

Strategic Priorities and Policy Committee

To: Chair and Members
Strategic Priorities and Policy Committee

From: John M. Fleming, Managing Director, City Planning and City Planner,
and
Kelly Scherr, Managing Director, Environmental and Engineering Services and City Engineer

Subject: Climate Change Emergency - Update

Meeting on: November 25, 2019

Recommendation

That, on the recommendation of the Managing Director, City Planner and the Managing Director, Environmental and Engineering Services and City Engineer, the attached report **BE RECEIVED** and the following actions **BE TAKEN** with respect to the City's Climate Emergency Declaration and the next steps to further reduce energy use and increase climate change mitigation and adaptation actions during the next twelve months:

- a) Staff **BE DIRECTED** to undertake the following immediate actions:
- i. Establish a City-wide target for London to achieve net zero community greenhouse gas (GHG) emissions by the year 2050.
 - ii. Consistent with the direction of Council's recently adopted Corporate Energy Conservation & Demand Management (CDM) Plan, pursue opportunities to achieve Corporate net zero GHG emissions prior to 2050 with the goal of demonstrating municipal commitment and leadership to Climate Emergency mitigation.
 - iii. Establish an internal team, inclusive of representatives from all service areas, to be champions for climate emergency actions within their service area and to help implement climate emergency initiatives.
 - iv. All Service Areas to identify immediate opportunities that can be implemented within existing resources using existing and new tools; deliver an educational program to all service areas to assist them with understanding the climate emergency and possible actions to address it.
 - v. Launch the process to develop a new Climate Emergency Action Plan (CEAP) and incorporate the Community Energy Action Plan into this process.
 - vi. Develop an interim screening Climate Emergency Evaluation Tool (CEET).
 - vii. Create a new Climate Emergency area on the City's web site, providing better communication to Londoners on the climate emergency, its implications and how they can assist.
 - viii. Advocate, as a municipal leader in Canada, for climate emergency action at the provincial and federal government level.
 - ix. Advance those actions and strategies identified in Council's strategic plan that will address the Climate Emergency through existing budgets.
- b) Staff **BE DIRECTED** to undertake the following actions within the next four months:
- i. Continue community and key stakeholder engagement on the CEAP process.

- ii. Complete an initial screen of current major transportation projects using the interim screening CEET.
 - iii. Complete and formalize a permanent screening CEET and administrative processes through expert review and London-focused risk evaluation.
 - iv. Include a standard section in all Standing Committee reports that addresses the Climate Emergency Declaration and, where appropriate, applies the screening CEET to the issues that are addressed in each report.
 - v. Seek out opportunities for new funding to support climate emergency initiatives.
- c) Staff **BE DIRECTED** to undertake the following actions within one year:
- i. Work with each Service Area to review all proposed major City projects and master plans (e.g., road widenings, facilities, parks and recreation facility upgrades, wastewater treatment, waste disposal, fleet) within the 10 year capital plan through the screening CEET and, where appropriate, recommend the modification of these projects;
 - ii. Work with each Service Area to review all major existing programs and projects through the screening CEET to determine what should be considered for elimination, what may be changed and what should be started in response to the climate emergency.
 - iii. Identify methods for advancing the urban forest strategy more quickly including exploring reforestation of under-utilized agricultural land within London and tree planting on a regional basis.
 - iv. Establish appropriate tools to encourage cool roofs, green roofs, and/or rooftop solar energy systems and other green infrastructure for private developments.
 - v. Work with relevant Service Areas to apply the screening CEET to review and make any required changes to address the climate emergency in the Design Specifications Manual, Site Plan Control Area By-law, Urban Design Guidelines, Tree Protection by-law, Purchasing By-law, all granting processes and other documents and processes that have an impact on the climate emergency, **IT BEING NOTED THAT** these assessments and amendments will be undertaken in priority, based on the magnitude of their potential impact on the climate emergency and **IT ALSO BEING NOTED THAT** the entirety of this process will be undertaken over a period that extends beyond the one-year timeline.
- d) Staff **BE DIRECTED** to complete the Climate Emergency Action Plan within one year, to include but not be limited to, the following components:
- i. A clear city-wide net zero community GHG emissions target (no later than 2050, but with the intent of establishing a path to net zero GHG emissions prior to 2050).
 - ii. A clear Corporate net zero GHG emissions target (no later than 2050, but with the intent of establishing a path to net zero GHG emissions prior to 2050).
 - iii. A clear strategy and specific actions to achieve the targets established in (i) and (ii), above.
 - iv. A strategic approach and specific tools for communicating the climate emergency.
 - v. Elevate discussions with developers, homebuilders and contractors regarding design and construction techniques to reduce lifecycle GHG emission impacts.

- vi. Explore opportunities for utilizing GHG offsets and establish policy for when this is appropriate.

IT BEING NOTED THAT:

- i. The City's Strategic Plan contains reference to more than 30 specific actions and strategies dealing with climate change;
- ii. The multi-year budget process contains numerous programs and projects in the base budget that address climate change mitigation and adaptation including the need to increase actions in this area of importance; and
- iii. Several Business Cases designed to increase actions that address climate change mitigation and adaptation have been submitted for multi-year budget deliberations.

Executive Summary

The changing climate is a problem that is both impacting all communities around the world and caused by the actions of all communities around the world. The shared resource of our atmosphere has lacked the stewardship required to ensure that future generations will be afforded the same benefits of ecological services, resource productivity and physical safety that we take for granted today.

London's direct impacts from climate change (severe weather damages including those from flooding, high winds, freezing rain and extreme temperatures; increase in vector-borne diseases like Lyme disease and West Nile virus; increasing cost and decreased availability of consumer goods; increased energy costs; loss of biodiversity; to name only a subset) affect or will affect all means of life and economic prosperity. These impacts will only get worse if strong collective actions to curb GHG emissions and adapt to the changes already occurring are not taken immediately.

In order to most efficiently and effectively respond to the climate emergency, existing programs and plans, community and industry partnerships and ground-level actions to address the impacts of climate change on our City need to be coordinated.

The time to act is now. The recommendations put forth in this report represent a clear strategy to implement a shift in the way we evaluate our work and a reorientation of our priorities to better position the City of London for the future. As a leader among peers on the municipal response to the climate emergency, London will signal to the community, other municipalities, the province, and businesses that, through our actions, safety and prosperity of future generations is of paramount importance.

This report:

- Identifies the key immediate, next steps with respect to the need to further reduce energy use and increase climate change mitigation and adaptation actions and how this will be elevated as part of the City's Climate Emergency Declaration during the next 12 months (December 2019 to November 2020);
- Replaces the proposed community engagement process for the Community Energy Action Plan (Approved April 9, 2019) with an expanded process for a Climate Emergency Action Plan;
- Identifies a number of recent, tangible actions that have been/are being taken with respect to climate change by the City, by the community and by businesses; and
- Highlights the interrelationship between programs, projects and strategies of current and upcoming activities designed to reduce GHG emissions (thereby mitigating contributions to climate change) and adapt to future climate change/severe weather impacts.

Council's 2019-2023 Strategic Plan

Municipal Council continues to recognize the importance of climate change mitigation, climate change adaptation, sustainable energy use, related environmental issues and the need for a more sustainable and resilient city in the development of its 2019-2023 - Strategic Plan for the City of London. Specifically, London's efforts in both climate change mitigation and adaptation address four of the five Areas of Focus, at one level or another:

- Strengthening Our Community
- Building a Sustainable City
- Growing our Economy
- Leading in Public Service

Analysis

1.0 Background

1.1 Context

On April 23, 2019 Council Resolved:

- i) *the Civic Administration **BE REQUESTED** to report back on tangible actions that the municipality can undertake with respect to Climate Change at a future meeting of the appropriate Standing Committee;*
- ii) *the following Declaration of a Climate Emergency **BE APPROVED**:*

"Whereas climate change is currently contributing to billions of dollars in property and infrastructure damage worldwide, stressing local and international economies;

Whereas climate change is currently jeopardizing the health and survival of many species and other natural environments worldwide, stressing local and international eco systems;

Whereas climate change is currently harming human populations through rising sea levels and other extraordinary phenomena like intense wildfires worldwide, stressing local and international communities;

Whereas recent international research has indicated a need for massive reduction in carbon emissions in the next 11 years to avoid further and devastating economic, ecological, and societal loss;

Whereas the climate in Canada is warming at twice the rate of the rest of the world, as per Canada's Changing Climate report;

Whereas current initiatives such as the greening of the city's fleet and energy reduction initiatives are not sufficient to meet the targets as defined by the IPCC scientists,

Whereas an emergency can be defined as "an often dangerous situation requiring immediate action";

Whereas municipalities such as Kingston, Vancouver and Hamilton have already declared climate emergencies;

*Therefore, a climate emergency **BE DECLARED** by the City of London for the purposes of naming, framing, and deepening our commitment to protecting our economy, our eco systems, and our community from climate change.";*

- *it being noted that the above-noted Declaration is not intended to invoke the City of London's Emergency Response Plan or to interfere with the responsibilities and*

power delegated to the Mayor to declare or to terminate a local emergency under the Emergency Management and Civil Protection Act, 1990;

- *it being further noted that a climate emergency is distinct from the kinds of emergencies contemplated under the Emergency Management and Civil Protection Act, 1990, as it is a global emergency with impacts extending beyond London.*

2.0 What are the Implications for London?

At the end of 2018, the UN Secretary General, António Guterres, in regards to the climate emergency warned:

- *Humanity and life on Earth now face a 'direct existential threat'*
- *The world must act swiftly and robustly to keep global warming under 1.5°C and try to avoid utterly catastrophic impacts to life on Earth¹*

(See Appendix "B" What is a Climate Emergency?)

2.1 How will the Climate Crisis affect London, Directly?

The environmental, social and economic impacts of climate change vary by region around the world due to the complexity of the climate system and its interrelation to regional socio-economic realities. Down-scaled global climate models and recent empirical evidence indicate that London can expect direct physical changes to include warmer, wetter, weather with increased likelihood and intensity of severe weather events.

Middlesex-London has experienced a range of extreme weather events such as extreme heat events, intense precipitation events leading to flooding, snow squalls and ice storms. Climate change is expected to increase the number, intensity, spatial extent and duration of many extreme weather events including rain, hail, thunder and lightning, strong winds, and extreme heat events².

Extreme Heat and Cold

Communities experience increases in mortality when temperatures rise above 25-26°C. There is a correlation between humidex and emergency room visits and hospitalizations in Middlesex-London and that heat-stress related morbidity (hospitalizations or emergency room visits for heat-related illness) is positively correlated with increasing summer humidex values⁴. Extreme cold conditions due to the disruptions to the jet stream in the atmosphere (i.e. the Polar Vortex) can also pose significant health risks to Canadians. People exposed to extreme cold conditions who do not take preventative measures are at risk of windburn, frostbite, hypothermia and death².

