year 2000.
- The City has accumulated more than \$1.5 million in avoided energy costs so far since 2007 due to improved energy efficiency in service delivery and capital investments.
- Between 2007 and 2012, the City spent between \$300,000 to \$600,000 per year in operating costs associated with energy management staff, feasibility studies, and other consulting costs.
- In this same period, the City spent between \$250,000 and \$1 million per year in capital investments related to energy-efficiency projects. These investments create energy savings every year over the life of the investment
- Energy cost for each commodity increases each year. Therefore, sustained energy reductions become more important each year as each unit of energy consumed becomes more expensive with rising energy prices.

Energy-related greenhouse gas emissions were 29,200 tonnes in 2012, a reduction of 34 percent from the baseline year of 2007. This is mainly due to the reduced use of coal-fired power plants to generate electricity in Ontario.

Methods of Measurement

The City of London procured software in 2007 to log monthly utility bills for our municipally-owned and administered buildings and facilities. The EnergyCap software has the capability to track, monitor and capture data to assist the City of London with reporting consumption and providing historical data.

Fleet data is provided from its software system Petrovend which is used for tracking vehicle fuelling at City of London Operation Centres.

Limitations of Measurement

The annual energy consumption and greenhouse gas emissions for the City of London do not include our Agencies, Boards & Commissions, nor does it include energy consumed in leased office space where the utility costs are incorporated in the leasing agreements.

Annual transportation fuel consumption and GHG emissions for the City of London do not include fuel consumption and emissions produced from the use of personal vehicles, railway or air travel for work related tasks by staff or by contracted services by the City of London.

3 CORPORATE ENERGY ANNUAL SUMMARY

In 2012, the City of London's corporate energy summary is categorized by consumption and the total cost of annual energy procured by commodity. Currently the City of London is capable of tracking annual electricity, natural gas, steam, chilled water, diesel and gasoline consumptions and costs. This allows the City of London to show the variances in costs associated to consumption.

The City of London has averaged the 2012 energy consumptions and cost data in comparison to London's population. This allows the City to demonstrate and relay to Londoners the energy consumed in relationship to service delivery provided by the corporation.

The City of London uses 2007 as a baseline, due to the fact that this is the first set of utility data within the EnergyCap software to track, monitor and capture data for tracking purposes and to help form baseline calculations.

3.1 TOTAL CORPORATE ENERGY CONSUMPTION

With the use of EnergyCap software, the City of London has the ability to breakdown and report annual energy consumption by the commodity and by Service Area.

3.1.1 ENERGY CONSUMPTION BY COMMODITY

Table 1 – Consumption by Commodity Comparison 2011-2012

Energy Consumption (ekWh)	2011	2012	Variance	% Change
Electricity	111,804,000	108,533,000	(3,271,000)	-3%
Natural Gas	53,265,000	46,264,000	(7,001,000)	-13%
Steam	2,921,000	2,592,000	(329,000)	-11%
Chilled Water	2,256,000	1,801,000	(455,000)	-20%
Diesel Fuel	21,472,000	20,778,000	(694,000)	-3%
Gasoline	6,944,000	7,083,000	139,000	2%
Total City Of London	198,662,000	187,051,000	(11,611,000)	-6%

In comparison to 2011, the City of London's total energy consumption and percentage of usage defined by commodity has shown a 6% reduction in 2012 as shown in Table 1.

Figure 1 – Total Energy Consumption by Commodity

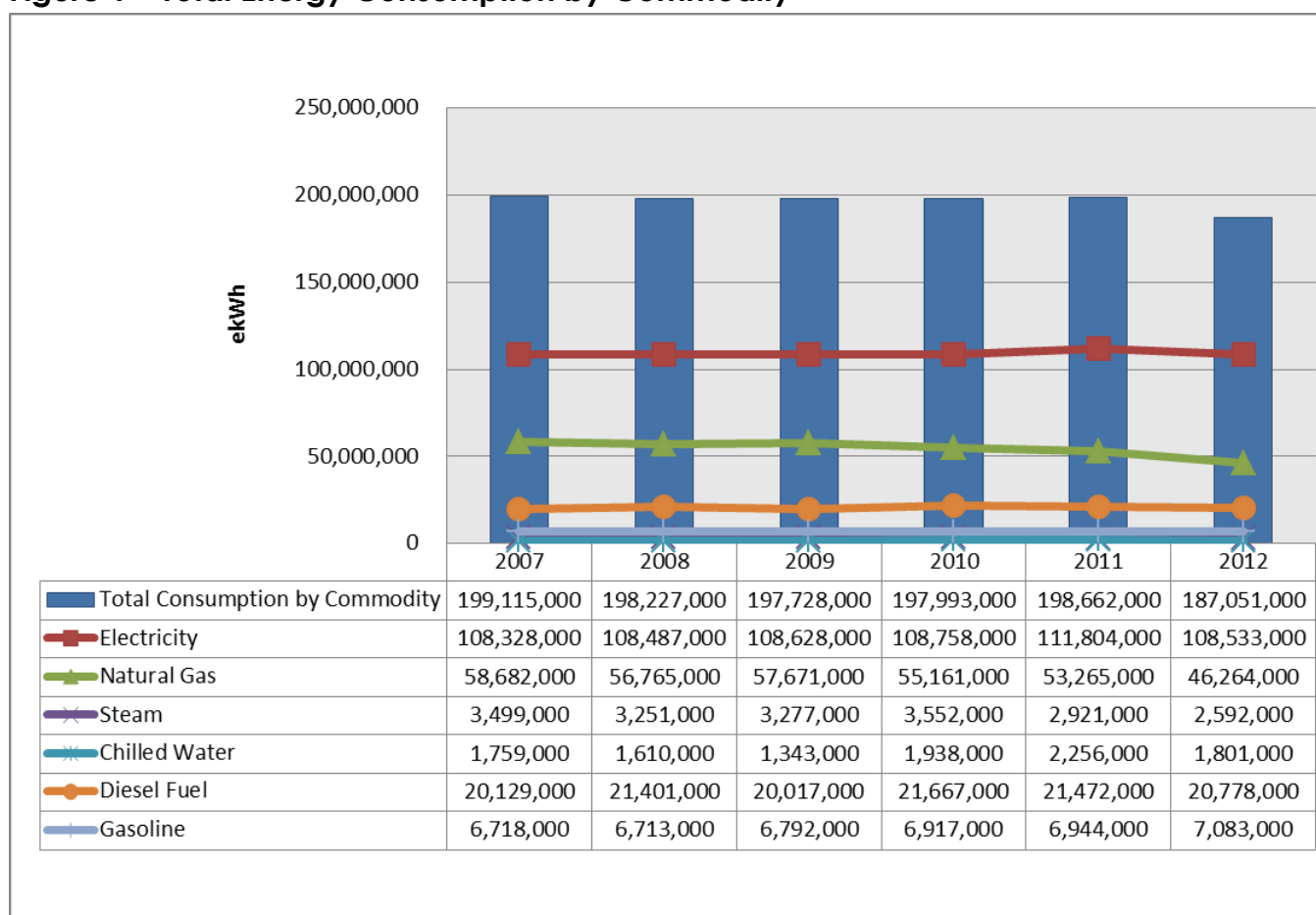


Figure 1 is a representation of the energy consumption (ekWh) for the overall commodity usage every year since 2007.

