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TO:	CHAIR AND MEMBERS CIVIC WORKS COMMITTEE MEETING ON MAY 5, 2015
FROM:	JAY STANFORD, M.A., M.P.A. DIRECTOR, ENVIRONMENT, FLEET & SOLID WASTE
SUBJECT:	2014 COMMUNITY ENERGY AND GREENHOUSE GAS INVENTORY: CHALLENGES AND OPPORTUNITIES

RECOMMENDATION

That on the recommendation of the Director, Environment, Fleet & Solid Waste the 2014 Community Energy & Greenhouse Gas Inventory report **BE RECEIVED** for information.

PREVIOUS REPORTS PERTINENT TO THIS MATTER
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Relevant reports that can be found at www.london.ca under City Hall (Meetings) include:

- Community Energy Action Program (July 21, 2014 meeting of the Civic Works Committee, CWC, Agenda Item #16)
- 2012 Community Energy and Greenhouse Gas Inventory: Challenges and Opportunities (October 28, 2013 meeting of the CWC, Agenda Item #8)

BACKGROUND

PURPOSE

The purpose of this report is to provide the Civic Works Committee (CWC) and Council with an overview of the updated 2014 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.

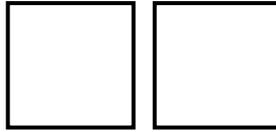
This CWC report and the *2014 Community Energy and Greenhouse Gas Inventory report* (found on the City of London website www.london.ca) are key deliverables of the Community Energy Action Plan and London Energy Connections Program.

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, under 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, and
 - c. 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 year”
- 2010 – the “first year” for which total energy cost “data was determined”

The *2014 Community Energy and Greenhouse Gas Inventory* is an update on the *2013 Community Energy & Greenhouse Gas Inventory* report that 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 road 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.

Role Within the 2015-2019 Strategic Plan

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

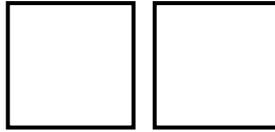
Growing our Economy

- Strategic, collaborative partnerships

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 the priorities they place on which energy-using sectors to work with and which energy commodities to focus on. As the adage goes, “if you cannot measure it, you cannot manage it.”

Providing this 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. This inventory data is also the foundation for many of the community engagement tools developed to date, such as the Trouble with Bubbles greenhouse gas visualization video and 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
- The new Active & Green Communities project 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
- London Strengthening Neighbourhoods Strategy

How is This 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.

Overview of the 2014 Community Energy and Greenhouse Gas Inventory

The *2014 Community Energy and Greenhouse Gas Inventory* report can be found on the City of London website (www.london.ca):

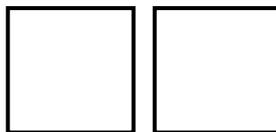
Overall, the results as demonstrated in the 2014 Inventory Report tell a positive story for the community. Even with the abnormally cold winter of 2014 (i.e., the "Polar Vortex") driving up natural gas use for space heating, London has managed to reduce its total greenhouse gas emissions to levels that are six percent below 1990 levels. **This meets the first milestone goal of London's CEAP (also the Provincial Goal)** – 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, on the road, and at work.

Energy use did increase between 2013 and 2014, but this was all driven by the abnormally cold winter of 2014. Natural gas use went up by eight percent, but the use of other energy commodities was relatively unchanged. What are more important are the longer-term trends in energy use, not year over year fluctuations. As noted, one single climatic event can swing energy usage for a one year period, making annual comparison difficult to interpret and potentially inaccurate.

