

TO:	CHAIR AND MEMBERS CIVIC WORKS COMMITTEE MEETING ON AUGUST 13, 2018
FROM:	JAY STANFORD, M.A., M.P.A. DIRECTOR, ENVIRONMENT, FLEET & SOLID WASTE
SUBJECT:	2017 COMMUNITY ENERGY AND GREENHOUSE GAS INVENTORY

RECOMMENDATION

That on the recommendation of the Director, Environment, Fleet & Solid Waste the 2017 Community Energy & Greenhouse Gas Inventory report **BE RECEIVED** for information.

PREVIOUS REPORTS PERTINENT TO THIS MATTER

Relevant reports that can be found at www.london.ca under City Hall (Meetings) include:

- Report to the August 29, 2017 Civic Works Committee (CWC) Meeting, 2016 Community Energy and Greenhouse Gas Inventory (Agenda Item #12)

STRATEGIC PLAN 2015-2019

Municipal Council has recognized the importance of climate change and other related environmental issues in its 2015-2019 - Strategic Plan for the City of London ([2015 – 2019 Strategic Plan](#)). Providing community energy use and greenhouse gas data in a timely fashion supports three of the four Areas of Focus at one level or another as follows:

Building a Sustainable City

- Strong and healthy environment

Leading in Public Service

- Collaborative, engaged leadership

Growing our Economy

- Strategic, collaborative partnerships

BACKGROUND

PURPOSE

The purpose of this report is to provide the Civic Works Committee (CWC) and Council with an overview of the 2017 Community Energy and Greenhouse Gas Inventory, and how this information illustrates the challenges and opportunities associated with reducing community energy use and greenhouse gas emissions.

This CWC report and the *2017 Community Energy and Greenhouse Gas Inventory report* (found on the City of London website www.london.ca) are key deliverables of the Community Energy Action Plan.

CONTEXT

The City of London does not have direct control over how much energy is used in London, but it does have influence. The control over energy use in London rests primarily with our citizens, visitors, employers and employees. Individual and collective action with respect to sustainable energy use, energy management, and energy conservation is critical for our future.

London's Community Energy Action Plan (CEAP) was approved by Council in July 2014. Within the CEAP, listed under the subsection titled Reporting and Education about the Economic and Environmental Considerations of Energy Use, the highest priority actions for the City of London were to:

1. Provide Londoners with annual information on community energy use and greenhouse gas (GHG) emissions.
2. Develop and report new energy-related performance indicators that highlight the total cost of energy and total money saved/generated from community energy actions.
3. Develop new tools to raise awareness on progress being made in London.

The City of London also reports this information on an annual basis to CDP Cities (formerly the Climate Disclosure Project) and the Global Covenant of Mayors for Climate & Energy.

DISCUSSION

Background

The CEAP focusses on actions to be taken over this Council term (2014-2018). The overall goals of the CEAP are to:

1. Increase the local economic benefit of sustainable energy use through:
 - a. Cost savings from energy conservation and energy efficiency,
 - b. Revenue from local production of clean and green energy products, and
 - c. Job creation associated with product and service providers engaged in these activities.
2. Reduce the environmental impact associated with energy use, through the use of greenhouse gas emission (GHG) reduction targets consistent with the Province of Ontario's goals, namely:
 - a. 15 percent reduction from 1990 levels by 2020,
 - b. 37 percent reduction from 1990 levels by 2030, and
 - c. 80 percent reduction from 1990 levels by 2050.

The three most common benchmark dates used by City staff to report on overall progress are:

- 1990 – the baseline year used for the Province of Ontario's GHG reduction targets
- 2007 – the year that energy use and greenhouse gas emissions reached their peak
- 2010 – the first year for which total energy cost data was determined

The *2017 Community Energy and Greenhouse Gas Inventory* provides an overview of the energy used in the London community as a whole. This report covers all significant energy sources used in London: natural gas, gasoline, electricity, diesel, fuel oil, and propane. Energy-using sectors covered by the inventory include transportation, residential, industrial, commercial, and institutional. It also includes an estimate of the total cost associated with these energy needs and the greenhouse gas emissions associated with these energy sources. In addition, this report also includes the greenhouse gas emissions associated with the City of London's W12A Landfill and closed landfill sites as well as sewage sludge incineration at the Greenway Wastewater Treatment Plant.