The commodity consumption trend indicates that consumptions have remained relatively unchanged for the City of London until 2012. In 2012 the City of London reduced consumptions across all commodities with the exception of gasoline. Since 2007, London's population has increased by about four percent, which means that corporate energy efficiency (in terms of energy used per person in London) improved by 10 percent over the extent of 6 year period. In comparison, the results conclude an overall 7 percent improvement in energy efficiency from 2011.

It is also important to note that differences in annual weather conditions will also impact energy needs, as this will impact building air conditioning and space heating needs as well as pumping and treatment requirements for water supply and wastewater.

In Table 2 below, further detailed energy consumptions by commodity compared to 2007 values, along with the percentage of changes.

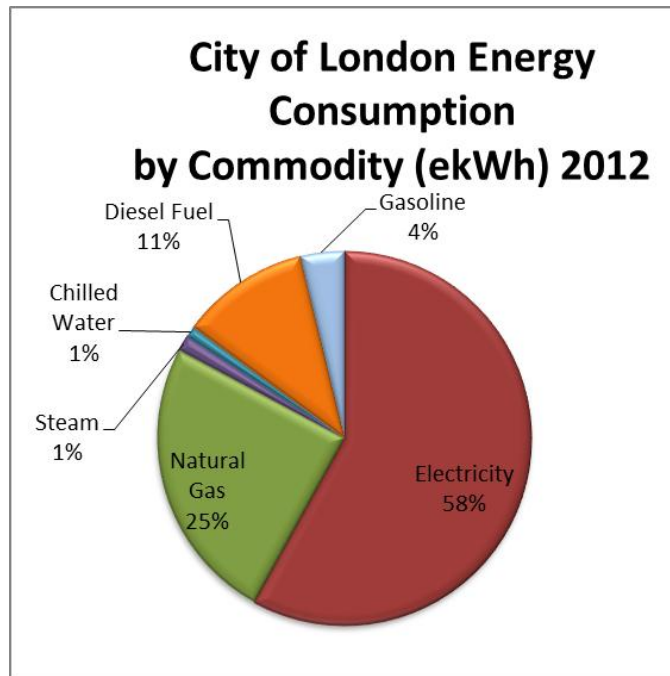
Table 2 – Energy Consumption by Commodity 2007-2012

Energy Consumption (ekWh)	2007	2012	Variance	% Change
Electricity	108,328,000	108,533,000	205,000	0%
Natural Gas	58,682,000	46,264,000	(12,418,000)	-21%
Steam	3,499,000	2,592,000	(907,000)	-26%
Chilled Water	1,759,000	1,801,000	42,000	2%
Diesel Fuel	20,129,000	20,778,000	649,000	3%
Gasoline	6,718,000	7,083,000	365,000	5%
Total City Of London	199,115,000	187,051,000	(12,064,000)	-6%

In 2012 the City of London has:

- Reduced natural gas consumption by 21% compared to 2007.
- Reduced steam consumption by 26% compared to 2007.
- Total electricity consumption is virtually unchanged compared to 2007.
- The total combined consumption has been reduced by 6%.

In summary:



- Electricity represents the majority of the Corporation's energy consumption, accounting for 58% of overall needs. This increased by 2% compared to 2011 values.
- Natural gas consumption accounts for 25% of overall energy needs. This decreased by 2% compared to 2011 values
- Diesel remains the most prominent fuel used within the City's vehicle fleet, given the large number of heavy-duty vehicles the City of London operates.

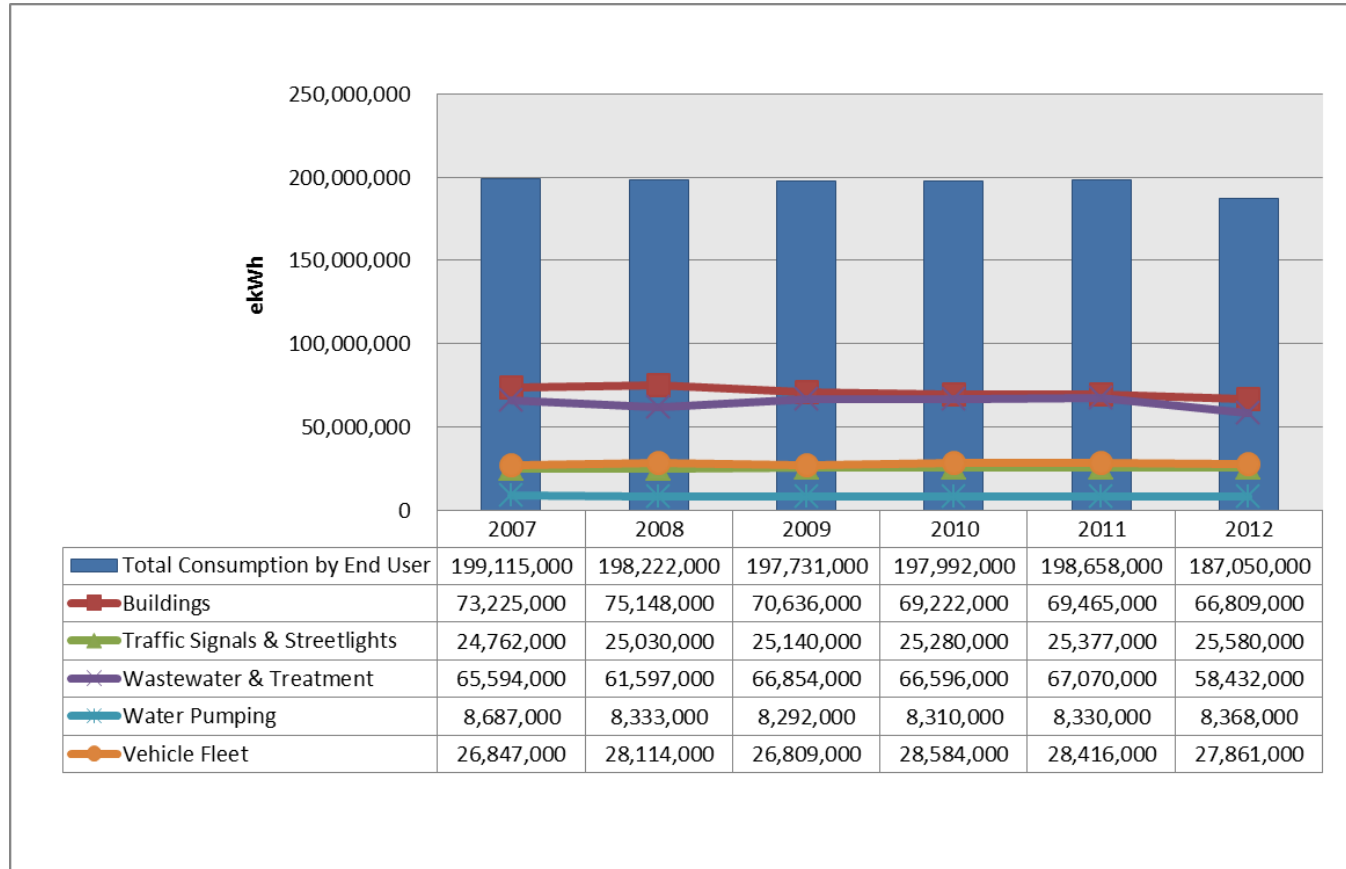
3.1.2 ENERGY CONSUMPTION BY SERVICE AREA