Lyme and Vector Borne Diseases

As the warming trend continues, previously inhospitable regions in Canada are becoming more suitable for vectors that carry infectious diseases. In southwestern Ontario, vector-borne diseases of immediate concern, among others include West Nile virus (WNV), Eastern Equine Encephalitis (EEE) and Lyme disease.

Climate change results in a projected increase in the spread of tick populations that harbour Lyme disease northward into central and eastern Canada. These projections have been validated through surveillance and monitoring. The Lyme disease vector is spreading into Canada at a rate of approximately 35-55 kilometers per year. Human cases of Lyme disease are increasing with approximately 30 cases reported in 2007 to 315 in 2012. The spread of black-legged tick populations and resulting human risk of exposure to Lyme disease is projected to continue to increase over the next several decades due to climate change² (see Appendix B-2)

Insects carrying diseases will not be the only species affected by climate change that may impact London residents. The Government of Ontario has produced a detailed list of anticipated ecological impacts from climate change (see Appendix D-1), which includes significant alterations to numerous species' migration and breeding habits, availability of food sources, expanded northern habitat ranges and the

acknowledgement that some less adaptable species may even disappear from their current habitats. Many of the interactions with nature that Londoners enjoy (birding, hunting, fishing, etc.) are likely to be impacted.

Ecological Concerns Affecting London

Increase in insect and disease outbreaks such as emerald ash borer, gypsy moths and oak wilt, have seen an increase, which adds pressures to the City's natural heritage systems. Over 700,000 ash trees have been infected with the emerald ash borer. Oak wilt could have the same impact on oak trees as has been seen in the loss of ash trees in the City of London. The increased tree stresses effects forest growth and their overall ability to store carbon leading to a larger GHG foot print for London.

Warming and wetter weather affect sensitive species and their isolated habitats. The decrease in water quality and thermal pollution changes the way species interact with one another and their environment. The stresses on the natural system lead to loss of habitat and loss of vulnerable species.

Financial Costs to Londoners

In addition to the health and ecological impacts that London will likely experience from the physical changes with the changing climate, London residents will also be subjected to increased financial costs from more extreme weather events.

Natural catastrophes are on the rise in Canada³. Federal expenditure for natural catastrophes from 2009-2015 was greater than the previous 39 years combined. The greatest spending was on floods, which accounted for 75% of the expenditures. Following the 2013 floods in Toronto, the average insurable claim for flooding was \$40,000. Adapting to the Climate Emergency to mitigate flood damage is paramount in reducing future costs arising from natural catastrophes. (see Appendix B-2)

Climate change's socio-economic impacts are also already being felt in London and it is anticipated that they will only increase in severity. Goods and services already experiencing negative impacts attributable to climate change include home insurance premiums, transportation and home energy costs and the availability and cost of many imported goods (e.g. produce from California, wine from France, olive oil from Italy).

In addition to these recognized and documented impacts, there are several potential sources of impacts that could negatively affect the quality of life for Londoners and put significant pressure on the City's infrastructure and financial health:

- Increased international migration to London as a result of drought, disease and/or global political instability in areas hard-hit by climate change;
- Reduced regional water security (quantity, quality and pressures from the US); and,
- Ramifications to food systems and other ecosystem services due to biodiversity loss.

London is not isolated from the wide array of impacts from climate change and every source of GHG emissions is a contributor to the problem. It is important to also recognize that there will be a disproportionately large impact on equity-seeking groups who are less resilient to economic shocks.

3.0 What can London Do?

3.1 Background

There are two primary types of responses to address climate change:

- Mitigation: mitigating future impacts through reductions in emissions of GHGs such as carbon dioxide, methane, and nitrous oxides, primarily as a result of the use of fossil fuels (e.g., fuel for personal vehicles, natural gas for heating buildings); and

- Adaptation: adapting infrastructure, homes, buildings, landscapes, etc. to better withstand current and future impacts of more frequent severe weather events that are created from a climate that is “wetter, warmer, and wilder” (see Appendix C-3).

There are also actions that can be taken that provide both climate change mitigation and adaptation benefits, for example:

- “Smart grid” technologies can provide both emissions reductions as well as an emergency back-up source of power in the event of a major power outage;
- Green roofs retain and reduce stormwater runoff from buildings as well as reduce energy demand for air conditioning directly (on the building) and indirectly (by reducing the urban heat island effect); and
- Urban forests reduce energy demand for air conditioning directly (by shading buildings and forming wind breaks) and indirectly (from reducing the overall urban heat island effect) and help to retain and reduce stormwater runoff.

3.2 Our Foundation - Actions to Date

The City of London has been leading and/or collaborating on three major initiatives dealing with increasing energy efficiency, reducing greenhouse gas generation and addressing climate change for over 20 years. Recent activities and actions are summarized in these three areas of activities (detailed in Appendix C):

1. 2014-2018 Community Energy Action Plan (Appendix C-1)
2. 2014-2018 Corporate Energy Conservation and Demand Management Plan and the next 2019-2023 Corporate Energy Conservation and Demand Management Plan approved by Council on October 29, 2019 (Appendix C-2), and
3. Planning and designing for severe weather and climate change adaptation (Appendix C-3)

Appendix D summarizes the major activity areas from the provincial and federal governments.

The City of London “climate change team” includes participation from all services areas in the form of programs, projects or activities that contribute to reducing energy use which subsequently reduce GHG emissions. Public reporting has been led by the Environmental & Engineering Services Area and is done through the Community Energy Action Plan (annually) and the Corporate Energy Management Program (annually).

Recently, Council has strengthened the resources in Planning in order that greater emphasis is placed on resiliency and sustainability planning and policy development (e.g., climate change adaptation, green development, green infrastructure). This strengthening will not only benefit existing programs and projects but is crucial to the implementation of many areas of The London Plan, Council’s Strategic Plan and addresses moving forward with the City’s Climate Emergency Declaration.

The City’s “climate change team” is further strengthened with expertise and knowledge from London Hydro, Enbridge, London District Energy and large energy stakeholders such as Western University, London Health Sciences Centre, Green Economy London, and many others. Similarly, numerous community stakeholders provide expertise as individuals through organizations like London Environmental Network, Urban League of London, etc.

Finally, City staff have also worked with and continue to work with many external stakeholder groups on climate change mitigation and adaptation:

- City staff played a leadership role within Quality Urban Energy Systems of Tomorrow (QUEST) Canada, a leading organization for community energy planning. QUEST estimates that over 200 communities in Canada have community energy plans, and more than 400 communities (collectively represents more than 50 percent of Canada's population) working on community energy initiatives.
- The City of London, along with Western University, is a participant in the Community Energy Knowledge Action Partnership (CEKAP), a unique Canada-wide partnership of universities and municipalities studying the challenges of implementing community energy plans. In 2019, QUEST gave London a 77% score overall on ten key indicators on how municipal and utility processes, policies, programs, and projects in London compare to smart energy best practices across Canada, with London scoring above-average on eight out of ten indicators
- The City of London operates the London Waste to Resources Innovation Centre along with Western University and many local, regional and national businesses. The focus is on creating greater value from waste materials and reducing the environmental, social and financial impact of existing materials.
- In October 2019, the City of London was selected by the Federation of Canadian Municipalities (FCM) to participate in a Canada-wide network of 25 municipalities to peer review existing climate change work and collaborate on areas needing further work in order to implement best practices for climate change mitigation and adaptation
- City staff work with peers in Ontario municipalities on climate change mitigation and adaptation activities through participation in the Clean Air Partnership and Regional Public Works Commissioners of Ontario.
- Globally, the City of London is a participant in CDP Cities and the Global Covenant of Mayors for Climate & Energy. In 2019, CDP Cities gave the City of London an "A-, Leadership" score for local climate change mitigation activities and a "C, Awareness" score for climate adaptation activities.

3.3 Actions and Timelines

The remainder of this section is divided into three areas and is City staff's response to Council's request *"to report back on tangible actions that the municipality can undertake with respect to Climate Change at a future meeting of the appropriate Standing Committee."*

1. Actions to Take Immediately
2. Actions to Take in the Next Four Months
3. Actions to Take within One Year

1. Actions to Take Immediately

- Establish a City-wide target for London to achieve net zero community greenhouse gas (GHG) emissions by the year 2050.
- Consistent with the direction of Council's recently adopted Corporate Energy Conservation & Demand Management (CDM) Plan, pursue opportunities to achieve Corporate net zero GHG emissions prior to 2050 with the goal of demonstrating municipal commitment and leadership to Climate Emergency mitigation.
- All Service Areas to identify immediate, incremental actions that can be implemented with existing resources, and using existing and new tools and educational materials created by the City to work towards the City-wide target.
- Launch the process to develop a new Climate Emergency Action Plan (CEAP) and incorporate the upcoming engagement for the Community Energy Action Plan into this

process and ensure that the community understands that one comprehensive plan is being prepared.

- Develop an interim screening Climate Emergency Evaluation Tool (CEET). The interim screening tool will be structured around high-level questions regarding the potential impact to the community and corporation regarding climate change aspects such as reducing fossil fuel use, reducing stormwater generation, and improving resiliency to severe weather events and extreme heat events.
- Create a new Climate Emergency area on the City's web site, providing better communication to Londoners on the climate emergency, its implications and how they can assist. This new web site will build on the existing tools, details and processes at the City.
- Advocate, as a municipal leader in Canada, for climate emergency action at the provincial and federal government level.
- Advance those actions and strategies identified in Council's strategic plan that will address the Climate Emergency through existing budgets.

2. Actions to Take in the Next Four Months

- Continue community and key stakeholder engagement on the Climate Emergency Action Plan process, including participation in the FCM Showcase Cities Pilot Project.
- Complete and formalize a permanent screening CEET and administrative processes through expert review and London-focused risk evaluation.
- Include a standard section in all Standing Committee reports that addresses the Climate Emergency Declaration and, where appropriate, applies the screening CEET to the issues that are addressed in each report.
- Prioritize and expedite, active transportation and transit infrastructure and services with existing budget resources.
- Seek out opportunities for new funding to support climate emergency initiatives.