Why is this Important and How Will Londoners and London Businesses Benefit?

Providing community energy use and greenhouse gas inventory data in a timely fashion helps to inform City staff on what progress is being made to reduce energy use and greenhouse gas emissions for the major energy-using sectors in London. This helps City staff to reassess priority projects, determine which energy-using sectors to work with and which energy commodities to focus on.

Providing these inventory data in a timely fashion also provides Londoners and London businesses and institutions with both information and feedback on the impact that their collective actions have made to date. These inventory data are also the foundation for many of the community engagement tools developed to date, such as the Trouble with Bubbles greenhouse gas visualization video as well as energy infographics.

What is the Connection with Other City of London Programs?

The community energy use and greenhouse gas inventory data is connected to many City of London programs and initiatives, such as:

- London's Community Energy Action Plan (CEAP)
- Corporate Energy Conservation & Demand Management (CDM) Plan
- Active & Green Communities and other CityGreen community engagement activities
- Active Transportation and Transportation Demand Management activities
- The London Plan
- London's Bus Rapid Transit (BRT) System
- London On Bikes Cycling Master Plan
- NeighbourGood London (implementation of London Strengthening Neighbourhoods Strategy)
- WhyWaste - waste reduction and diversion programs
- Water conservation and efficiency programs
- Climate change adaptation (e.g., stormwater management)
- Parks and Recreation Master Plan
- Urban Forest Strategy

How is the Data Acquired and Funded?

The community energy use and greenhouse gas inventory data is maintained in-house by City staff, with utility data being provided by London Hydro and Union Gas (without charge), retail sales of fuel data provided by Kent Marketing (purchased), and other data provided by Statistics Canada. Data analyses and interpretation is completed in-house by City staff. The methodology used to develop the community energy use and greenhouse gas inventory has been reviewed by ICLEI Canada as part of the Partners for Climate Protection Program, as well as HDR Incorporated as part of the CDP Cities program.

Overview of the 2017 Community Energy and Greenhouse Gas Inventory

The *2017 Community Energy and Greenhouse Gas Inventory* report can be found on the City of London website (www.london.ca).

Overall, the results in the report continue to tell a positive story for the community. In 2017, Londoners managed to reduce total greenhouse gas emissions to levels that are 17 percent below 1990 levels (versus the target of 15 percent). Ontario's actions to replace coal-fired power plants with cleaner forms of power generation have played a significant role in this reduction. Greenhouse gas emissions from Ontario's electricity grid were 90 percent lower than they were ten years ago. However, Londoners have also taken action by reducing the amount of energy they use at home and at work.

The current data, achieved through provincial and local actions, increases the confidence that Londoners, businesses and institutions will be able to meet our 2020 community greenhouse gas reduction goal to be 15 percent below 1990 levels by 2020. Whether emissions continue to decrease depends upon the impact of energy and fuel conservation efforts, provincial and federal climate change policies, climate trends, economic growth, and consumer choices.

Energy use by sector in London is as follows:

- 40 percent from industrial, commercial, and institutional buildings and facilities;
- 37 percent from transportation, primarily cars and trucks on London's roads; and
- 23 percent from single-family residential homes.

Energy use accounted for 95 percent of community greenhouse gas emissions. The remaining five percent of greenhouse gas emissions are methane emissions from landfills and nitrous oxide emissions from sewage sludge incineration.