Table 3 – Consumption by Service Area Comparison 2011-2012

Energy Consumption (ekWh)	2011	2012	Variance	% Change
Buildings	69,465,000	66,809,000	(2,656,000)	-4%
Traffic Signals & Streetlights	25,377,000	25,580,000	203,000	1%
Wastewater & Treatment	67,070,000	58,432,000	(8,638,000)	-13%
Water Pumping	8,330,000	8,368,000	38,000	0%
Vehicle Fleet	28,416,000	27,861,000	(555,000)	-2%
Total City Of London	198,658,000	187,050,000	(11,608,000)	-6%

In comparison to 2011, the City of London's total energy consumption and percentage of usage defined by service area result in a 6 percent overall reduction in 2012 as shown in Table 3. By separating the service areas, this gives the City of London the ability to see where energy consumptions are being used and the opportunity to target areas for future improvements.

Figure 2 – Total Energy Consumption by Service Area



The total energy consumption by commodity illustrated in Figure 2 represents the overall energy consumption (ekWh) by the service areas since 2007.

The six year commodity trend indicates that consumptions have remained relatively unchanged for the City of London with the exception of 2012. In 2012 the City of London service areas reduced their overall consumptions by 6 percent. Buildings and Wastewater Treatment were the major contributors to the reductions received in 2012, while some service areas continue to grow in consumption.

In Table 4 below, further detailed energy consumption by service area in comparison to 2007 values is shown, along with the percentage of changes.

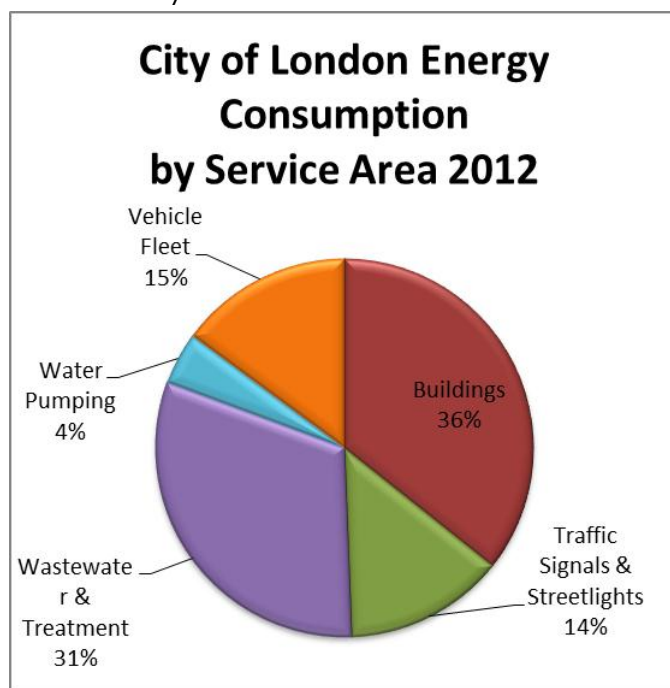
Table 4 – Energy Consumption by Service Area 2007-2012

Energy Consumption (ekWh)	2007	2012	Variance	% Change
Buildings	73,225,000	66,809,000	(6,416,000)	-9%
Traffic Signals & Streetlights	24,762,000	25,580,000	818,000	3%
Wastewater & Treatment	65,594,000	58,432,000	(7,162,000)	-11%
Water Pumping	8,687,000	8,368,000	(319,000)	-4%
Vehicle Fleet	26,847,000	27,861,000	1,014,000	4%
Total City Of London	199,115,000	187,050,000	(12,065,000)	-6%

In 2012 the City of London service areas, since 2007 have:

- Decreased in building consumption by 9%.
- Decreased in water pumping energy consumption by 4%.
- Decreased wastewater & treatment consumption by 11%
- Increased fleet fuel consumption by 4%.

In summary:



- Buildings (36%) and Wastewater & Treatment (31%) hold the highest percentage of demand for energy consumption for the City of London.
- Vehicle Fleet (15%) and Traffic Signals & Streetlights (14%) contribute to significant demand for energy consumptions.
- Water Pumping (4%) remains the lowest end user contributor in energy consumption demands for the City of London.

3.1.3 TOTAL CORPORATE ENERGY CONSUMPTION PER CAPITA BY SERVICE AREA

The City of London's corporate energy consumption contributes to serving the public, businesses and visitors to London. The consumption reported is significant to the services provided to the community. London continues to grow in population, and increased services are required to support that growth. It is important to capture energy usage per capita to demonstrate the City of London's achievements in energy reductions while continued growth occurs in London.

Table 5 – Energy Consumption Per Capita 2010-2011

Energy Consumption (ekWh) by Service Area	2011	2012	Change from Past Year Variance	% Change
Buildings	69,465,000	66,809,000	(2,656,000)	-3.8%
Traffic Signals & Streetlights	25,377,000	25,580,000	203,000	0.8%
Wastewater & Treatment	67,070,000	58,432,000	(8,638,000)	-12.9%
Water Pumping	8,330,000	8,368,000	38,000	0.5%
Vehicle Fleet	28,416,000	27,861,000	(555,000)	-2.0%
Total City Of London	198,658,000	187,050,000	(11,608,000)	-5.8%
London's Population	366,200	369,000	2,800	0.8%
Energy Use (ekWh) per person	542	507	(36)	-6.6%

In 2012 the City of London reduced corporate energy consumptions by approximately 6 percent illustrated in Table 5 above. Decreases in commodity use suggests that corporate initiatives and programs currently in place to reduce consumption act as a counterbalance to the additional increases of demand for energy due to London's growth.

- The City of London's population increased by approximately 1 percent in 2012
- Corporate energy use per person decreased by over 6 percent from 2011

Table 6 – Energy Consumption Per Capita 2007-2012

Energy Consumption (ekWh) by Service Area	2007	2012	Change since 2007 Variance	% Change
Buildings	73,225,000	66,809,000	(6,416,000)	-8.8%
Traffic Signals & Streetlights	24,762,000	25,580,000	818,000	3.3%
Wastewater & Treatment	65,594,000	58,432,000	(7,162,000)	-10.9%
Water Pumping	8,687,000	8,368,000	(319,000)	-3.7%
Vehicle Fleet	26,847,000	27,861,000	1,014,000	3.8%
Total City Of London	199,115,000	187,050,000	(12,065,000)	-6.1%
London's Population	355,000	369,000	14,000	3.9%
Energy Use (ekWh) per person	561	507	(54)	-9.6%

The City of London's population has grown by 4 percent (14,000 people) since 2007. Table 6 above indicates the corporate energy consumption per capita by commodity in comparison to 2007. Six years of commodity data shows continued improvement of corporate energy use per capita with an overall reduction of 10 percent in 2012 compared to 2007.