3. Actions to Take within One Year

- Work with each Service Area to review all proposed major City projects and master plans (e.g., road widenings, facilities, parks & recreation facility upgrades, wastewater treatment, waste disposal, fleet) within the 10 year capital plan through the screening CEET and, where appropriate, recommend the modification of these projects;
- Work with each Service Area to review all major existing programs and projects through the screening CEET to determine what should be considered for elimination, what may be changed and what should be started in response to the climate emergency.
- Identify methods for advancing the urban forest strategy more quickly including exploring reforestation of under-utilized agricultural land within London and tree planting on a regional basis.
- Establish appropriate tools to encourage cool roofs, green roofs, and/or rooftop solar energy systems and green infrastructure for private developments.
- Work with relevant Service Areas to apply the screening CEET to review, and make any required changes to address the climate emergency in the Design Specifications Manual, Site Plan Control Area By-law, Urban Design Guidelines, Tree Protection by-law, Purchasing By-law, all granting processes and other documents and processes that have an impact on the climate emergency, noting that:

- these assessments and amendments will be undertaken in priority, based on the magnitude of their potential impact on the climate emergency; and
- the entirety of this process will be undertaken over a period that extends beyond the one-year timeline.
- Complete and publish the new Climate Emergency Action Plan, which will include (but not be limited to) the following:
 - A clear city-wide net zero community GHG emissions target (as early as possible, but no later than 2050).
 - A clear Corporate net zero GHG emissions target (as early as possible, but no later than 2050).
 - A clear strategy and specific actions to achieve the community and corporate targets listed above.
 - A strategic approach and specific tools for communicating the climate emergency.
 - A strategy for climate change adaptation, with a focus on the impact of severe weather on London's built infrastructure including an updated flood forecasting and warning system.
- Elevate discussions with the development industry regarding design and construction techniques to reduce lifecycle GHG emission impacts as well as to reduce stormwater generation through low-impact development techniques.
- Explore opportunities for utilizing GHG offsets and establish policy for when this is appropriate.

3.4 Actions Being Taken While the CEAP is Developed

This report outlines how the City is exhibiting ownership and taking a leadership role on responding to the climate emergency. In addition to City actions, the following "Top Five Actions" were identified through the Community Energy Action Plan engagement process to be applicable for the majority of Londoners, London's businesses and employers, and senior levels of government for reducing fossil fuel use and GHG emissions, as well as adapting to climate change. These represent actions that can be and/or are being implemented now and will be supported by City-led actions within the new Climate Emergency Action Plan. It is imperative that existing actions and directions under way are not delayed while the new CEAP is being developed.

Londoners

- Drive less (or not at all) – make more trips by walking, cycling, transit, carpooling
- Reduce transportation impacts by switching to an electric vehicle, a hybrid vehicle, or a very fuel efficient one.
- Make your home more energy efficient and severe weather resilient– and work towards net-zero energy use and reduced stormwater runoff.
- Reduce food waste, especially for high-impact foods such as red meat and dairy.
- Go local – for food, for products, for vacations.

London's Businesses & Employers

- Invest in energy efficiency and low-impact development measures for buildings and processes.
- Apply green procurement strategies to the supply chain.
- Invest in green fleet measures.
- Reduce business travel, especially by air, through webinars and video conferences. If business travel is required, consider carbon offsetting.
- Reduce employee commuting – promote cycling, transit, carpooling, telework.

Strategic Areas of Focus	Strategy (Determines the action, method or plan to bring about the future desired state)
	<ul style="list-style-type: none"> • Update flood forecast and warning system to address a changing climate. • Build more infrastructure for walking and bicycling. • Continue to expand options and programs to increase mobility. • Develop a strategic plan for a future with connected and autonomous vehicles. • Support Londoners to access affordable public transit where they live and work. • Implement the London Transit Commission (LTC) 5 Year Specialized Service Plan. • Implement the LTC Ridership Growth Strategy. • Implement a rapid transit system to improve the reliability and capacity of existing transit service and support London Plan city building. • Implement the LTC 5 Year Conventional Service Plan. • Plant more trees to increase the city's tree canopy cover.
GROWING our Economy	<ul style="list-style-type: none"> • Expand opportunities and activities through the London Waste to Resources Innovation Centre. • Implement the Smart City Strategy. • Plan for High Speed Rail. • Undertake regional planning partnerships with neighbouring municipalities and promote regional connectivity.
LEADING in Public Service	<ul style="list-style-type: none"> • Measure and publicly report on corporate performance. • Increase access to information to support community decision making.

4.0 Conclusion

This report outlines the immediate and near-term actions to be undertaken by the City in response to the declaration of a climate emergency, and to demonstrate the City's leadership in responding to this declaration. The next steps begin immediately, will build upon existing and ongoing actions to understand, acknowledge and reduce the City's contribution to the climate emergency and improve the City's resilience to the changing climate.

Prepared by:	Michael Fabro, P.Eng, M.E.B. Manager, Sustainability and Resiliency
Prepared by:	Jamie Skimming, P. Eng Manager, Community Energy Initiatives
Prepared and Submitted by:	Gregg Barrett, AICP Manager Long Range Planning and Sustainability
Prepared and Submitted by:	Jay Stanford, M.A. M.P.A. Director, Environment, Fleet and Solid Waste
Recommended by:	John Fleming, MCIP, RPP Managing Director, Planning and City Planner
Recommended by:	Kelly Scherr, P.Eng., MBA, FEC Managing Director, Environmental and Engineering Services and City Engineer

September, 2019
GB/MF/JS/CS

Appendices

Appendix A- References.

Appendix B- Climate Emergency City Background.

Appendix B-1- What is a Climate Emergency City

Appendix B-2- Graphics

Appendix C-City of London Background Reports

Appendix C-1-Community Energy Action Plan (CEAP) - Examples of Actions Taken to Reduce Energy Use and Climate Change in London

Appendix C-2-Corporate Energy Management/Conservation Demand Management (CDM) Plan - Examples of Actions Taken by the City of London to Reduce Energy Use and Climate Change

Appendix C-3-Adapting to Severe Weather/Climate Change Adaptation - Examples of Actions Taken to Adapt to Climate Change in London

Appendix D-Senior Levels of Government

Appendix D-1-Overview of Provincial Government – Climate Change and Government of Ontario Ecological Concerns

Appendix D-2-Overview of Federal Government – Canada’s Action on Climate Change

Appendix A – References

1. United Nation's Secretary General Statement September 10, 2018
2. Assessment of Vulnerability to the Health Impacts of Climate Change in Middlesex-London Report Prepared for the Middlesex-London Health Unit, 2014
3. In the Insurance Bureau of Canada (IBC) Combatting Canada's Rising Flood Costs 2018
4. World Metrological Organization- The State of the Global Climate in 2018
5. IPCC, 2018: Summary for Policymakers. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. World Meteorological Organization, Geneva, Switzerland, 32 pp.

Appendix B-1- What is a Climate Emergency

What is it?

This climate emergency is a call to action to combat and reduce greenhouse gas (GHG) emissions by 45% from 2010 levels by 2030 and to establish net zero GHG emissions by 2050 or sooner. Reduction in GHG emissions is required to slow and hopefully stop the rapid intensification of the greenhouse effect within our atmosphere and stabilize global temperatures to no more than 1.5°C above pre-industrial levels.

The average global temperature for 2015–2019 is on track to be the warmest of any equivalent period on record. It is currently estimated to be 1.1°Celsius ($\pm 0.1^\circ\text{C}$) above pre-industrial (1850–1900) times. Widespread and long-lasting heat waves, record-breaking fires and other devastating events such as tropical cyclones, floods and drought have had major impacts on socio-economic development and the environment⁴.

- United Nation's World Meteorological Association, 2018

“Every extra bit of warming matters, especially since warming of 1.5°C or higher increases the risk associated with long-lasting or irreversible changes, such as the loss of some ecosystems,”⁵

- Intergovernmental Panel on Climate Change, 2018

In Canada, Federal and Provincial levels of government have established legislation and programs to reduce GHG emissions and increase sustainability and resiliency among communities. The climate emergency recognizes that upper levels of Government have established GHG targets and programs but they are not sufficient to stop the increases in GHG emissions worldwide or meet the targets as set out in the United Nations Paris Agreement.

According to the United Nations Intergovernmental Panel on Climate Change, the global warming of the last 50 years is, with over 95% probability, due to human activity¹.

What is causing it?

Exponential population and economic growth, but also the modern lifestyle of our globalised consumer society over recent decades have all continuously increased the emissions of CO₂ and other GHGs. The concentration of these GHGs in the earth's atmosphere is currently higher than at any time in the last 800,000 years.

The above-average rate of climate change that has been experienced since the 19th century is primarily due to the start of the industrial age and the associated demands for energy. The burning of coal, oil and gas resources that were naturally created over millions of years and stored in the earth's crust released large quantities of GHGs directly into the atmosphere which, in turn, intensified the natural greenhouse effect of the atmosphere. The increase in the concentration of GHGs in the atmosphere and the resulting warming is a reflection of the inability of the planet's natural systems to accommodate the rapid injection of historically sequestered carbon.

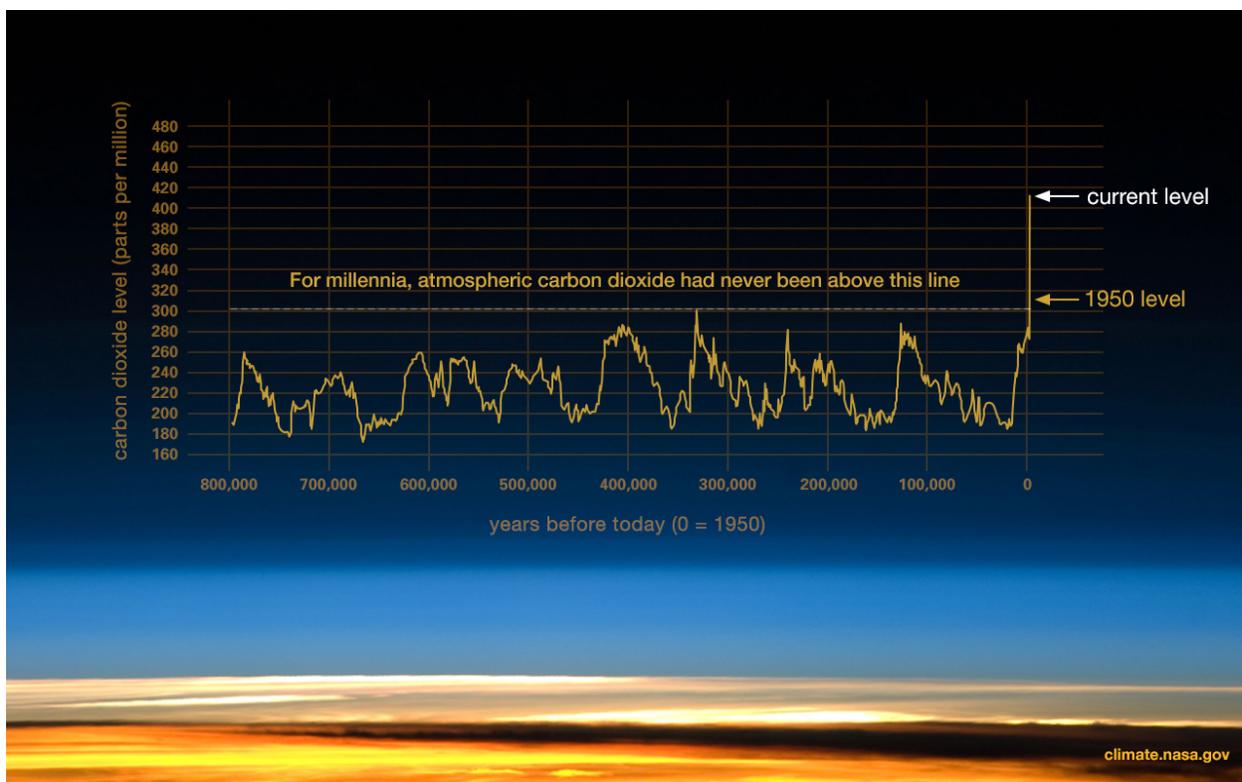


Figure 1 - Credit: Luthi, D., et al.. 2008; Etheridge, D.M., et al. 2010; Vostok ice core data/J.R. Petit et al.; NOAA Mauna Loa CO2 record.

