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| **TO:** | **CHAIR AND MEMBERS<br>CIVIC WORKS COMMITTEE<br>MEETING ON JUNE 8, 2016** |
| **FROM:** | **JAY STANFORD, M.A., M.P.A.<br>DIRECTOR, ENVIRONMENT, FLEET & SOLID WASTE** |
| **SUBJECT:** | **2015 COMMUNITY ENERGY AND GREENHOUSE GAS INVENTORY** |

## RECOMMENDATION

That on the recommendation of the Director, Environment, Fleet & Solid Waste the 2015 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:

- Joining the Compact of Mayors (November 3, 2015 meeting of the CSC, Agenda Item #2)
- 2014 Community Energy and Greenhouse Gas Inventory: Challenges and Opportunities (May 5, 2015 meeting of the CWC, Agenda Item #14)
- Community Energy Action Program (July 21, 2014 meeting of the CWC, Agenda Item #16
- 2012 Community Energy and Greenhouse Gas Inventory: Challenges and Opportunities (October 28, 2013 meeting of the CWC, Agenda Item #8)

## 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

**Growing our Economy**
- Strategic, collaborative partnerships

**Leading in Public Service**
- Collaborative, engaged leadership

## BACKGROUND

### PURPOSE

The purpose of this report is to provide the Civic Works Committee (CWC) and Council with an overview of the updated 2015 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 *2015 Community Energy and Greenhouse Gas Inventory rep*ort (found on the City of London website www.london.ca) are key deliverables of the Community Energy Action Plan and London Energy Connections Program.

**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 in 2014-2015 are 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.

**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. 6 percent reduction from 1990 levels by 2014,
   b. 15 percent reduction from 1990 levels by 2020,
   c. 37 percent reduction from 1990 levels by 2030, and
   d. 80 percent reduction from 1990 levels by 2050.

The three most common benchmark dates being used for reporting on overall progress are:

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

The *2015 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.

Having joined the Compact of Mayors in 2015, new information needed to be included within London's energy and GHG emissions inventory as per the Global Protocol for Community-Scale GHG Emission Inventories (GPC) as follows:

- London's share of fuel used by aviation
- London's share of fuel used by railways
- Waste generated in London and disposed of outside of London

These sources are relatively minor compared to local sources such as road transportation, buildings, and local industry. Estimates for these sources have been provided for 2015 as well as historical years for which community energy use and GHG emissions data have been reported.

**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 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) and the London Energy Connections Program
- Corporate Energy Conservation & Demand Management (CDM) Plan
- Active & Green Communities and other CityGreen community engagement activities
- The (draft) London Plan
- Shift London Rapid Transit Environmental Assessment
- London On Bikes Cycling Master Plan and other Active Transportation and Transportation Demand Management activities
- NeighbourGood London: London Strengthening Neighbourhoods 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.

**Overview of the 2015 Community Energy and Greenhouse Gas Inventory**

The *2015 Community Energy and Greenhouse Gas Inventory* report can be found on the City of London website (www.london.ca). Highlights are contained in the box on the next page and text that follows

**Overall**, the results as demonstrated in the 2015 Inventory Report continue to tell a positive story for the community. In 2015, London managed to reduce its total greenhouse gas emissions to levels that are eight percent below 1990 levels. **This surpasses the first milestone goal of London's CEAP** – to reduce total greenhouse gas emissions to six percent below 1990 levels by 2014.

Ontario's actions to replace coal-fired power plants with cleaner forms of power generation have played a significant role in this reduction. However, 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 recent trends are not positive, as retail sales of gasoline in London continue to grow at a pace greater than population growth, erasing many of the gains observed between 2008 and 2011. London's competitive retail fuel market may be encouraging out-of-town commuters and shoppers to fuel up while in London as noted in discussions with Kent Marketing. Lower fuel prices may also be encouraging people to drive more often.

Variable weather events, such as 2014's "Polar Vortex", can make annual comparisons difficult to interpret. What are more important are the longer-term trends in energy use, not year by year fluctuations.