3.1.4 TOTAL CORPORATE ENERGY CONSUMPTION SUMMARY

Through conservation projects and through Corporate Energy Management practices the City of London has maintained minimal consumption increases within the past six years without impacts to services. The reduction of six percent in commodity use suggests that corporate initiatives currently in place to reduce consumption on existing and new infrastructure act as a counterbalance to the additional increases of demand for energy due to London's growth.

3.2 TOTAL CORPORATE ENERGY COSTS

With the use of EnergyCap software, the City of London has the ability to breakdown and report annual energy costs by the commodity and by Service Area.

In 2012, the City of London (not including Agencies, Boards & Commissions) spent approximately \$16,204,000 on energy. This represents about two percent of the City of London's operating budget for 2012.

3.2.1 ENERGY COSTS BY COMMODITY

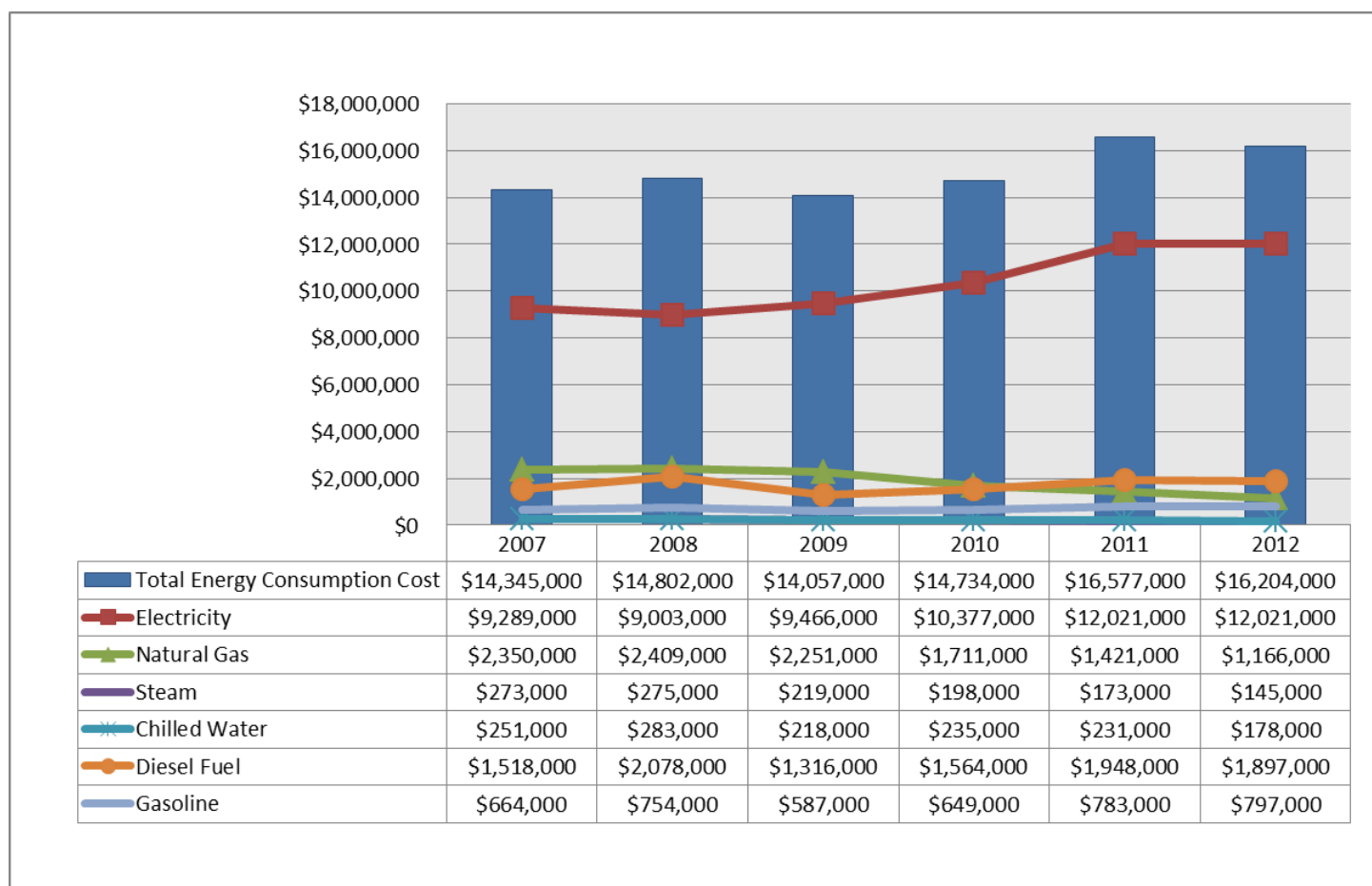
Table 7 – Energy Costs by Commodity Comparison 2011-2012

	2011	2012	Variance	% Change
Buildings	\$ 4,753,000	\$ 4,521,000	\$ (232,000)	-5%
Traffic Signals & Streetlights	\$ 3,231,000	\$ 3,335,000	\$ 104,000	3%
Wastewater & Treatment	\$ 5,047,000	\$ 4,816,000	\$ (231,000)	-5%
Water Pumping	\$ 815,000	\$ 838,000	\$ 23,000	3%
Vehicle Fleet	\$ 2,730,868	\$ 2,694,000	\$ (36,868)	-1%
Total City Of London	\$ 16,576,868	\$ 16,204,000	\$ (372,868)	-2%

In 2012, the City of London's total energy costs by commodity results indicate an approximately decrease by 2 percent from 2011 as illustrated in Table 7.

In 2011, costs associated to electricity, gasoline, and diesel fuel remained steady which contributed to the marginal decrease in the City of London's operating costs. The 2 percent variance equates to an approximate cost avoidance of \$350,000 in energy costs to the City of London for the 2012 operating year.

Figure 3 - Total Energy Cost by Commodity



The total energy cost by commodity illustrated in Figure 3 is a representation of the energy overall cost by commodity per year since 2007.

The cost by commodity trend indicates the costs for energy continue to rise for the City of London. In 2012 the City of London commodity costs remained relatively unchanged from 2011. Electricity costs and fuel costs have stabilized in the market for 2012 and the cost for natural gas and steam continued to decline in 2012. Chilled water and gasoline costs remain relatively consistent since 2007.

In Table 8 below, further detailed energy consumption by commodity in comparison to 2007 values is shown, along with the percentage of changes.