Specific highlights of recent progress, as observed by longer-term trends, include:

- **Londoners are using energy more efficiently** – on a per person basis, Londoners and London businesses used 11 percent less energy overall in 2017 than used in 2007.
- **London is producing more good and services for every unit of energy used** – on a dollar gross domestic product (GDP adjusted for inflation) per unit energy basis, London’s industrial, commercial, and institutional sector improved the value of goods and services produced per unit of energy used by 55 percent between 1990 and 2017.
- **London is spending less money on energy** – improvements in energy efficiency compared to 2010 levels of energy efficiency (on a per person basis and applied to activity in 2017) avoided \$150 million in energy costs had there been no improvements (i.e., Londoners and businesses would have spent \$150 million more in 2017 on energy).
- **Londoners’ share of greenhouse emissions are significantly lower** – on a per person basis, Londoners and London businesses released 34 percent fewer greenhouse gas emissions in 2017 than they did in 1990, along with reductions in air pollution emissions (e.g., nitrogen oxides, volatile organic compounds) from fossil fuel use.

In addition, since 1990:

- The total amount of energy used in London in 2016 was 57,500 terajoules, 12 percent above 1990 levels. This increase is due to London’s growing population along with our growing economy, partially offset by the improved energy efficiencies noted below;
- Energy use per person for transportation decreased by 7 percent;
- Energy use per person for single-family residential homes decreased by 20 percent;
- Energy use per person for industrial, commercial, and institutional buildings decreased by 11 percent; and
- London’s total annual greenhouse gas emissions, estimated to be over 2.7 million tonnes, have decreased by 17 percent.

Since 2007, London’s “peak year” for energy use:

- The total amount of energy used in London decreased by 3 percent; and
- London’s total annual greenhouse gas emissions have decreased by 26 percent.

There are four major energy commodities used in London – natural gas, gasoline, electricity, and diesel. The following table summarizes the impact of these energy commodities in terms of total energy use, total cost, and GHG emissions.

Energy Commodity	Share of Total Energy Used (in gigajoules)	Share of Total Energy Costs	Share of Energy-related GHG Emissions
natural gas	41%	19%	44%
gasoline	27%	36%	37%
electricity	20%	35%	2%
diesel	7%	7%	11%
other	5%	3%	6%

London as a whole spent almost \$1.5 billion on energy in 2017, an increase of five percent from 2016. Gasoline costs increased by 13 percent, due primarily to a 67 percent increase in crude oil prices in 2017. Electricity costs decreased by nine percent, due to the combination of lower electricity consumption as well as lower prices resulting from Ontario’s Fair Hydro Plan. Natural gas costs increased by 32 percent overall due primarily to a combination of an 80 percent increase in natural gas commodity prices and a six percent increase in natural gas use.

Carbon pricing through Ontario’s Cap and Trade program had a relatively modest impact on energy prices, adding about seven percent to the total natural gas price and about 3 cents per litre to the marketing operating margin component of gasoline.

Transportation fuel use remains the one area where overall recent trends have not been positive. The volume of fuel sold in London had been increasing year-over-year between 2011 and 2016, although this trend stopped in 2017 with a reduction of almost three percent between 2016 and 2017.

Vehicle ownership in London has grown by 32 percent since 2011, or almost five percent per year on average. As of December 2017, there were almost 278,000 light-duty vehicles registered in London – an increase of almost 68,000 vehicles since 2011. However, on a positive note, the average annual fuel use per registered vehicle in London was 15 percent lower in 2017 compared to 2011.

Figure 1 illustrates the trend on energy use for major energy-using sectors on a per person basis since 1990. Figure 2 illustrates the trend for energy costs by commodity since 2010. Figure 3 illustrates the trend in total annual greenhouse gas emissions since 1990 and compares these emissions to the greenhouse gas emission reduction targets established by the federal and provincial government.