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

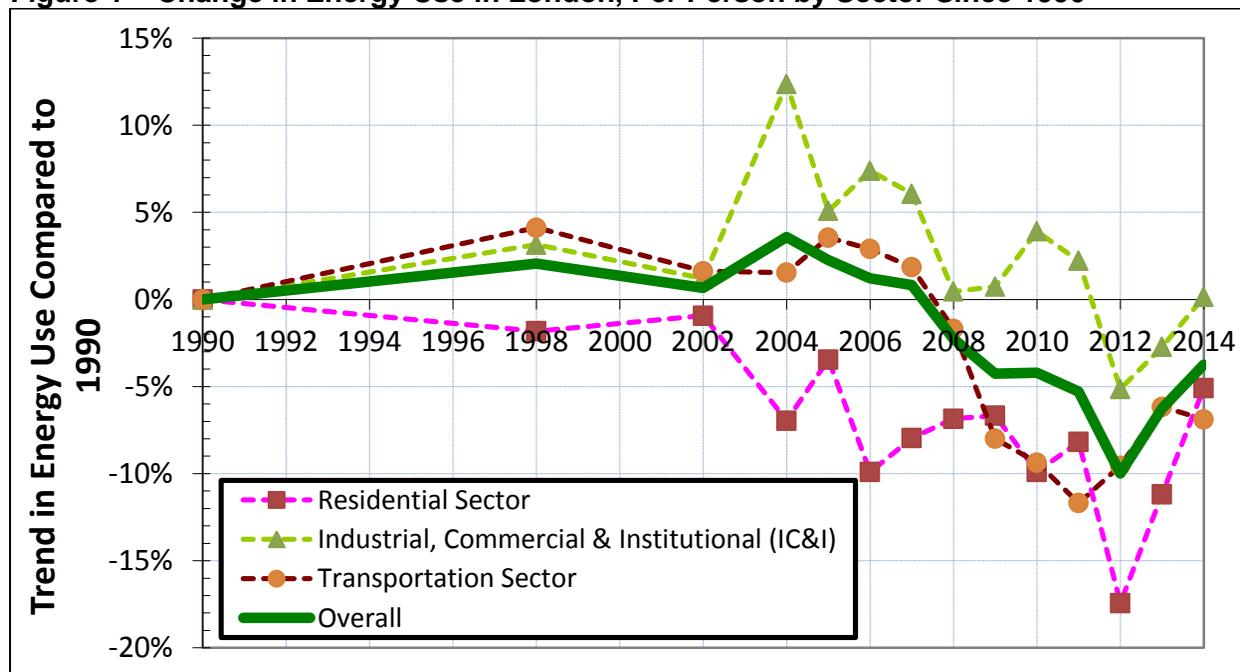
- **Improved energy efficiency** – on a per person basis, Londoners and London businesses used five percent less energy overall in 2014 than used in 2007.
- **Improved energy productivity** – on a dollar gross domestic product per unit energy basis, London's industrial, commercial, and institutional sector improved its energy productivity by 31 percent between 1990 and 2014.
- **Energy savings** - almost \$70 million was available for other uses in 2014 compared to "business as usual" if we'd stayed at 2010 levels of energy efficiency per person and applied to activity in 2014.
- **Reduced environmental footprint** – on a per person basis, Londoners and London businesses released 24 percent fewer greenhouse gas emissions in 2014 than they did in 2007, along with reductions in air pollution emissions (e.g., nitrogen oxides, volatile organic compounds) from fossil fuel use.



Other report highlights include:

- London as a whole consumed approximately 58,800 terajoules of energy in 2014, 18 percent above 1990 levels and one percent above 2007 (peak year).
- Energy use per person by sector in London in 2014 has improved since 1990 (Figure 1):
 - 7 percent decrease from cars and trucks on London’s roads;
 - 5 percent decrease from single-family residential homes; and
 - No change from industrial, commercial, and institutional buildings and facilities from 1990 levels, but six percent better than 2007 levels.
- Energy use by sector in London in 2014 breaks down as follows:
 - 42 percent from industrial, commercial, and institutional buildings and facilities;
 - 32 percent from cars and trucks on London’s roads; and
 - 26 percent from single-family residential homes.
- Natural gas was the largest source of energy used in London, accounting for 45 percent of all energy used:
 - Gasoline accounted for 24 percent of London’s energy use; and
 - Electricity accounted for 20 percent of all of the energy used in London.
- London’s energy productivity (real \$GDP per gigajoule of energy used in the Institutional, Commercial & Industrial sector) increased from \$474/GJ in 1990 to \$622/GJ in 2015 (in 2007 dollars).
- London as a community spent almost \$1.6 billion on energy in 2014, an increase of nine percent from 2013:
 - Most of this was driven by higher demand for natural gas due to colder than normal winter temperatures, which also increased the price of natural gas itself. Combined, total natural gas costs increased by 45 percent between 2013 and 2014.
 - However, gasoline and electricity are still the most prominent costs, accounting for 35 and 34 percent respectively of the total cost.
 - Figure 2 illustrates the trends in energy costs by energy commodity.
- London as a whole released over 3 million tonnes of greenhouse gas emissions in 2014, six percent below 1990 levels, and 19 percent below London’s peak GHG emission levels in 2007 (Figure 3):
 - Energy use accounted for 95 percent of community greenhouse gas emissions; and landfill gas accounted for the remaining five percent.
 - In addition to the energy reductions noted above, greenhouse gas emissions from Ontario’s electricity grid were 80 percent lower than they were ten years ago.