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

- **Improved energy efficiency** – on a per person basis, Londoners and London businesses used six percent less energy overall in 2014 than used in 2007.
- **Improved energy productivity** – on a dollar gross domestic product (GDP) per unit energy basis, London's industrial, commercial, and institutional sector improved its energy productivity by 44 percent between 1990 and 2015.
- **Energy savings** – improvements in energy efficiency compared to 2010 levels of energy efficiency (on a per person basis and applied to activity in 2015) resulted in almost $70 million in avoided energy costs.
- **Reduced environmental footprint** – on a per person basis, Londoners and London businesses released 25 percent fewer greenhouse gas emissions in 2015 than they did in 1990, along with reductions in air pollution emissions (e.g., nitrogen oxides, volatile organic compounds) from fossil fuel use.

Other report highlights for 2015 include:

The total amount of energy used in London in 2015 was 59,500 terajoules, 16 percent above 1990 levels and on par with 2007 (peak year).

- Energy use per person by sector in London has improved since 1990 (Figure 1):
  - 2 percent decrease from cars and trucks on London's roads;
  - 13 percent decrease from single-family residential homes; and
  - 6 percent decrease from industrial, commercial, and institutional buildings.

- Energy use by sector in London is as follows:
  - 39 percent from industrial, commercial, and institutional buildings and facilities;
  - 37 percent from transportation, primarily cars and trucks on London's roads; and
  - 24 percent from single-family residential homes.

- Natural gas was the largest source of energy used in London, accounting for 41 percent of all energy used:
  - Gasoline accounted for 26 percent of London's energy use; and
  - Electricity accounted for 20 percent of all of the energy used in London.

- London's energy productivity (as described using inflation-adjusted real $GDP in 2007 dollars per gigajoule of energy used in the Institutional, Commercial & Industrial sector) increased from $474/gigajoule in 1990 to $682/gigajoule in 2015.

- London as a community spent almost $1.5 billion on energy, a decrease of nine percent from 2014:
  - Most of this was driven by the drop in global oil prices, which resulted in local annual average gasoline prices at the pumps dropping by 18 percent (23 cents per litre).
  - With electricity prices continuing to rise, electricity now accounts for 38 percent of local energy costs.
  - However, gasoline is still very significant, accounting for 34 percent of local energy costs.
  - Figure 2 illustrates the trends in energy costs by energy commodity.

- London as a whole released almost 3.2 million tonnes of greenhouse gas emissions, eight percent below 1990 levels, and 18 percent below London's peak GHG emission levels in 2007 (Figure 3):
  - Energy use accounted for 96 percent of community greenhouse gas emissions; and landfill gas accounted for the remaining four percent.
  - Greenhouse gas emissions from Ontario's electricity grid were 80 percent lower than they were ten years ago.

- The new sources that had to be added to this year's inventory report for the Compact of Mayors – domestic aviation, railways, and waste generated in London but disposed of outside London – account for less than three percent of London's energy needs and less than five percent of London's GHG emissions.