What substantiates the emergency?

The Intergovernmental Panel on Climate Change (IPCC) is the UN body established to assess the science related to climate change and is widely regarded as the authority on the topic. The IPCC was established by the United Nations Environment Programme (UN Environment) and the World Meteorological Organization (WMO) in 1988 to provide policymakers with regular scientific assessments concerning climate change, its implications and potential future risks, as well as to put forward adaptation and mitigation strategies.

The reports produced by the IPCC since its creation have provided the world with ever-increasing certainty that human activity is responsible for the current state of climate change. Furthermore, the IPCC has increasingly urged that world leaders take action to significantly reduce the rate of GHG emissions. The most recent IPCC reports, culminating from the sixth assessment cycle, include:

- “Global Warming of 1.5°C. An IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.”;
- “Climate Change and Land: an IPCC Special Report on Climate Change, Desertification, Land Degradation, Sustainable Land Management, Food Security, and Greenhouse gas fluxes in Terrestrial Ecosystems” approved draft dated August 7, 2019; and,
- “The Ocean and Cryosphere in a Changing Climate” dated September 24, 2019.

Key findings across these most recent reports add to the large volume of scientific evidence already established that overwhelmingly supports the emergency status of the need to limit warming to 1.5°C or less.

With global actions centred around incremental improvements to our global GHG emissions only, limiting warming to 1.5°C or less is become less and less attainable.

“The 20 warmest years on record have been in the past 22 years. The degree of warming during the past four years has been exceptional, both on land and in the ocean.”

“Temperatures are only part of the story. Extreme and high impact weather affected many countries and millions of people, with devastating repercussions for economies and ecosystems in 2018,”

“Many of the extreme weather events are consistent with what we expect from a changing climate. This is a reality we need to face up to. Greenhouse gas emission reduction and climate adaptation measures should be a top global priority,”

- World Meteorological Organization, February 6, 2019

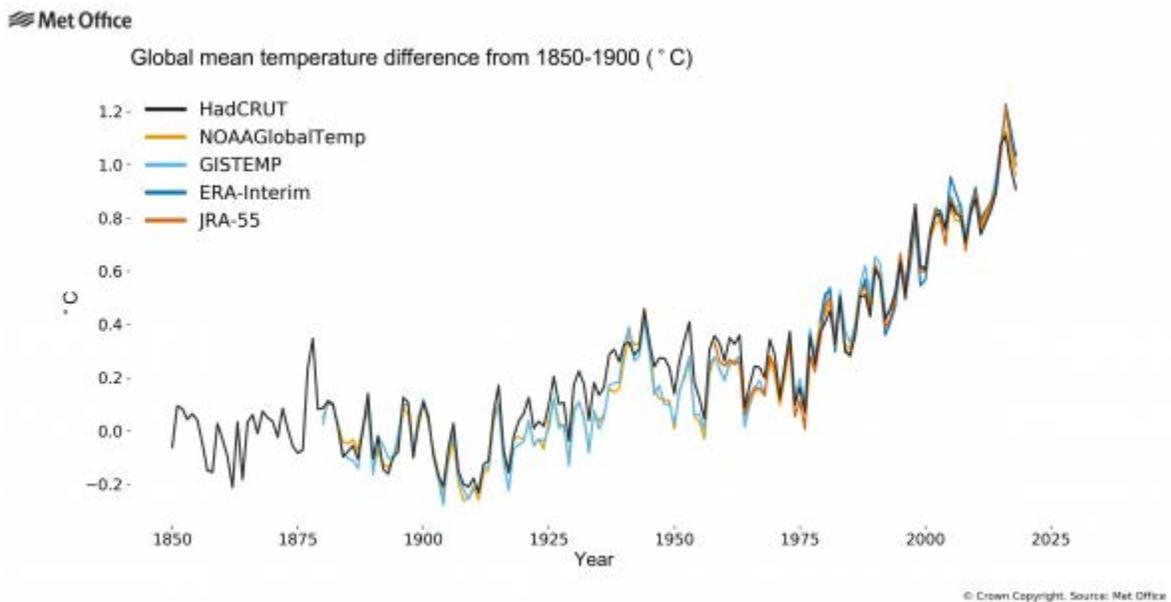


Figure 2- Source: WMO – Global temperature tracking datasets

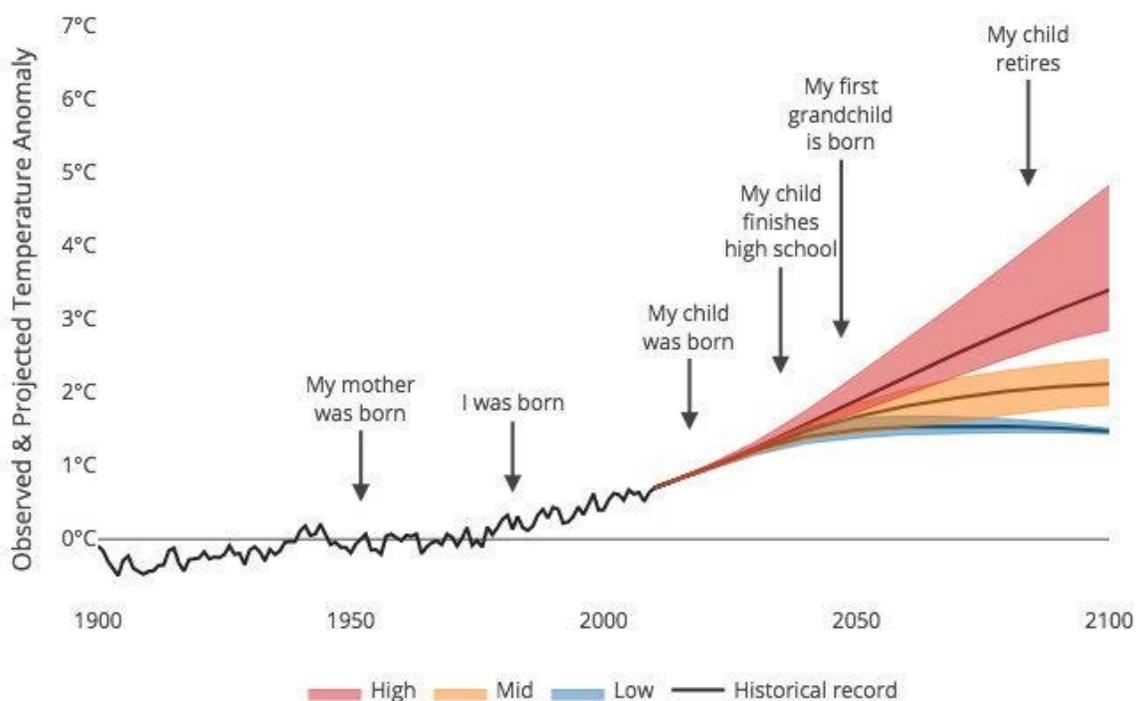


Figure 3-Source; Extinction Rebellion temperature futures based on emissions scenarios (high, mid, low)

What is the Critical Timeframe?

Carbon Budget

A carbon budget is a tool to understand the existing amount of GHG emissions currently in the atmosphere and the additional amount of GHGs that could be added and still

allow us to meet our goals. Because the world is already most of the way to 1.5°C of warming (approximately 1.04°C warmer than pre-industrial levels), the earth's carbon budget to limit global warming to a level of 1.5°C warmer is relatively small.

Based on the most recent Carbon Budget report (SR15) by the IPCC there is a 66% chance of avoiding 1.5°C warming if emissions are limited to 420 gigatonnes (Gt) of CO₂-equivalent GHGs – or 10 years of current emissions. Similarly, the budget for a 50/50 chance of exceeding 1.5°C is to 580 Gt CO₂-equivalent GHGs – 14 years of current emissions.

Overall, regardless of the IPCC projected Carbon Budget, to prevent the earth from warming more than 1.5°C above pre-industrial levels, GHG emissions must be reduced to net zero and drawing of current GHGs must occur as soon as possible.

Known Unknowns

Significant tipping points exist in the earth's climate system and represent "known unknowns", which leading scientists highly suspect will have significant effects but the extent and severity of those effects and when they may occur are unknown. These tipping points include the melting of the earth's ice sheets on Greenland and Antarctica, the results of which would be sea level rise on the order of metres and disappearance of earth's polar "reflectors" of sunlight; destabilization of the vast expanses of permafrost in the northern hemisphere and subsequent release of immense amounts of methane, a GHG with global warming potential that is 25 to 28 times more potent than carbon dioxide; and, the slowing and/or reversal of established ocean currents that are key drivers of weather patterns globally. Any one of these tipping points may have the potential to initiate irreversible acceleration of the changes to our climate system and we cannot be sure of when these will occur, only that their occurrence will become more likely with continued warming.

Climate Action Around the World

The Climate Emergency Campaign officially started in the city of Darebin, Australia, whose city government passed the first declaration of climate emergency in December 2016. Hoboken New Jersey became the third city in the world and the first city in North America to declare a Climate Emergency in November, 2017. The City of London followed Vancouver, Halifax, Kingston and Kitchener in declaring a Climate Emergency.