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



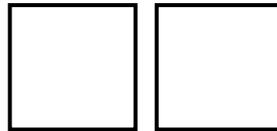


Figure 2 – Trends in Energy Costs by Energy Commodity

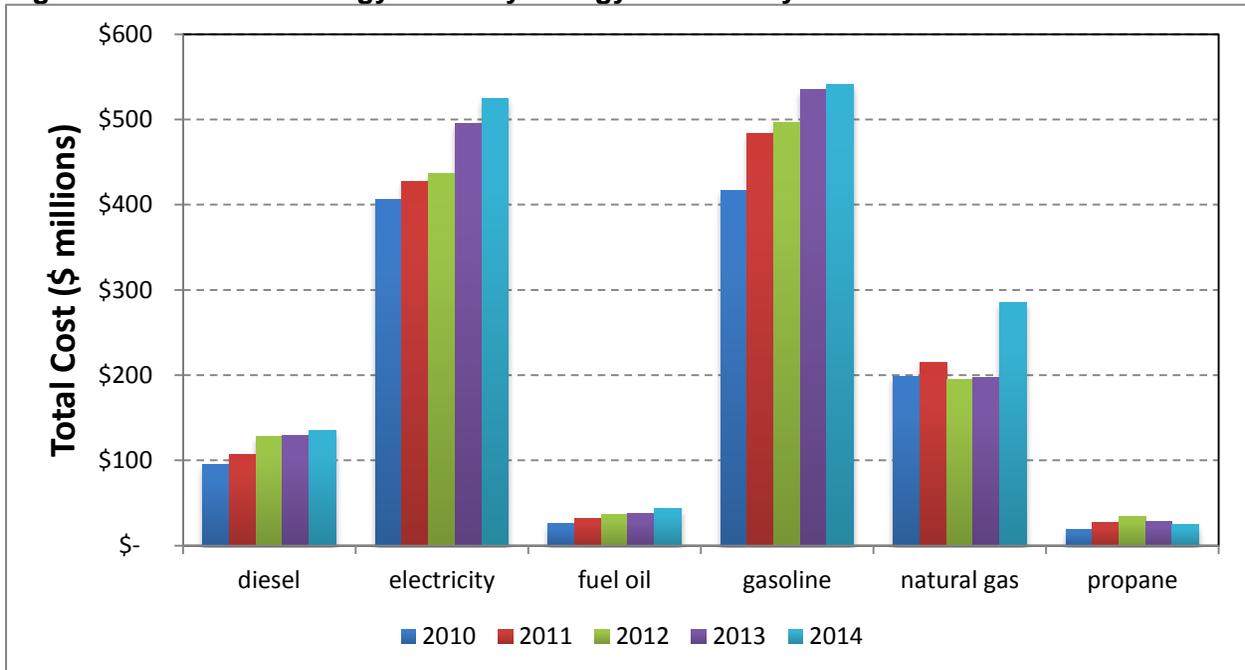
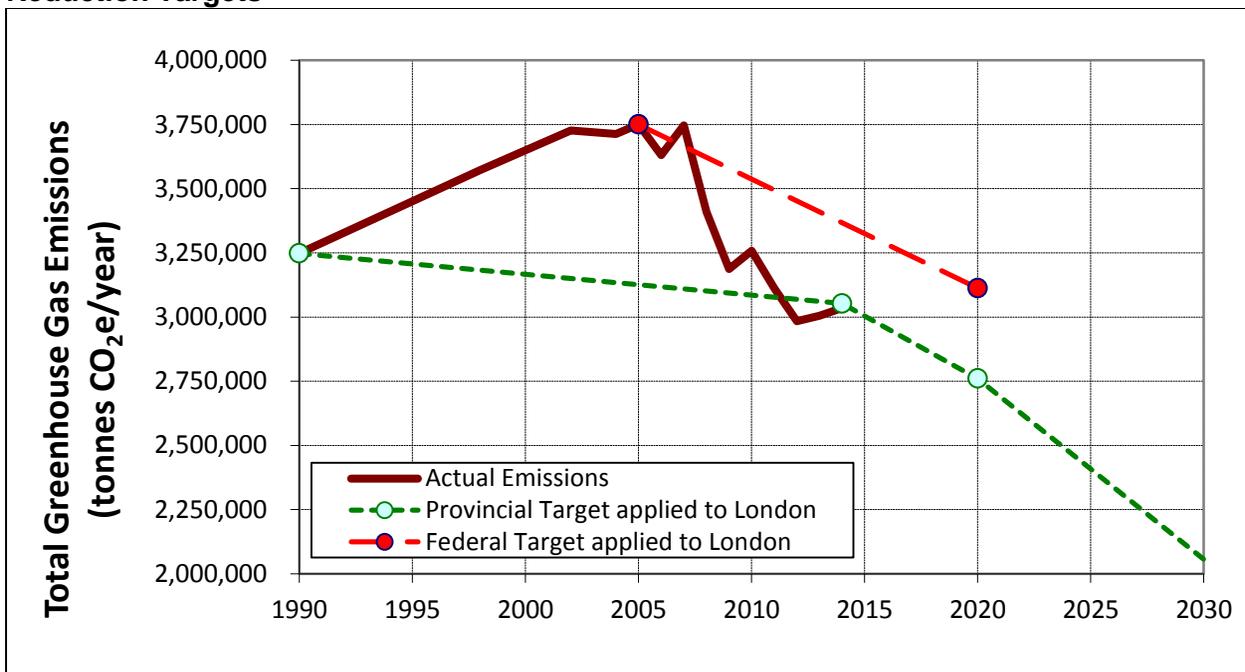