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

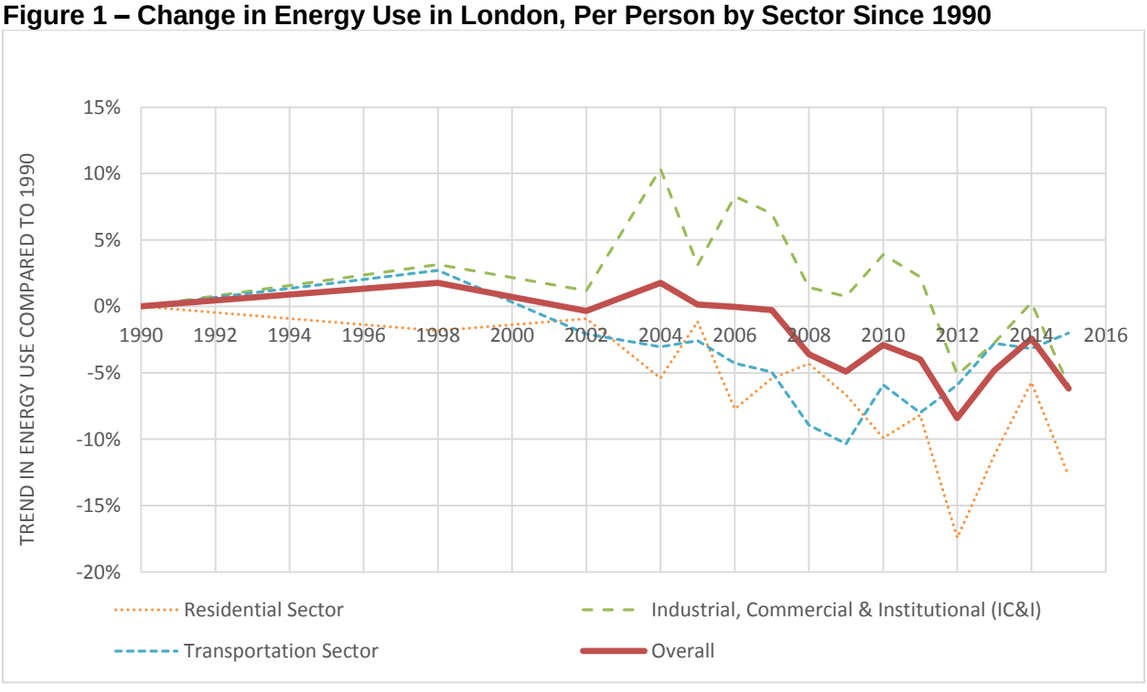


**Figure 2 – Trends in Energy Costs ($ Millions) by Energy Commodity**

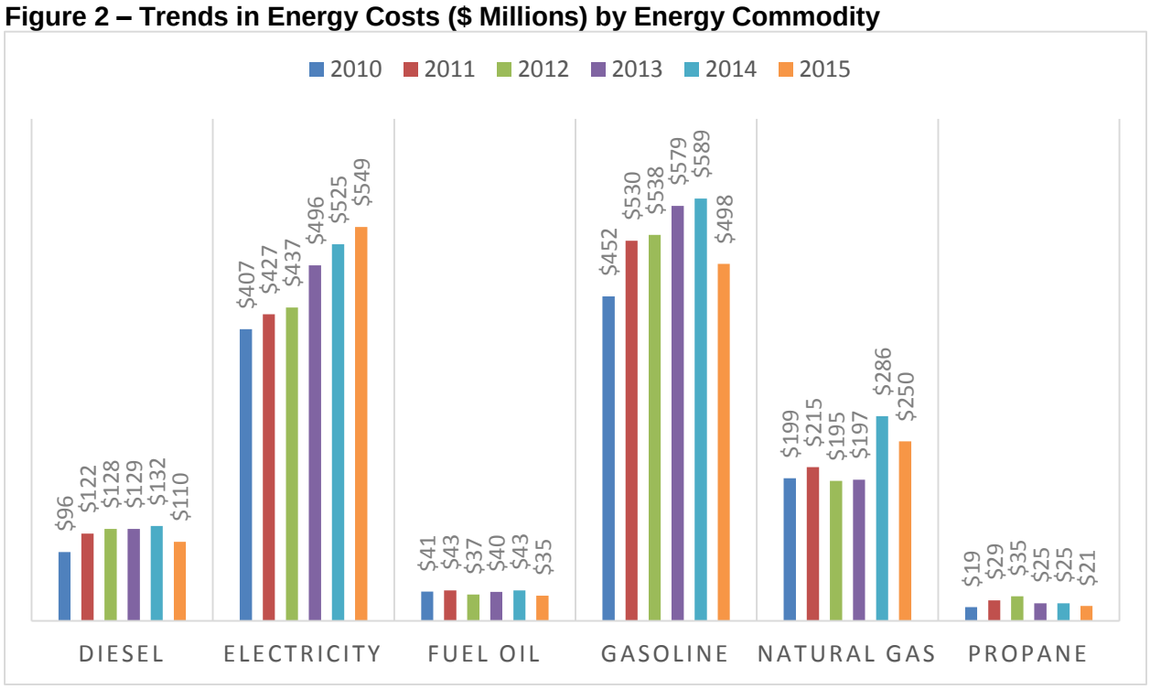
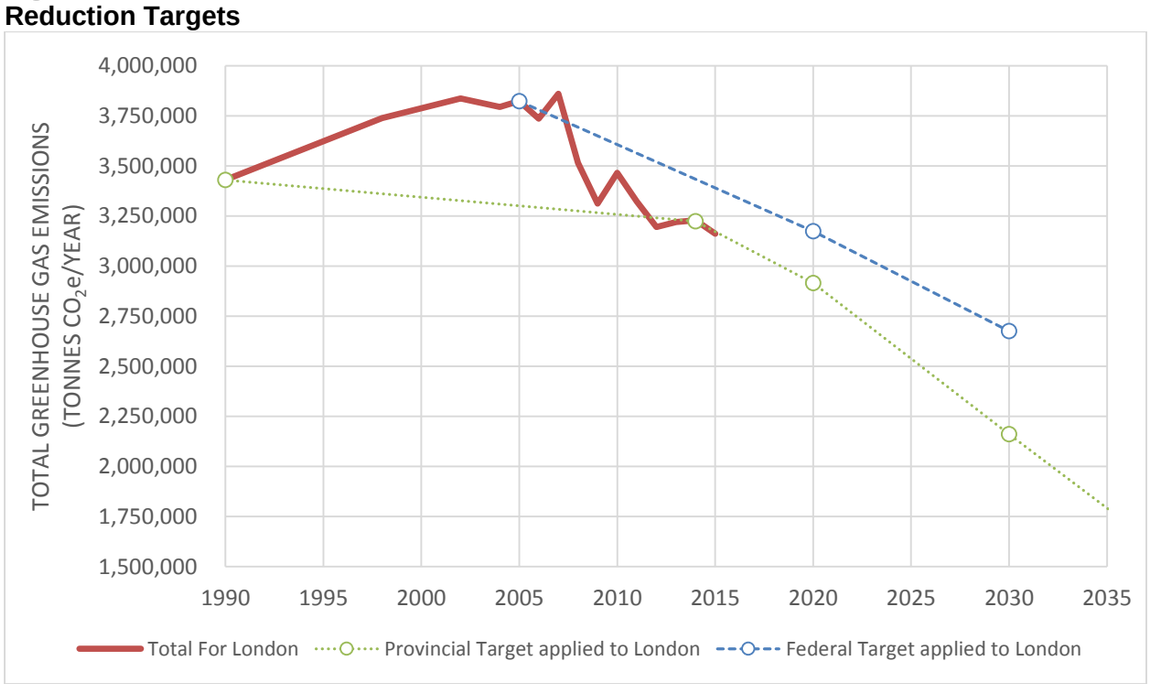