In 2018, 196 Countries including Canada signed the Paris Accord. The intent of the accord is to keep the global temperature from rising 2°C above pre-industrial levels (and preferable not more than 1.5°C) by 2050. The Climate Emergency campaign seeks that GHGs peak by 2020 and be at net zero by 2050. Some experts within the climate science community argue that even these targets are not aggressive enough.

To achieve the recommended goals of the Paris Accord, local governments have adopted a climate emergency response. The climate emergency response is to acknowledge that the current targets as set by upper level governments are not sufficient to meet the recommendation of the Paris Accord. Climate Emergency Cities recognize the need for immediate action at a scale that is comparable to that of the actions taken to respond to global threats during World War II.

Considering the attention and prevalence of worldwide youth climate strikes, a lack of action to respond to the climate emergency also now harbours significant reputational risk for London's place on the regional, national and world stage.



Figure 4 - The Climate Strike, City of London, September 29, 2019

What can a single municipality do?

“Local governments in Canada have a significant role to play in minimizing the impacts of climate change on their population, economy, and fiscal budgets.”

— *Simon Fraser University Adaptation to Climate Change Team, 2015*

As the level of political leadership closest to citizens, municipalities have the unique opportunity to leverage that connection to affect real, on-the-ground change even in the absence of strong leadership from higher levels of government. As reported in London’s 2018 Community Energy and Greenhouse Gas Inventory, the municipal government has direct control over only approximately four percent of London’s community GHG emissions (i.e., methane emissions from the W12A landfill and fossil fuel use by municipal operations), but decisions made by City Council regarding land use and transportation have influence on an approximately 70 percent of London’s community GHG emissions. The decisions made at City Hall have a direct influence on the establishment of norms and expectations for Londoners related to both reducing GHG emissions and the City’s ability to adapt to the changing climate and increase resiliency for severe weather events.

Prioritization of mass transit over personal vehicle transportation, designing for a reduction in the average distance to amenities from residential neighbourhoods, walkability of civic streets, support for green and low-impact infrastructure development, social safety net and emergency response programs and mandatory assessment of large projects for their impacts with respect to climate change are only some of the ways a single municipality can make a difference.

Worldwide, there are increasingly bold examples of leadership from municipalities that demonstrate that a commitment to reducing GHG emissions and adapting to the consequences of climate change are both fiscally responsible and overwhelmingly

positive: A great example is Toronto's Don River wetland creation in the docklands (\$1.3B) which is anticipated to mitigate major flood impacts from future severe storms.



Figure 5 Global Covenant of Mayors-2017

Sources of Community GHG Emissions in London

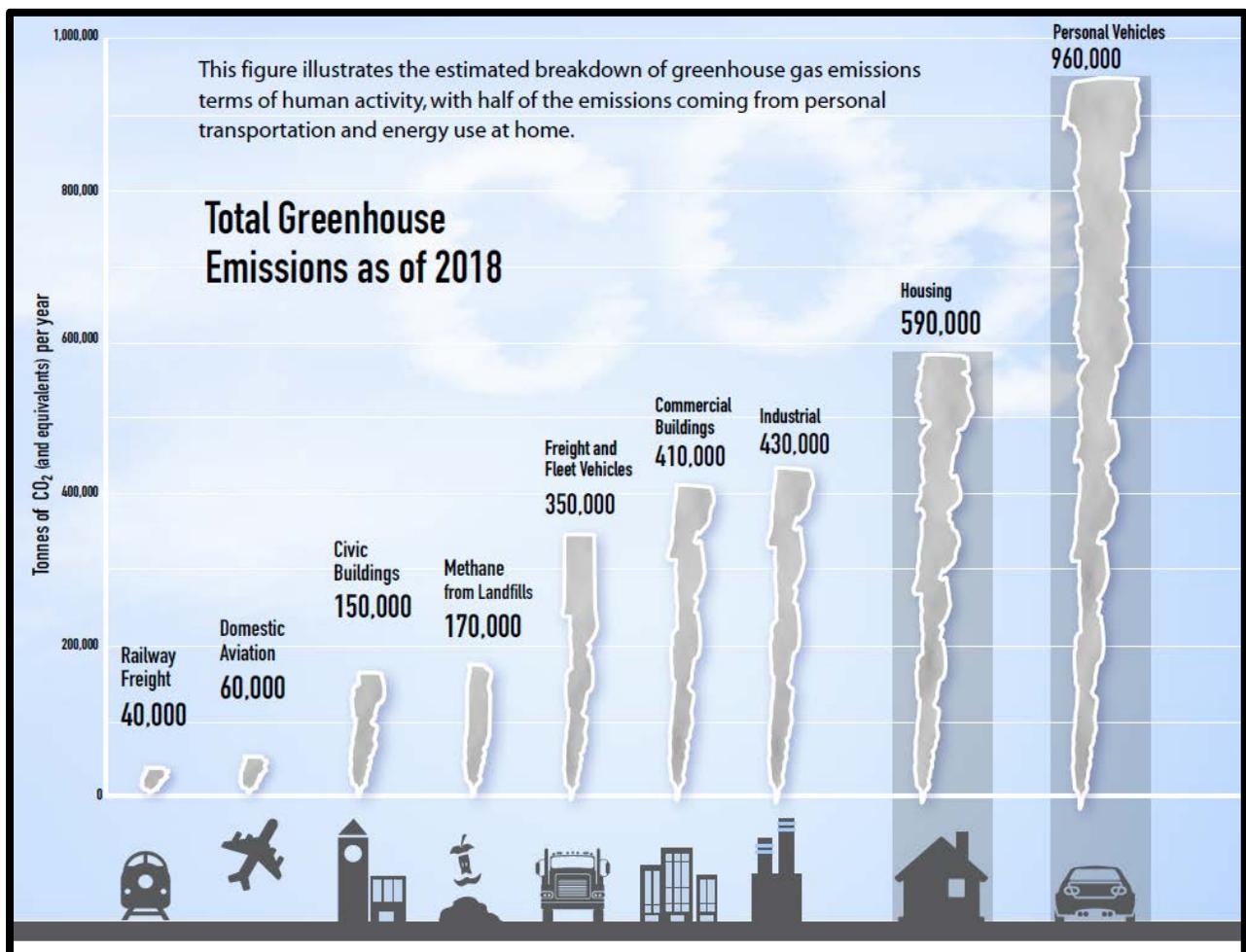


Figure 6-City of London greenhouse gas sources 2018

Appendix B-2- Graphics

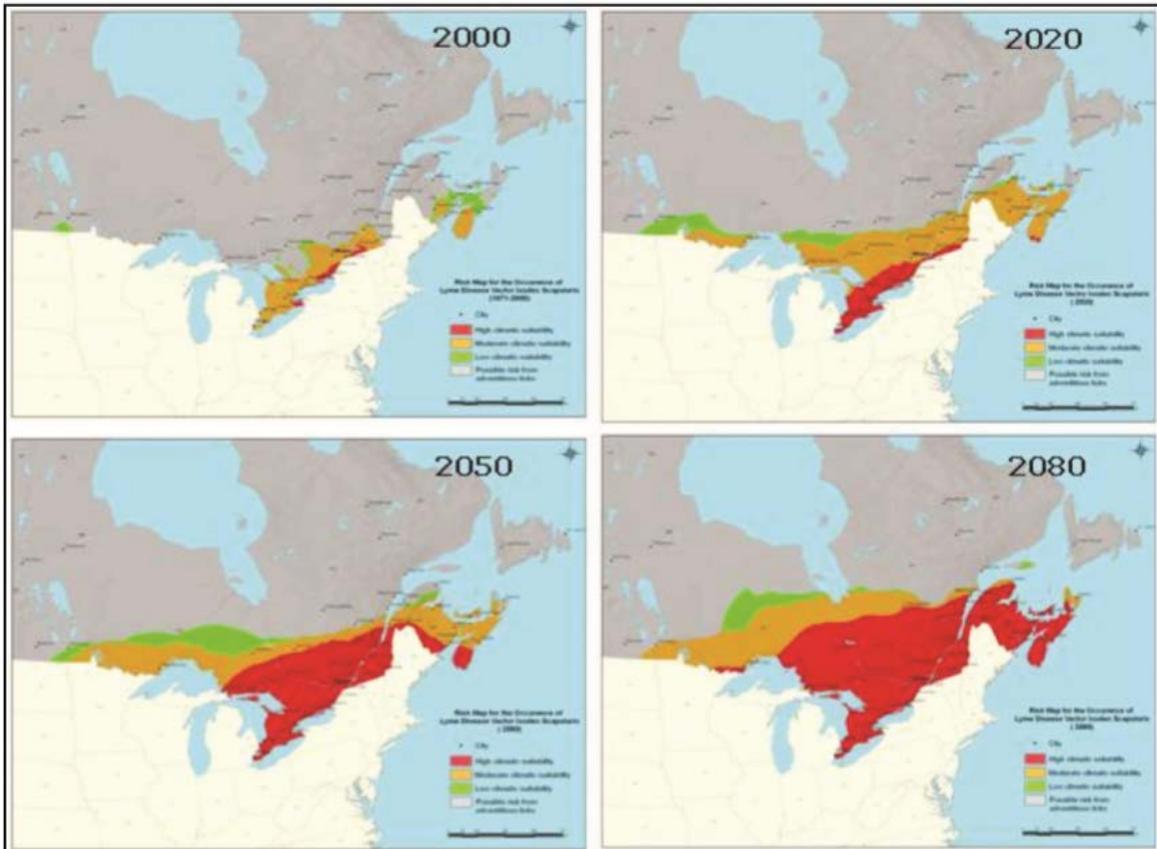
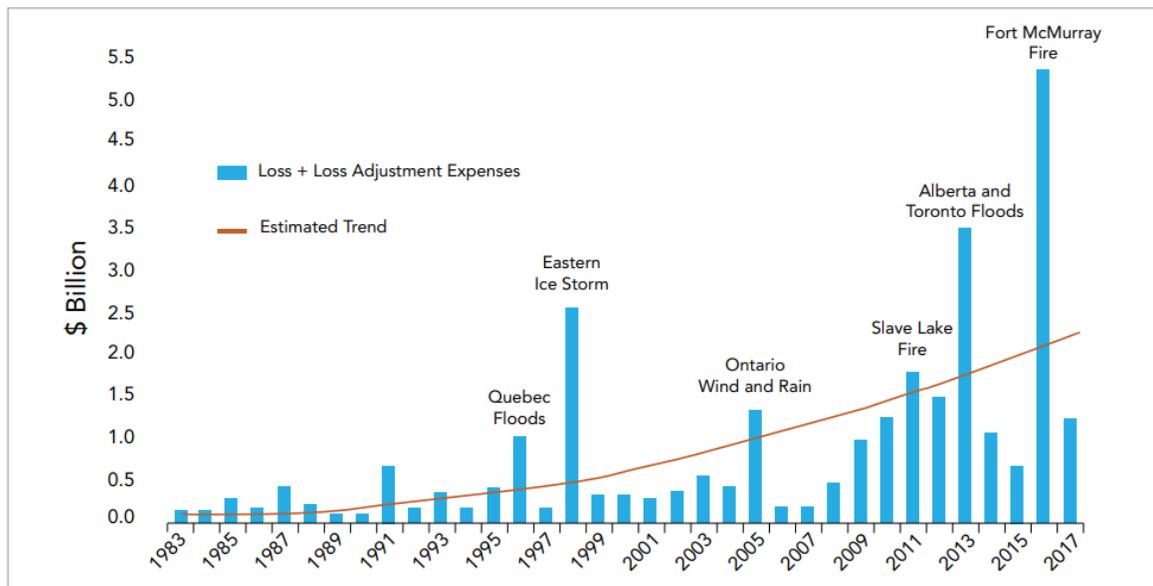