Figure 3 – London’s Greenhouse Gas Emission Trend versus Federal and Provincial Reduction Targets



Challenges and Opportunities

As noted, Londoners, London businesses, and institutions spent almost \$1.6 billion on energy in 2014. London would be better off keeping more of its money in the local economy. Every percentage that Londoners and London businesses reduce energy use keeps about \$14 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 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 the local capacity for electricity generation helps keep electricity-related expenditures in London, as well as builds local capacity to develop these projects.

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With Ontario’s electricity grid becoming significantly “cleaner” than it was last decade, the role of electricity in London’s climate change actions will need to shift towards encouraging the use of electricity to replace fossil fuels. Examples could include purchasing more electric vehicles to reduce gasoline use, and installing more heat pumps to reduce natural gas use for space heating. 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.

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 for recharging EVs 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.

The investments that the City of London is planning to make on its transportation system, particularly rapid transit and cycling infrastructure, will help to reduce 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.

In summary, investing in community energy projects helps to build a sustainable city, strengthens our communities, and grows our economy.

Next Steps

The next steps will be to develop the means to measure progress on the sector-specific goals (measurable or aspirational), established in the CEAP as part of the London Energy Connections Program, for each energy-using sector in London:

- Single-Family Homes
- Multi-Unit Residential Buildings
- Commercial and Institutional Buildings
- Industry and Manufacturing
- Stores and Restaurants
- Local Energy Production and Co-generation of Heat and Power
- Vehicles and the Transportation System

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

2014 Community Energy and Greenhouse Gas Inventory