Figure 1 – Change in Energy Use in London, Per Person by Sector Since 1990

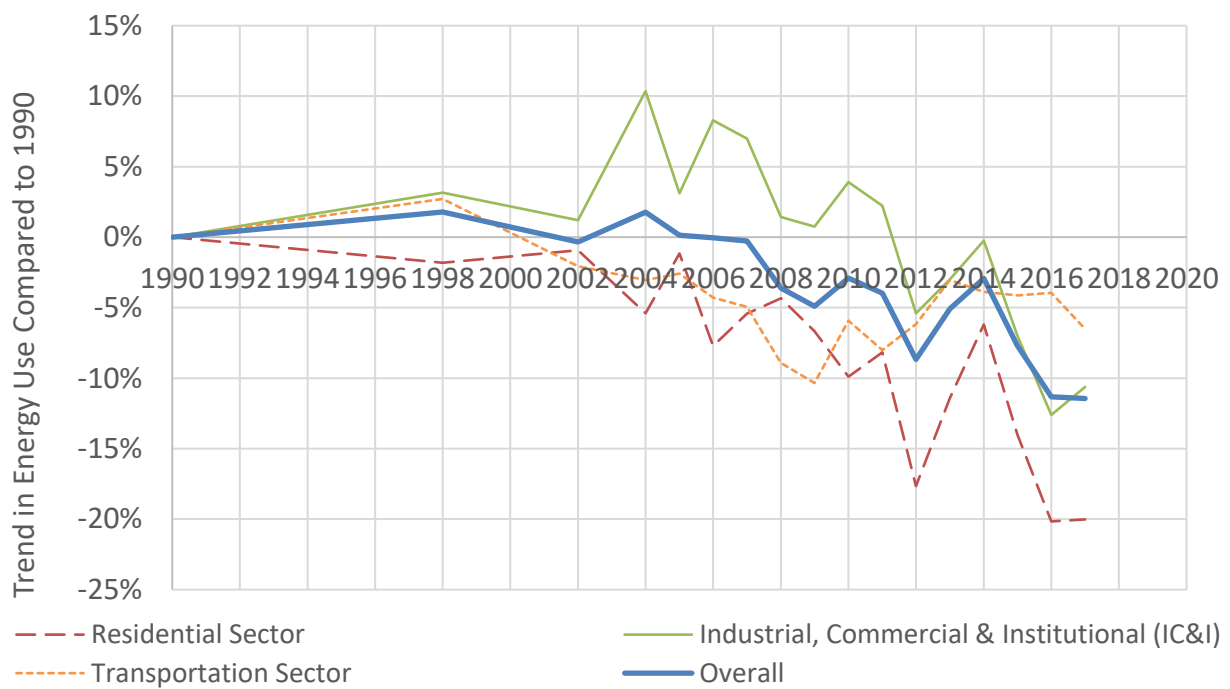