Figure 7- London-Middlesex Health Unit Referenced Spread of Lyme Disease Vector

Figure 2: Catastrophic Insured Losses in Canada (1983 – 2017)

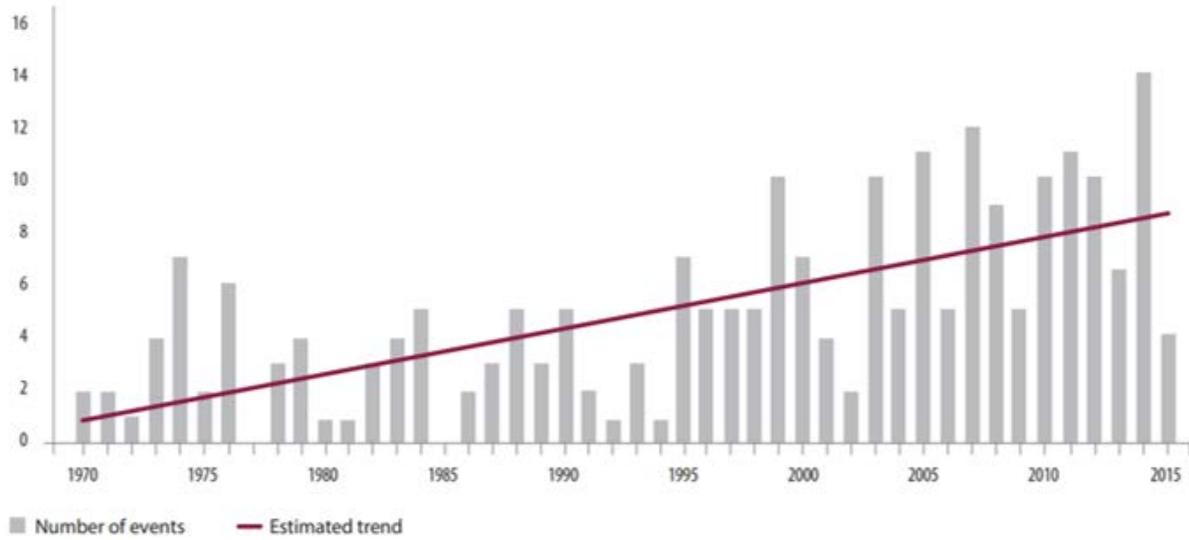


Source: IBC Facts Book, PCS, CatIQ, Swiss Re, Munich Re & Deloitte.

*Values in 2017\$ CAN, 2017; total natural catastrophe losses normalized by inflation and per-capita wealth accumulation

Figure 8 – Insurance Bureau of Canada Natural Catastrophe Losses Normalized by Inflation (1983-2017)

Number of Natural Disasters in Canada Requiring DFAA Compensation for Provinces and Territories (1970–2015)



Source: Public Safety Canada, 2016–2017 Evaluation of the Disaster Financial Assistance Arrangements.

Figure 9–Public Safety Canada 2017

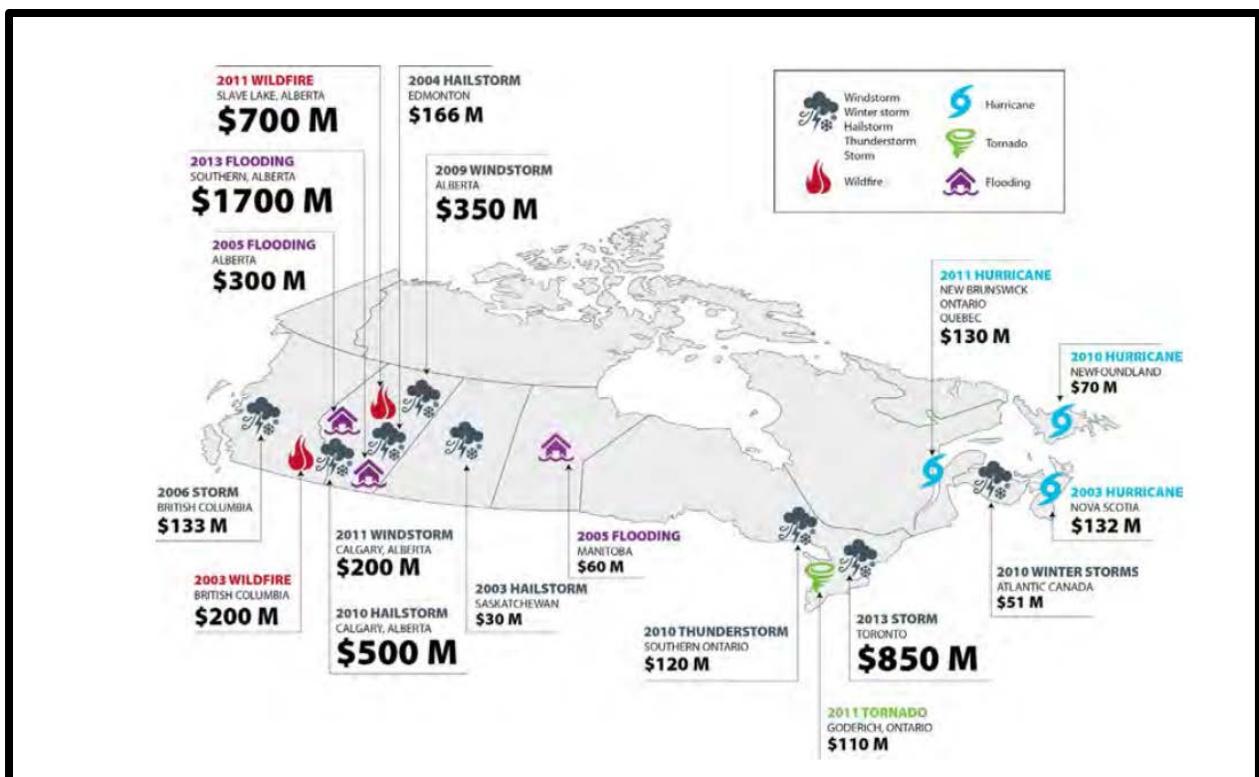


Figure 10– Insurance Bureau of Canada Natural Catastrophe Mapping (2003-2013)

Appendix C-1 – Community Energy Action Plan (CEAP)- Examples of Action Taken to Reduce Energy Use and GHG Emissions in London

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 citizens, visitors, employers and employees.

London's [2014-2018 CEAP](#) outlined a plan to reduce our dependence on fossil fuel and help the community move forward on energy conservation, energy efficiency, renewable energy, and other sustainable energy solutions (e.g., fuel switching) that reduce GHG emissions. It focused on actions to be undertaken during the previous Council term (2015-2018). The CEAP functions as London's climate change mitigation plan. The overall goals of the CEAP were 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 & 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 GHG reduction targets consistent with the Province of Ontario's former targets, 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.

Actions and Results to Date

Annual reporting for CEAP occurs through two documents; Community Energy Action Plan – Update and Status and the [Community Energy Use and Greenhouse Gas Emission Inventory](#).

The [2014-2018 Community Energy Action Plan – Final Update](#) was reported at the April 2, 2019 meeting of the Civic Works Committee. Over 80 percent of the strategies and City-led actions set out in 2014 were completed by the end of 2018, with significant progress made on the remaining items.

Final Status on the 2014-2018 CEAP's 17 Key Strategies				
Not Started	25 Percent Completion	50 Percent Completion	75 Percent Completion	Completed
0 strategies (0%)	0 strategies (0%)	1 strategy (6%)	2 strategies (12%)	14 strategies (82%)

Final Status on the 2014-2018 CEAP's 40 City-led Actions				
Not Started	25 Percent Completion	50 Percent Completion	75 Percent Completion	Completed
0 actions (0%)	0 actions (0%)	0 action (0%)	8 actions (20%)	32 actions (80%)

The following are major highlights of actions taken since 2014:

- Incorporating Community Energy Action Plan principles into The London Plan.
- The official launch of the London Environmental Network (LEN) on March 27, 2015. LEN

was created to help protect our environment and build a sustainable community by supporting local environmental organizations improve their internal capacity and ability to deliver on their missions.

- Working with the Clean Air Partnership and other Ontario municipalities to study the use of Local Improvement Charges to deliver Property-Assessed Clean Energy financing for home energy retrofits. This included a workshop in London in April 2016 with local stakeholders and currently involves participation in a FCM Transition 2050 project to develop a pilot project for use in participating Ontario municipalities in 2020.
- London District Renewable Energy Co-operative Inc. (LDREC) is a co-operative that developed and invested in ten (10) rooftop solar photo-voltaic (PV) projects in the London area, with a combined capacity of 3.07 megawatts. In the summer of 2016 it was given consent by the Financial Services Commission of Ontario (FSCO) to proceed with a public offering of shares for these projects. Using the 2018 grid marginal emission factor, these projects reduce GHG emissions by about 500 tonnes per year.
- Tested new tools, with support from Ontario's Municipal Energy Plan Implementation funding program, to encourage energy-saving behaviour, such as:
 - Project Neutral (cost and carbon footprint calculator)
 - Active & Green Home Check-Up pilot project (energy-saving tips for your home)
 - MyCarma London pilot project (eco-driving and vehicle fuel efficiency report card)
 - Solar Home Evaluation pilot project
- Expanding the annual Go Wild Grow Wild Green Expo (April each year) to include a Green Living Zone focusing on local services needed to live a greener lifestyle at home and at work.
- Completed the multi-municipality Federation of Canadian Municipalities (FCM) Green Municipal Fund study with the City of Kingston, City of Kitchener and the City of Waterloo to examine barriers to net-zero energy green development and how to address the barriers in the context of a multi-use development. The London case studies looked at West 5 greenfield site and the McCormick factory brownfield redevelopment site.
- Completed the FCM Green Municipal Fund study, in partnership with the Canadian Biogas Association and Union Gas, on a feasibility of producing renewable natural gas (RNG) from the organics component of municipal solid waste for use as fuel in compressed natural gas (CNG) vehicles.
- Completed the Local Energy Efficiency Partnerships (LEEP) for Renovators workshops in partnership with Natural Resources Canada and the London Home Builders' Association.
- Partnered with the London Environmental Network to support the launch of Green Economy London, a target-based sustainability program for business that was launched in May 2019 and is part of the nation-wide Green Economy Canada network. To date, Green Economy London has surpassed its Year One membership goals.
- Completion of the Environmental Assessment for Rapid Transit and confirmation of provincial and federal funding for three priority rapid transit projects.
- Creation of the London ON Bikes Cycling Master Plan and the construction of over 87 lane kilometres of road cycling lanes and 20 kilometres of parks pathways since 2014.
- Completing streets by constructing of new sidewalks in existing neighbourhoods every year.
- Delivery and partnering on programs such as Active and Safe Routes to School and

London Celebrates Cycling events.