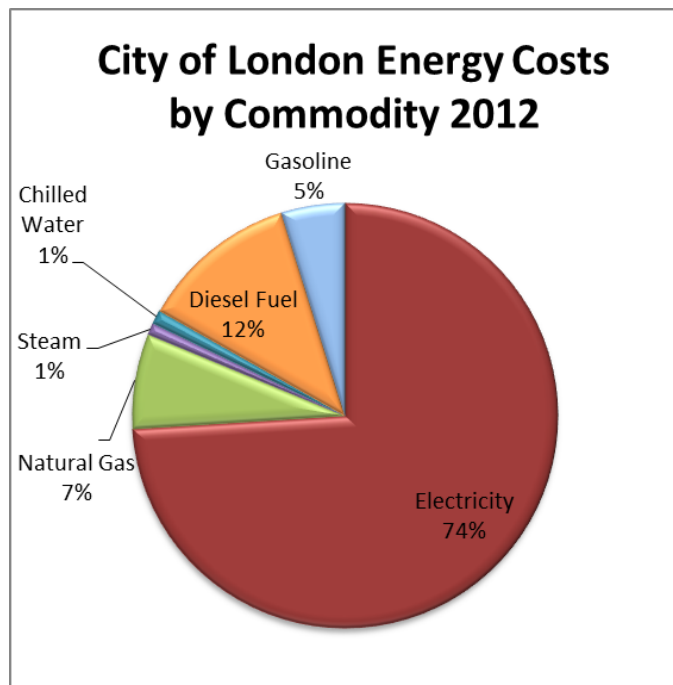
Table 8 – Energy Costs by Commodity 2007-2012

	2007	2012	Variance	% Change
Electricity	\$ 9,289,000	\$ 12,021,000	\$ 2,732,000	29%
Natural Gas	\$ 2,350,000	\$ 1,166,000	\$ (1,184,000)	-50%
Steam	\$ 273,000	\$ 145,000	\$ (128,000)	-47%
Chilled Water	\$ 251,000	\$ 178,000	\$ (73,000)	-29%
Diesel Fuel	\$ 1,518,000	\$ 1,897,000	\$ 379,000	25%
Gasoline	\$ 664,000	\$ 797,000	\$ 133,000	20%
Total City Of London	\$ 14,345,000	\$ 16,204,000	\$ 1,859,000	13%

In 2012 the City of London has seen:

- Reduced natural gas and steam costs by over 45% compared to 2007
- Increased electricity costs of 29% compared to 2007.
- The total combined costs are noticeably higher today (by 13%) compared to 2007.

In summary:



- Electricity represents the majority of the Corporation's energy costs, accounting for 74% in 2012. This is an increase of 2% compared to 2011.
- Natural gas consumption accounts for 7% of overall energy costs in 2012.
- Diesel is the most prominent fuel used within the City's vehicle fleet, given the large number of heavy-duty vehicles the City of London operates.

3.2.2 ENERGY COSTS BY SERVICE AREA

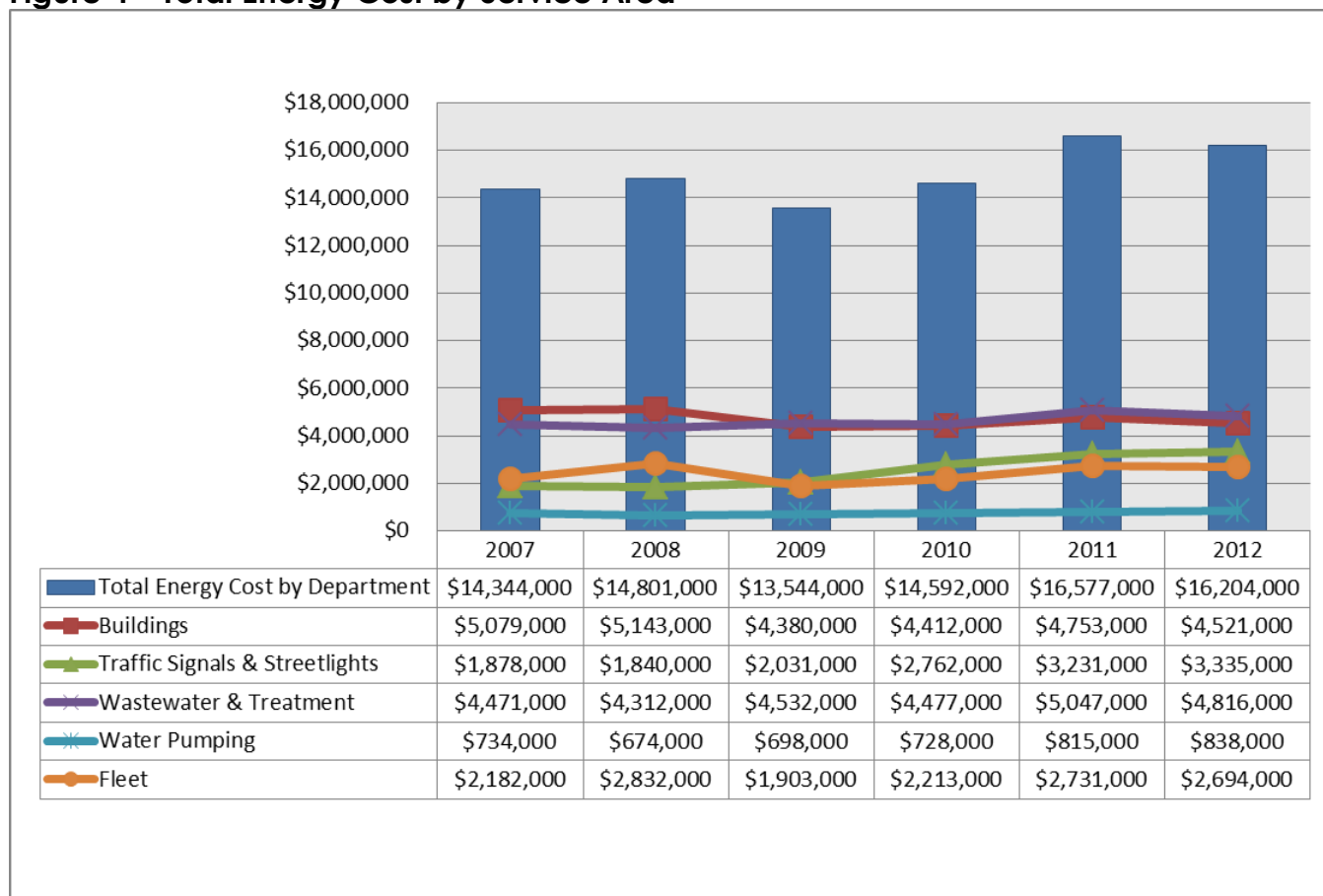
Table 9 – Energy Costs by Service Area Comparison 2011-2012

	2011	2012	Variance	% Change
Buildings	\$ 4,753,000	\$ 4,521,000	\$ (232,000)	-5%
Traffic Signals & Streetlights	\$ 3,231,000	\$ 3,335,000	\$ 104,000	3%
Wastewater & Treatment	\$ 5,047,000	\$ 4,816,000	\$ (231,000)	-5%
Water Pumping	\$ 815,000	\$ 838,000	\$ 23,000	3%
Vehicle Fleet	\$ 2,731,000	\$ 2,694,000	\$ (37,000)	-1%
Total City Of London	\$ 16,577,000	\$ 16,204,000	\$ (373,000)	-2%

In 2012, the City of London's total energy costs by service area decreased by approximately 2 percent from 2012 as identified in Table 9.

Buildings and Wastewater & Treatment reduced costs contributing to the successful 2 percent decrease for the City of London operational costs in 2012, which reduced the average increases in energy costs associated to Traffic Signals and Water Pumping.

Figure 4 – Total Energy Cost by Service Area



The total energy cost by service area illustrated in Figure 4 is a representation of the energy overall cost by end user per year since 2007.

The cost by service area trend indicates that in 2012 costs for energy have stabilized compared to continued increases in past years with an overall reduction of approximately 10 percent. Traffic Signals & Streetlights and Water pumping saw minimal increases, whereas all other service areas saw decreased costs in their energy procurement for 2012.