Figure 2 – Trends in Energy Costs (\$ Millions) by Energy Commodity

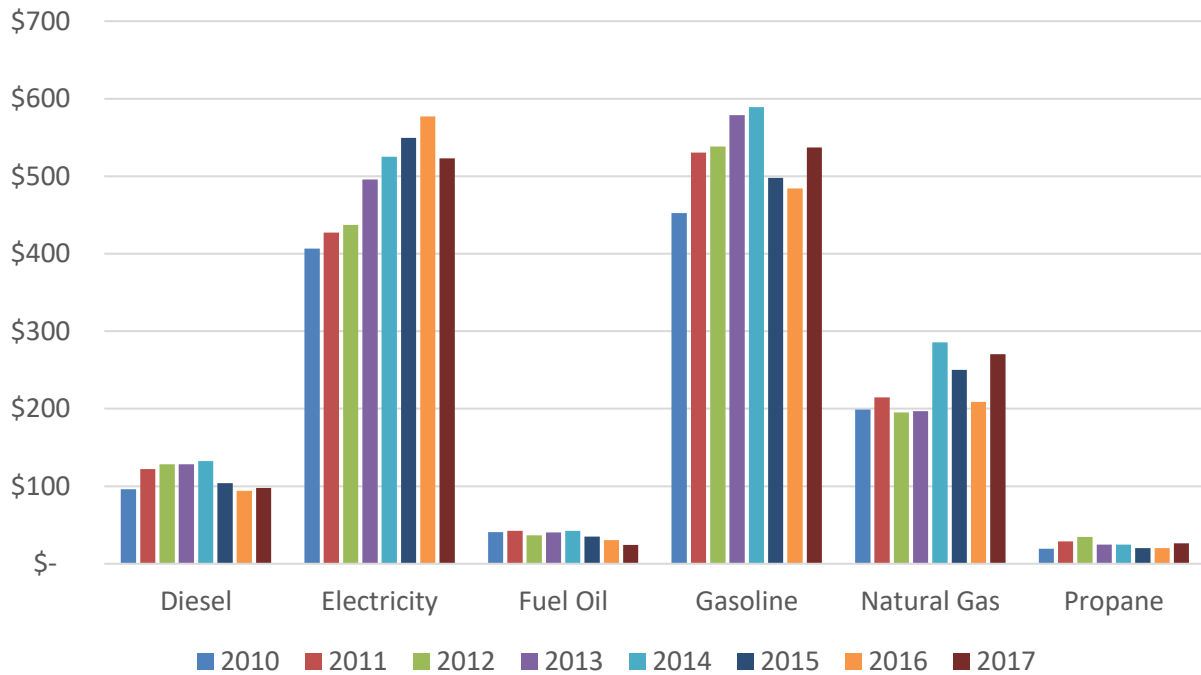
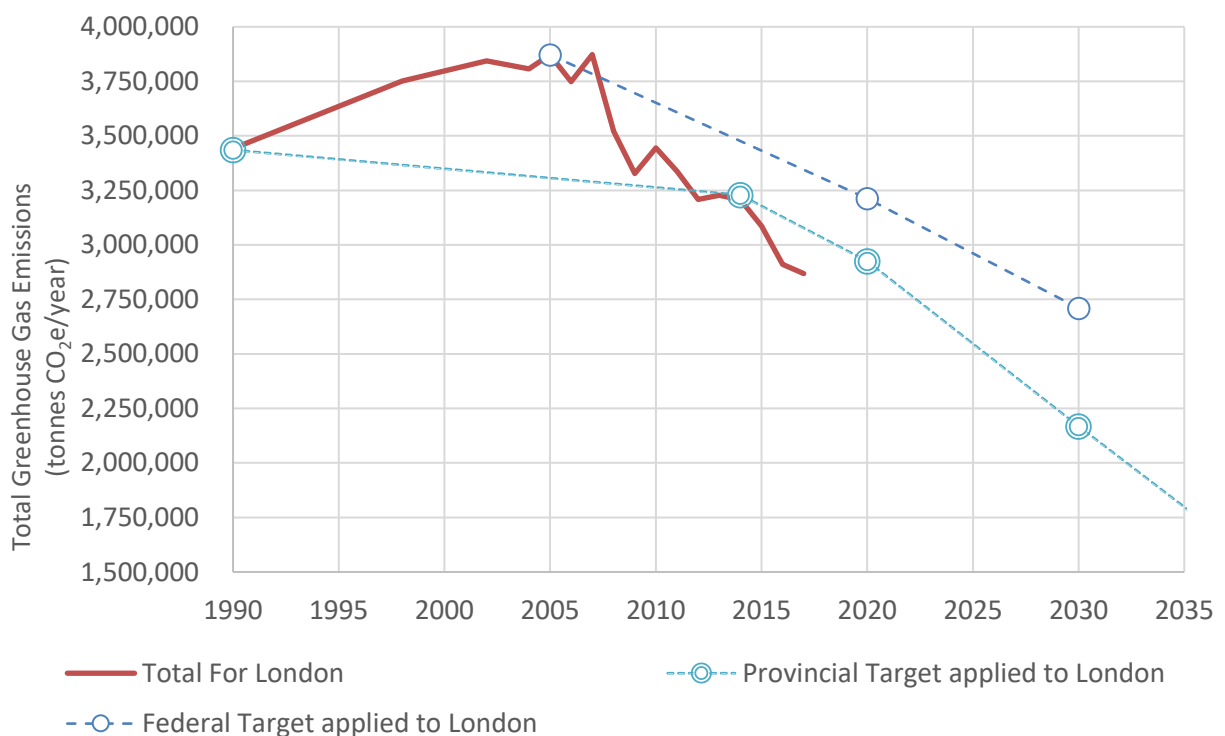