Other indicators of community-led progress for the 2014-2018 CEAP include:

- As of January 2019, there were 23 BOMA BEST Sustainable Buildings in London, up from four in 2013.
- As of April 2019, there was almost 20 megawatts of renewable power generation capacity (solar, biogas, and small hydro) in London, up from 2 megawatts in 2011. Using the 2018 grid marginal emission factor, these projects reduce GHG emissions by about 6,000 tonnes per year.
- As of December 2018, there were almost 3,300 hybrid & electric vehicles registered in London, up from almost 1,500 in 2013. This is estimated to reduce GHG emissions by about 6,000 tonnes per year.

Highlights from the 2018 Community Energy Use and Greenhouse Gas Emission Inventory report for energy use and GHG emissions are below:

Energy Use	
Highlight	Comment
The total amount of energy used in London in 2018 was 61,800 terajoules. This is a 7% increase over 2017	The combination of a colder winter and a hotter summer in 2018 (compared to 2017) increased the demand for natural gas and electricity One terajoule is equal to the energy contained within about 26,000 litres of gasoline - roughly the amount of gasoline in 500 cars
Almost \$1.6 billion was spent by Londoners and London businesses on energy in 2018. This is a 11% increase over 2017	Almost 90% of this money leaves London. Every 1% reduction in energy use that Londoners and London businesses achieve keeps about \$13 million from leaving the local economy
Improvements in energy efficiency avoided expenditures on energy of another \$160 million in 2018	This is determined by comparing 2018 levels of energy efficiency on a per person basis to those seen in 2010
On a per person basis, Londoners and London businesses used 8% less energy overall in 2018 than used in 2007	2007 is the year that energy use reached its peak in London

Greenhouse Gas Emissions	
Highlight	Comment
Total GHG emissions in 2018 were over 3.1 million tonnes of equivalent carbon dioxide	The top three sources in 2018 were personal vehicles (30%), single-family homes (19%), and local industry (14%)
London's 3-year rolling average GHG emissions in 2018 were 13% below 1990 levels	The rolling average is determined by averaging the last 3 years; 2016, 2017 and 2018. The goal is to reach 15 percent reduction from 1990 levels by 2020
London's GHG emissions in 2018 were 9% below 1990 levels	The colder winter and a hotter summer increased the use of natural gas for heating and electricity generation, which resulted in higher GHG emissions In comparison, GHG emissions in 2017 were the lowest to date at 17% below 1990 levels

London's per capita GHG emissions in 2018 were 30% below 1990 levels	This was 7.8 tonnes per person in 2018, down from 11.2 tonnes per person in 1990
London's GHG emissions in 2018 were 19% below 2007 levels	2007 is the year that GHG emissions reached their peak in London

Upcoming Action – Immediate Next Steps

To achieve the current 2030 GHG reduction goal, Londoners and London businesses will need to reduce our fossil fuel use per person by about 40 percent between 2018 and 2030.

Future Action

In addition to what can be enhanced/started right away (see above), based on existing knowledge and experience and funding that is generally contained in base program budgets, the 2019-2023 Climate Emergency Action Plan will include actions and policies that support:

- Energy retrofits of existing single-family and multi-family housing stock
- Energy retrofits of existing industrial, commercial, and institutional buildings
- “Future ready” green development standards (net-zero energy, low-impact development)
- Implementation of higher-order public transit, structured around bus rapid transit
- Expanded active transportation & sustainable transportation choices (e.g., implementation of rapid transit)
- The need for more low-emission and zero-emission vehicles
- The need for more local renewable energy generation and utilization
- Outreach and engagement programs to encourage Londoners to take action
- Outreach and engagement programs to encourage London businesses to take action

Proposed City projects, such as the production of renewable natural gas (RNG) from the W12A Landfill as well as the London Waste to Resources Innovation Centre, will be significant contributors to the 2019-2023 Climate Emergency Action Plan. As part of the 2020-2023 Multi-Year Budget deliberations, funding has been identified for proposed additional actions as follows:

- Developing and testing new monetary and non-monetary incentives to encourage Londoners to take action
- Invest in new tools and resources that complement existing CEAP and other environmental activities
- Participation in a multi-municipality Property-Assessed Clean Energy (PACE) pilot program to help home owners fund deep energy retrofits of their existing home
- Investment in a Transportation Management Association to help London employers promote sustainable commuting options for their employees
- The expansion of a bike share program (if approved in 2020)

It is important to recognize that many important community needs (e.g., homelessness, poverty, unemployment) will be part of 2020-2023 Multi-Year Budget deliberations. In some cases, energy conservation and climate change initiatives play a role in addressing other community challenges (e.g., affordable housing, affordable public transit, etc.).

The City of London was recently approved to receive federal funding under the Investing in Canada Infrastructure Program (ICIP) for a series of transportation projects including three components of the planned rapid transit system:

- Downtown Loop
- East London Link

- Wellington Gateway

Rapid transit service will help balance growth by promoting the efficient use of infrastructure through transit oriented development to create a more sustainable and liveable form. These projects will:

- Manage growth and transportation capacity constraints;
- Create an environment that supports investment in higher density, mixed-use developments;
- Realize greenhouse gas emission savings through mode shift from automobiles to transit;
- Increase resiliency to climate change;
- Offer a mode of transportation that is an attractive alternative to the personal vehicle; and
- Improve transit reliability and frequency to move people more efficiently.

Appendix C-2- Corporate Energy Management and Conservation and Demand Management (CDM) Plan- Examples of Actions Taken to Reduce Energy Use and GHG Emissions in City Operations

The City's Corporate Energy Management Program can trace its roots as far back as the 1990s, and was expanded in 2007 to focus on six key areas:

1. Tracking & monitoring energy consumption;
2. Renewable energy and feasibility projects;
3. Leadership in Energy and Environmental Design (LEED) Buildings;
4. Energy conservation and demand management projects;
5. Energy procurement; and
6. Creating a corporate "culture of conservation".

In August 2011, the provincial government introduced *Ontario Regulation 397/11* under the *Green Energy Act, 2009*. This regulation requires municipalities, municipal service boards, school boards, universities, colleges and hospitals to report on their energy consumption and associated GHG emissions annually beginning in 2013. The affected public agencies were also required to develop and implement five-year CDM plans starting in 2014.

In response, the [2014 Corporate Energy Conservation and Demand Management \(CDM\) Plan](#) was produced, with the primary goal to achieve a ten percent reduction in total annual corporate energy use by 2020, using 2014 as the baseline year. Additional details can be found on the [Corporate Energy Management Program](#) page on the City of London's website.

Actions and Results to Date

Some of the results achieved as of 2018 for energy use reduction and GHG include:

Energy Use Reduction	
Highlight	Comment
The City achieved a 9% reduction in total annual energy use as of 2018	Total energy use had dropped by 10% as of 2017. However, due to colder weather in 2018, there was increase in natural gas consumption in buildings and increase in fleet fuel consumption
Energy use per capita for service delivery have been reduced by 15%	Wastewater treatment decreased by 8% Facilities decreased by 14% Fleet decreased by 6% Streetlights decreased by 32%
Annual energy costs have been reduced by 5%, from \$18.8 million in 2014 to \$17.9 million in 2018	Energy costs would have been \$3 million higher in 2018 if the energy efficiency improvements/programs were not in place. About \$12.5 million in total energy cost avoidance over the last five years

Greenhouse Gas Emissions	
Highlight	Comment
Energy-related GHG emissions have been reduced by 13% from 2014 levels	GHG emissions from facility and infrastructure energy use had dropped 25% as of 2017. However, colder winter and a hotter summer increased the demand for natural gas for heating and electricity generation, which resulted in higher GHG emissions

Greenhouse Gas Emissions	
Highlight	Comment
Energy-related GHG emissions have been reduced by 58% from 2007 levels	Given that electricity accounts for 60% of corporate energy needs, the phase-out of coal-fired power generation has contributed significantly to corporate GHG reductions. The three-year rolling average reduction for the 2016-2018 period is 60% from 2007 levels.