In Table 10 below, further detailed energy costs by service area in comparison to 2007 values is shown, along with the percentage of changes.

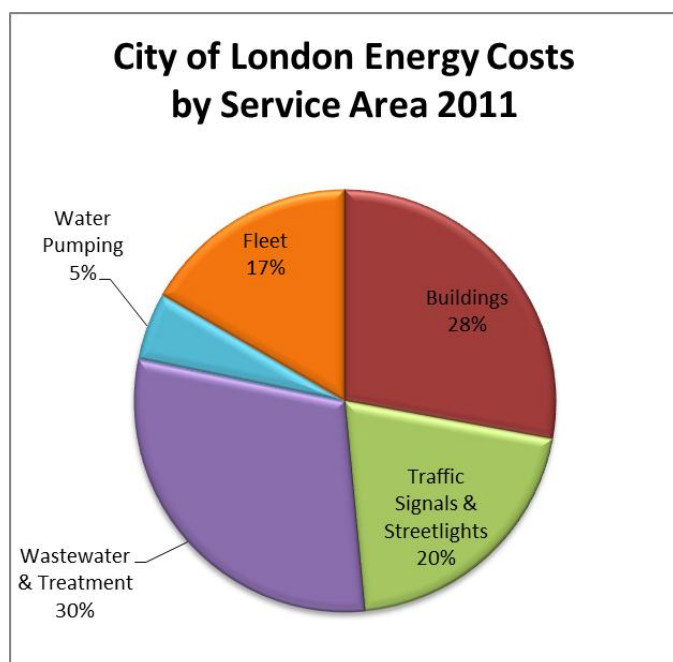
Table 10 – Energy Costs by Service Area 2007-2012

	2007	2012	Variance	% Change
Buildings	\$ 5,079,000	\$ 4,521,000	\$ (558,000)	-11%
Traffic Signals & Streetlights	\$ 1,878,000	\$ 3,335,000	\$ 1,457,000	78%
Wastewater & Treatment	\$ 4,471,000	\$ 4,816,000	\$ 345,000	8%
Water Pumping	\$ 734,000	\$ 838,000	\$ 104,000	14%
Vehicle Fleet	\$ 2,182,000	\$ 2,694,000	\$ 512,000	23%
Total City Of London	\$ 14,344,000	\$ 16,204,000	\$ 1,860,000	13%

In 2012 the City of London service areas have seen:

- Decreased building energy costs by 11% compared to 2007
- Increased traffic signals & streetlight costs by 78% compared to 2007
- The total combined energy costs by end user are 13% higher today compared to 2007

In summary:



- Wastewater pumping and treatment represents the majority of the Corporation's energy costs by service area, accounting for 30% for 2012
- Buildings continue to account for 28% of overall end user energy costs compared to 2012
- Street lighting & traffic signals are the third highest contributor in energy consumed by end user at 20%

3.2.3 ENERGY COSTS PER CAPITA

The operation, maintenance and services provided by the City of London contribute to the overall corporate energy costs associated to serving the public, businesses and visitors of London.

Table 11 – Energy Costs Per Capita 2011-2012

Energy Costs by Service Area	2011	2012	Change from Past Year Variance	% Change
Buildings	\$ 4,753,000	\$ 4,521,000	\$ (232,000)	-4.9%
Traffic Signals & Streetlights	\$ 3,231,000	\$ 3,335,000	\$ 104,000	3.2%
Wastewater & Treatment	\$ 5,047,000	\$ 4,816,000	\$ (231,000)	-4.6%
Water Pumping	\$ 815,000	\$ 838,000	\$ 23,000	2.8%
Fleet	\$ 2,731,000	\$ 2,694,000	\$ (37,000)	-1.4%
Total City Of London	\$ 16,577,000	\$ 16,204,000	\$ (373,000)	-2.3%
London's Population	366,200	369,000	2,800	0.8%
Energy costs per person	\$ 45	\$ 44	\$ (1.35)	-3.0%

In 2012 the City of London reduced corporate energy costs by approximately 2 percent compared to 2011. Table 11 above reflects the corporate energy costs per capita by service area for the City of London. Decreased cost suggests that corporate initiatives and

programs currently in place support the City of London to reduce energy costs as the city continues to see growth. In 2012:

- The City of London's population increased by approximately 1 percent
- Corporate energy costs per person decreased by 3 percent

Table 12 – Energy Costs Per Capita by Service Area 2007-2012

Energy Costs by Service Area	2007	2012	Change since 2007	
			Variance	% Change
Buildings	\$ 5,079,000	\$ 4,521,000	\$ (558,000)	-11.0%
Traffic Signals & Streetlights	\$ 1,878,000	\$ 3,335,000	\$ 1,457,000	77.6%
Wastewater & Treatment	\$ 4,471,000	\$ 4,816,000	\$ 345,000	7.7%
Water Pumping	\$ 734,000	\$ 838,000	\$ 104,000	14.2%
Fleet	\$ 2,182,000	\$ 2,694,000	\$ 512,000	23.5%
Total City Of London	\$ 14,344,000	\$ 16,204,000	\$ 1,860,000	13.0%
London's Population	355,000	369,000	14,000	3.9%
Energy costs per person	\$ 40	\$ 44	\$ 3.51	8.7%

The City of London's population has grown by 4 percent (14,000 people) since 2007. Table 12 above indicates the corporate energy costs per capita by service area in comparison to 2007. Six years of commodity data shows continued energy cost increases for corporate energy with an overall increase of 9 percent in corporate energy use per capita from 2007.

3.2.4 TOTAL CORPORATE ENERGY COST SUMMARY

Total corporate energy costs continue to increase, with the price of electricity in Ontario being the major contributor. However, corporate energy management practices by the City of London to include cost avoidance measures through procurement, building retrofits, and other conservation measures assist in continued efforts to reduce amounts of energy to help avoid the market cost increase.

The City of London is committed to reducing energy costs. 2012 indicates positive returns to this commitment. The energy improvements and cost avoidance measures being implemented today are helping to avoid and sustain the market changes and inflation costs the City of London is faced with in the associated costs to procure energy.