Figure 3 – London's Greenhouse Gas Emission Trend versus Federal and Provincial Reduction Targets



Household-Level Energy Use and Greenhouse Gas Emissions

The average household in London, living in a single-family home, spends about \$430 every month on energy. Over half of this, about \$240, is spent on gasoline. Electricity accounts for just over \$100 per month, while natural gas is under \$80 per month.

In terms of household greenhouse gas emissions, the average household emits 10 tonnes per year. As with cost, over half (55%) of this comes from burning gasoline. Natural gas used for space heating and water heating accounts for 38 percent of emissions. Organic waste in the landfill accounts for about six percent. Given Ontario's clean electricity grid, electricity use in the home only accounts for two percent of household GHG emissions.

Challenges and Opportunities

As previously noted, Londoners, London businesses, and institutions spent almost \$1.5 billion on energy in 2017, and almost 90 percent of this money leaves London (i.e., leaves the local economy). Every percentage that Londoners and London businesses reduce energy use keeps about \$13 million from leaving the local economy. Money saved through energy efficiency and conservation can be used for other purposes, whether that's paying down debts faster or purchasing other local goods and services.

Investing in energy-saving retrofits, sustainable energy projects, and local energy production creates local jobs. Examples of the above include:

- Energy retrofits of existing buildings, as well as the design and construction of high-performance new buildings, are primarily carried out by London area builders, contractors, and service providers and can also generate demand for London area suppliers of energy-saving products.
- Replacing older appliances with new, energy efficient (Energy Star) appliances also helps to reduce energy use and supports the local and regional economy.
- Increasing local electricity generation and bioenergy production keeps energy-related expenditures in London, as well as builds local capacity to develop these projects.

Given the recent trend towards increasing gasoline sales in London, the investments that the City of London is planning to make on its transportation system, particularly through bus rapid transit, London's Cycling Master Plan and other transportation demand management (TDM) solutions, will play a key role in reducing London's use of transportation fuels. Developing the means to measure the contribution that these investments make towards reducing fuel use will be challenging, yet important.

With over 90 percent of Ontario's electricity now coming from emissions-free sources (e.g., nuclear, hydro, wind and other renewable), the role of electricity in London's climate change actions is shifting towards encouraging the use of electricity to replace fossil fuels. Examples could include purchasing electric vehicles to reduce gasoline use, and installing heat pumps to reduce natural gas use for space heating.

Even though the province is looking to switch fossil fuel use towards electricity, conserving electricity will still remain important for reducing energy costs as well as emissions during peak demand periods when natural gas is used to provide peak power.

In Summary

The results as demonstrated in the 2017 Inventory Report continue to tell a positive story for London. Ontario's actions to replace coal-fired power plants with cleaner power generation have played a significant role in this reduction. Londoners have also taken action by reducing the amount of energy they use at home and at work.

Transportation fuel use is the one area where progress is lagging. This highlights the importance of City-led measures outlined in the 2030 Transportation Master Plan and the London Plan to shift Londoners towards sustainable transportation choices.

ACKNOWLEDGEMENTS:

This report was prepared with assistance from Allison Miller, Transportation Demand Management Coordinator and Pat Donnelly, Urban Watershed Program Manager.

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Documents found on the City of London website (www.london.ca) are:

2017 Community Energy and Greenhouse Gas Inventory