**Figure 3 – London's Greenhouse Gas Emission Trend versus Federal and Provincial Reduction Targets**




## Challenges and Opportunities

As previously noted, Londoners, London businesses, and institutions spent almost $1.5 billion on energy in 2015, and almost 90 percent of this money leaves London. London would be better off keeping more of this money in the local economy. Every percentage that Londoners and London businesses reduce energy use keeps about $13 million from leaving our 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 helps keep 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 Shift (rapid transit) and London ON Bikes (cycling infrastructure), 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. However, any increase in transit ridership and active transportation will also result in reduced retail sales of fuels at local gas stations.

With 90 percent of Ontario's electricity now coming from emissions-free sources (e.g. nuclear, hydro, and 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. Both of these measures have been highlighted in Ontario's Climate Change Strategy (MOECC, 2015), with electric vehicles receiving support through both principal funding for a province-wide electric vehicle charging network and increased incentives for purchasing electric vehicles.

The increased use of electricity for transportation will provide some technical challenges for future energy and greenhouse gas inventories, since it could be difficult to determine how much electricity was used in a home for recharging electric vehicles versus powering appliances and other power loads within the home or building. However, any increase in electric vehicle use will result in reduced retail sales of fuels at local gas stations.

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. However, as this inventory data shows, there will be a need to increase the focus on actions that can reduce fuel use and natural gas use.

**SUMMARY:**

The results as demonstrated in the 2015 Inventory Report continue to tell a positive story for London. Ontario's actions to replace coal-fired power plants with cleaner forms of power generation have played a significant role in this reduction. However, 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 recent trends are not positive, as retail sales of gasoline in London continue to grow at a pace greater than population growth. This highlights the importance of City-led measures outlined in the 2030 Transportation Master Plan and the draft 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:

2015 Community Energy and Greenhouse Gas Inventory