4 CORPORATE ENERGY COST AVOIDANCE

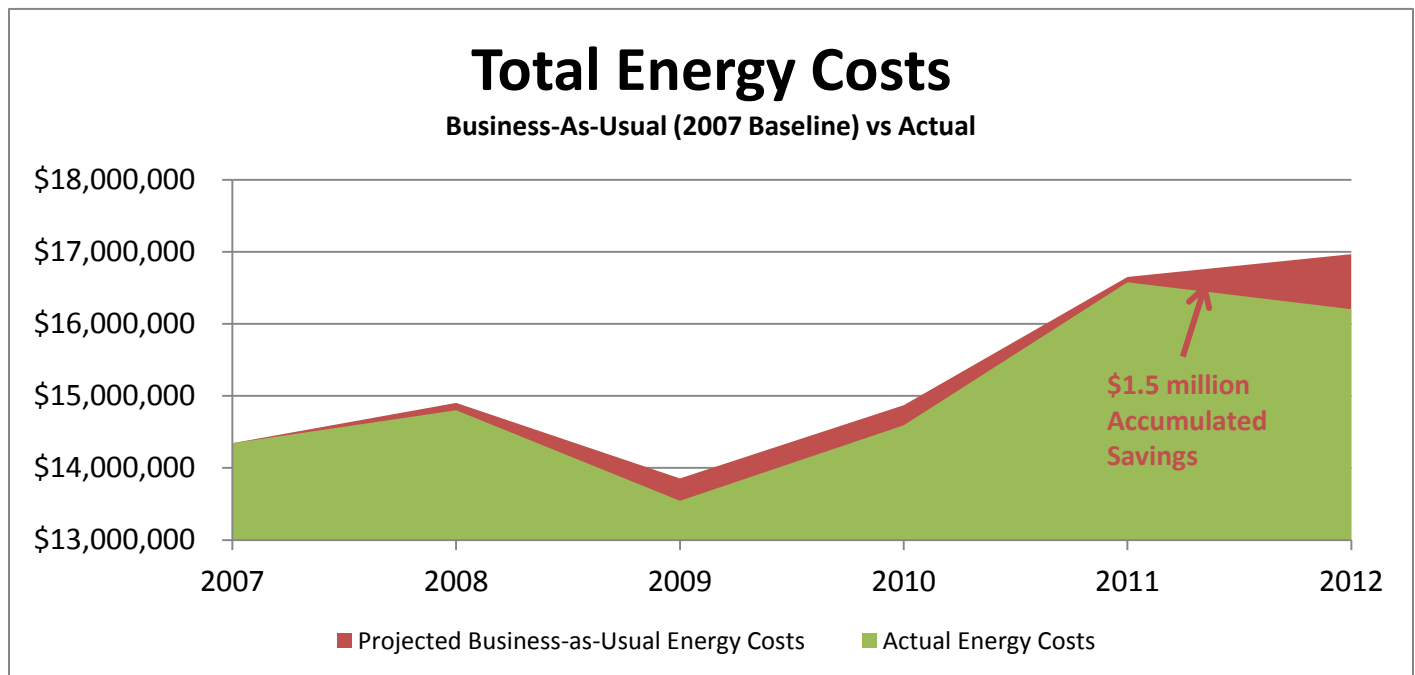
In terms of service delivery to Londoners, energy use per person has dropped by 10 percent since 2007 levels. This energy reduction can be attributed to recent energy conservation and facility upgrades, as well as above average seasonal winter temperatures in 2012 compared to 2007 data.

Table 13 – Energy Costs Per Capita by Service Area 2007-2012

Energy Consumption (ekWh) by Commodity per person			Change since 2007		2007-2012 Avoided Costs
	2007	2012	Variance	% Change	
Electricity	305	294	(11)	-3.6%	\$ (434,000)
Natural Gas	165	125	(40)	-24.2%	\$ (282,000)
Steam	10	7	(3)	-28.7%	\$ (42,000)
Chilled Water	5	5	(0)	-1.5%	\$ (3,000)
Diesel Fuel	57	56	(0)	-0.7%	\$ (13,000)
Gasoline	19	19	0	1.4%	\$ 11,000
Total City Of London	561	507	(54)	-9.6%	(\$763,000)

Approximately \$750,000 in energy costs were avoided in 2012 compared to 2007 levels, and more than \$1.5 million in energy savings have been accumulated since 2007.

Figure 5 – Avoided Energy Costs



5 CORPORATE GREENHOUSE GAS EMISSIONS

In 2012 the City of London's corporate GHG emissions can be summarized by commodity and by service area. Based on the City of London's current use of electricity, natural gas, steam, chilled water, diesel and gasoline consumptions and costs, GHG emissions can be calculated. The total GHG reflects the municipal operations and can be measured annually back to 2007. This allows the City of London to show trends in GHG emissions over the last six years.

5.1 TOTAL CORPORATE GREENHOUSE GAS EMISSIONS BY COMMODITY

In 2012, the City of London's energy-related greenhouse gas emissions by commodity decreased by 34 percent from 2007. This is a 2 percent increase in reductions of greenhouse gas emissions from 2011.

Table 14 – Greenhouse Gas Emissions by Commodity 2007-2012

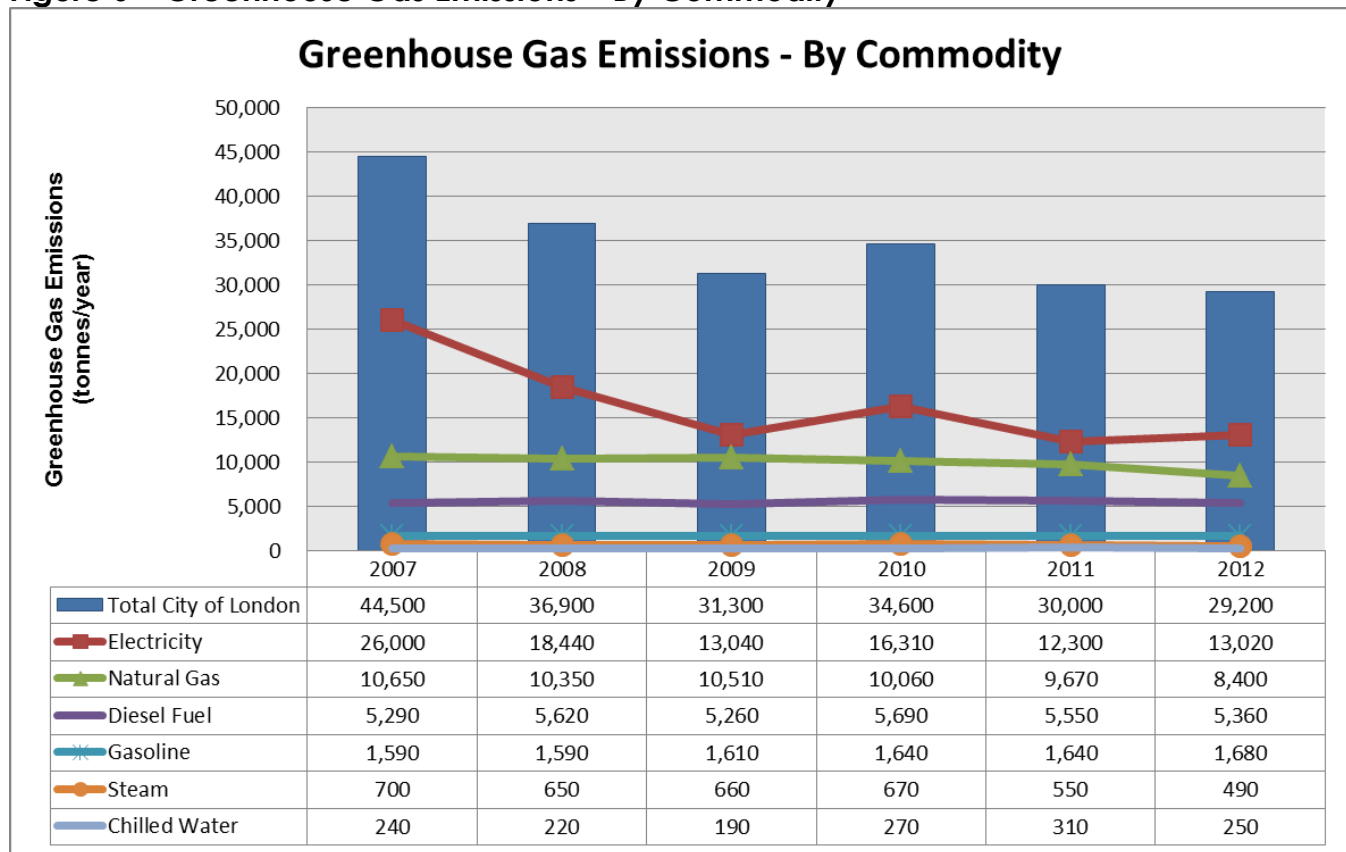
GHG Emissions – By Commodity (tonnes/year)	2007	2011	2012	Change from Past Year		Change since 2007	
				Difference (tonnes)	Percentage Change	Difference (tonnes)	Percentage Change
Electricity	26,000	12,300	13,020	720	6%	(12,980)	-50%
Natural Gas	10,650	9,710	8,430	(1,280)	-13%	(2,220)	-21%
Diesel Fuel	5,290	5,550	5,360	(190)	-3%	70	1%
Gasoline	1,590	1,640	1,680	40	2%	90	6%
Steam	700	550	490	(60)	-11%	(210)	-30%
Chilled Water	240	310	250	(60)	-19%	10	4%
Total City of London	44,500	30,100	29,200	(900)	-3%	(15,300)	-34%

Most of the recent progress in reducing energy-related corporate greenhouse gas emissions is due to provincial action to replace coal-fired power plants with cleaner electricity generation.

The total GHG emissions by commodity illustrated in Figure 6 below is a representation of the GHG emission reductions since 2007.

Overall, since 2007 the City of London has reduced its energy related carbon footprint by over 34 percent. The corporation continues to search for innovative and collective ways to reduce GHG emissions from energy use.

Figure 6 – Greenhouse Gas Emissions – By Commodity



5.2 TOTAL CORPORATE GREENHOUSE GAS EMISSIONS BY SERVICE AREA

The City achieved significant GHG reductions in 2012 in comparison to the 15 percent reduction in 2011 due to Province action to replace coal power generation with cleaner power generation sources. All service area's reduced GHG emissions in 2012 with a total decrease of 3 percent compared to 2011. (It should be noted that the total does not include landfill gas emissions. These are identified as part of Community greenhouse gas generation estimates.)

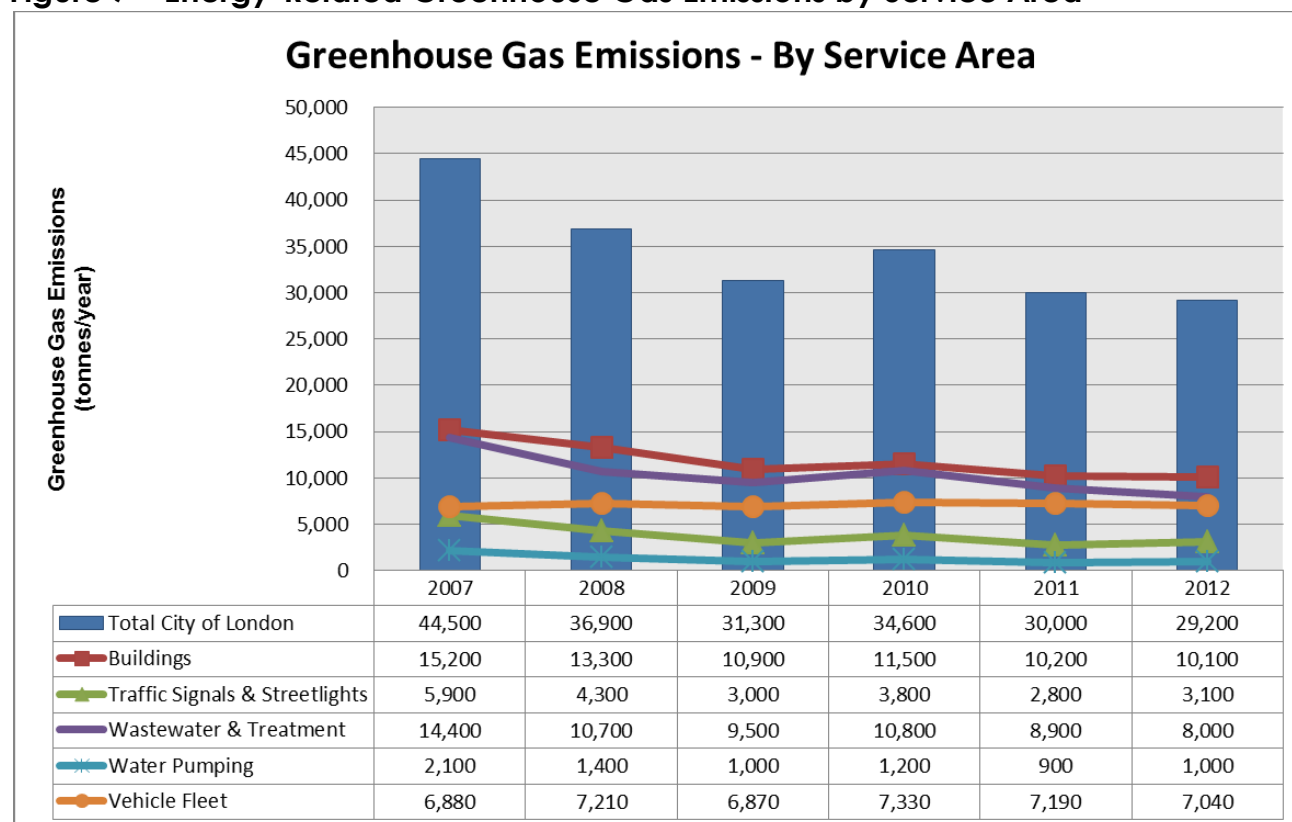
Table 15 below represents trends for all service areas for the City of London since the baseline year of 2007.

Table 15 – Greenhouse Gas Emissions by Service Area 2007-2012

GHG Emissions – By Service Area (tonnes/year)				Change from Past Year		Change since 2007	
	2007	2011	2012	Difference (tonnes)	Percentage Change	Difference (tonnes)	Percentage Change
Buildings	15,200	10,200	10,100	(100)	-1%	(5,100)	-34%
Traffic Signals & Streetlights	5,900	2,800	3,100	300	7%	(2,800)	-47%
Wastewater & Treatment	14,400	8,900	8,000	(900)	-8%	(6,400)	-44%
Water Pumping	2,100	900	1,000	100	7%	(1,100)	-52%
Vehicle Fleet	6,880	7,190	7,040	(150)	-2%	160	2%
Total City of London	44,500	30,000	29,200	(800)	-3%	(15,300)	-34%

The total GHG emissions by service area illustrated in Figure 7 below is a representation of the GHG emission reductions by commodity since 2007.

Figure 7 – Energy-Related Greenhouse Gas Emissions by Service Area



Overall, since 2007 the City of London has reduced its energy related carbon footprint by over 34 percent (not including landfills). The corporation continues to search for innovative and collective ways to reduce GHG emissions from energy use.