The following is a summary of few of the key energy initiatives from the last five years which contributed to energy savings and GHG reductions:

Project	Results
Canada Games Aquatic Centre – Lifecycle Renewal	<ul style="list-style-type: none"> • 20% total energy reduction • 5% peak electricity use reduction • Annual electricity-related GHG emission reduction <ul style="list-style-type: none"> ○ 30 tonnes based on the grid-average emission factor ○ 135 tonnes based on the fossil-on-margin emission factor • Received \$3 million loan from FCM and \$154,000 in incentives from London Hydro and \$35,000 from Union Gas • Co-generation (heat & power) system cost avoidance - \$20,000 annually
Street Lights Conversion to LEDs	<ul style="list-style-type: none"> • Phase 1 – 56% reduction in electricity use, \$690,000 in electricity cost avoidance annually • Phase 2 – 64% reduction in electricity use, \$620,000 in electricity cost avoidance • Annual GHG reduction of 940 tonnes based on the off-peak fossil-on-margin emission factor • Total incentives from London Hydro - \$1.8 million
Aeration Blowers Upgrade at Pollution Control Plants	<ul style="list-style-type: none"> • \$760,000 annual electricity cost avoidance • 14% reduction in wastewater electricity reduction and 6% reduction in total City’s electricity use • Annual electricity-related GHG emission reduction <ul style="list-style-type: none"> ○ 200 tonnes based on the grid-average emission factor ○ 850 tonnes based on the fossil-on-margin emission factor • \$2.1 million in incentives from London Hydro
Pump Optimization at Elgin-Middlesex Pump Station	<ul style="list-style-type: none"> • 850,000 kWh savings annually • \$100,000 in electricity savings annually • Annual electricity-related GHG emission reduction <ul style="list-style-type: none"> ○ 25 tonnes based on the grid-average emission factor ○ 110 tonnes based on the fossil-on-margin emission factor • \$420,000 in incentives from Hydro One • City received “Excellence in Energy Conservation” plaque from Hydro One in March 2019
Southeast Reservoir Pumping Station	<ul style="list-style-type: none"> • constructed to LEED silver standard; consumes 25% less energy compared to similar building • A green roof to reduce stormwater runoff • Exterior lighting that does not contribute to light pollution • Water use reduction measures in plumbing fixtures

Project	Results
Various Facility Energy Retrofits	<ul style="list-style-type: none"> • Savings over the last five years: <ul style="list-style-type: none"> ○ 10,300,000 kWh electricity savings ○ 52,000 m³ natural gas savings • Annual electricity-related GHG emission reduction <ul style="list-style-type: none"> ○ 320 tonnes based on the grid-average emission factor ○ 1,200 tonnes based on the fossil-on-margin emission factor • Annual natural gas-related GHG emissions reductions of 100 tonnes
Solar Roof Top Sections	<ul style="list-style-type: none"> • Policy to construct all new buildings to be “solar ready“
Various Green Fleet Measures	<ul style="list-style-type: none"> • Reduced fleet consumption by 2% in the last five years • Annual fuel-related GHG reduction of 170 tonnes • \$127,000 savings in the last five years

Upcoming Action – Immediate Next Steps

The new 2019-2023 CDM Plan, approved by Municipal Council on October 29, 2019, was developed through an interdepartmental exercise that included a review of the City’s current approach to energy management, a review of plans in other municipalities in southern Ontario, and a series of staff meetings with major service areas. The new plan can be found on the [Corporate Energy Management Program](#) webpage on the City of London’s website.

Using 2018 as the baseline year for the new 2019-2023 Plan, the proposed goals for 2023 include a five percent reduction target for total annual energy use by 2023 and an associated 10 percent decrease in energy use per capita. These measures are expected to avoid about 900 tonnes per year of greenhouse gas emissions by 2023. Work on the new CDM Plan will begin immediately.

Future Action

Based on existing knowledge and experience and funding that is generally contained in base program budgets, major activities planned for 2019-2023 also include:

- generating power from waste heat at the Greenway Wastewater Treatment Plant
- additional energy efficiency measures at wastewater treatment plants and water pumping stations
- additional building energy retrofits
- continuing the replacement of diesel waste collection (packers) trucks with compressed natural gas trucks
- in-reach programs to encourage City of London employees to take action

The 2019-2023 CDM Plan will also investigate possible pathways for City operations to reach net zero greenhouse gas emissions by 2050, or possibly sooner. For example, the proposed production of renewable natural gas (RNG) from the W12A Landfill presents a significant opportunity to reduce corporate GHG emissions through the use of a small portion of the produced RNG for City fleet vehicles and buildings.

As part of the 2020-2023 Multi-Year Budget deliberations, funding has been identified for proposed additional actions as follows:

- Feasibility studies that identifying and assess new projects for carbon curtailment
- Culture of Conservation employee engagement activities
- Improving energy efficiency performance measurement & reporting
- Electric vehicle charging stations, with cost recovery for the operations, maintenance and lifecycle replacement costs of these chargers

Appendix C-3 – Adapting to Severe Weather/Climate Change Adaption- Examples of Actions Taken to Adapt to Climate Change in London

The City of London has 43 km of Thames River located within its boundary and another 85 km of smaller creeks and waterways. Combined with the history of numerous floods, the majority of adaptation work has been focused on the river and stormwater infrastructure challenges. However, more subtle adaptation changes have been occurring as a necessity by various service areas and divisions at the operational level, in order to respond to more frequent and more severe storm events. Embedding climate change considerations has now become a necessary component of the majority of infrastructure projects.

Actions and Results to Date:

Work began from 2009 to 2011 regarding adaptation, focused on the Thames River, flooding, and related water infrastructure by staff from Western University. Their work provided insight to changes in rainfall patterns, flood lines and vulnerability to severe weather (see below):

City staff research and resources have led to the completion of five key initiatives that were supplemented by further detailed work described below in three major “Action” categories. These 5 initiatives are listed below.

1. Climate Change Adaptation Phase 1: Vulnerability Assessment completed in 2014 as an internal review led by the Risk Management Division and designed to take action on upcoming capital projects.
2. The ‘Flooding Matters Program” was launched in 2015 and concluded in 2018 to address basement flooding and sewer back-up given more extreme and more frequent rainfall events.
3. The West London Dyke Master Repair Plan was completed in 2016 to guide the enhanced flood protection and structural improvements to this 2.4 km long flood dyke that protects over 1,100 homes in London’s Blackfriar’s neighbourhood surrounding Labatt Park. The West London Dyke improvements result in flooding protection up to the 250 year storm event, plus a 0.6m freeboard..
4. City of London Emergency Flood Plan was updated in 2018 with supporting mapping and real-time water level monitoring resources.
5. The Pollution Prevention Control Plan completed in 2018 targeted combined sewer and sewer system overflows by establishing a long-term plan to reduce the impact of these overflows while maintaining level of service given the anticipation of more extreme and more frequent rainfall events.

Additional adaptation work has been completed through related programs and strategies such as the Emergency Management Program, Parks and Recreation Master Plan, Urban Forestry Strategy and Urban Agriculture Strategy.

Actions by City Staff

Research and resources went into the completion of several initiatives including:

- Climate Change Adaptation Phase 1: Vulnerability Assessment completed in 2014 as an internal review led by Risk Management Division and designed to take action on upcoming capital projects;

- Corporate Asset Management Plan (2014) embedded climate change adaptation and vulnerability considerations into results and recommendations;
- The ‘Flooding Matters Program’ was launched in 2015 and concluded in 2019 to address basement flooding and sewer back-up given more extreme and more frequent rainfall events;
- Basement Flooding Grant Program – voluntary program for homeowners with homes constructed prior to 1985 to disconnect their weeping tiles (foundation drains) from the sanitary system and redirect to new sump pit and pump system (which reduces flows to the sanitary system, particularly during wet weather);
- Combined Sewer Separation Program – replacing combined sewers with modern separated system, which reduces the volume of wet weather flows reaching wastewater pumping stations and treatment plants, as well as the volume of associated combined sewer overflows (untreated sewage) to receiving watercourses. Since 2016, 6 kilometres of combined sewers have been removed;
- The Pollution Prevention Control Plan (PPCP) completed in 2018 was a master planning exercise to guide and prioritize sewer and wastewater infrastructure improvement given the anticipation of more extreme and more frequent rainfall events.
- Specific actions resulting from implementation of the PPCP include:
 - the construction of the Burbrook Tunnel Stormsewer Project, a 3 metre diameter stormsewer to enable sewer separation projects in the Old East neighbourhood and to supply an outlet for existing and future quantities of stormwater to the South Thames River;
 - Wastewater Treatment Plant flood-proofing improvements including raising the height of perimeter dykes to safeguard against higher river floods;
 - various wastewater treatment plant upgrades and improvements to enhance wet weather treatment, through chemically enhanced primary treatment (which allows the majority of flow to receive at least primary level of treatment, prior to bypass for major wet weather events); and
 - projects that connect sewage treatment plants (e.g., Pottersburg and Vauxhall) to allow the transfer of sewage between plants to better share sewage treatment capacity during wet weather events;
- City of London Emergency Flood Plan was updated in 2018 with mapping resources;
- Low Impact Development measures have been incorporated into new road work (e.g. SoHo neighbourhood) highlighting the ability to lessen surface water entering stormwater systems and are incorporated into the recommendations of the Dingman Creek Subwatershed Environmental Assessment master plan to be completed in 2020;
- Enhanced and targeted education and awareness initiatives (e.g., FOG cups and W.A.S.H. programs) designed to reduce blockages in the sewer system due to misuse;
- The elimination of centre bridge supports (e.g. Victoria Bridge over the South Thames River, Ridout Street) when replacing and upgrading river bridge structures that would otherwise collect floating debris in the Thames River and waterways during flood events with the potential to create waterway blockages; and
- Parks and Recreation Master Plan Update considered the need for more shade structures in parks and playing fields without tree canopy and the maintenance costs

or replacement costs of different playing fields (e.g. soccer vs. baseball) that exist in the floodplain and experience increased flood damages and impacts.

Actions by City Staff in Collaboration with Western University

Work began from 2009 to 2011 regarding adaptation, focused on the Thames River, flooding, and related water infrastructure by Western University to provide:

- updated hydrologic analysis of the intensity, duration and frequency of rainfall anticipated for London in order to provide insight into the possible impacts to design and operation of water infrastructure;
- updated climate and hydrologic modelling that suggested flood lines should be revised given climate change and severe weather projections;
- insight into the vulnerability of water infrastructure due to climate change and severe weather; and
- assessments in collaboration with Western Geography staff and supported by City staff, regarding urban heat island impacts using Green Roof technologies implemented and monitored at the Western campus in conjunction with 3 other Canadian universities.

Actions by City staff in collaboration with Upper Thames River Conservation Authority (UTRCA) staff

- The West London Dyke Master Repair Plan was completed in 2016 to phase the increases in height and upgrading to this 2.4 km long flood dyke that protects over 1,100 homes in the Blackfriar neighbourhood and adjacent Labatt Park;
- Vegetation management on London's seven earthen flood dykes to ensure their effectiveness in protecting neighbourhoods near the river in such areas as The Coves, Kensington Village, and Glen Cairn;
- Ongoing collaboration with staff at the UTRCA established additional 'real-time' water flow monitoring on the Thames River and local flood prone creeks;
- UTRCA staff continue to model and update flood lines with updated technology and equipment for the City of London (ongoing);
- Work collaboratively to increase education and awareness regarding Low Impact Development techniques for private property and residential neighbourhoods.

Ongoing work by City Staff in Collaboration with Business & Community Groups

- Through the 2014-2018 CEAP, inspire local actions that address both mitigation and adaptation (e.g. tree planting, green infrastructure).
- Through Active & Green Communities Initiative, inspire neighbourhood level adaptation actions.

Additional adaptation work has been completed through related programs and strategies such as the Emergency Management Program, Parks and Recreation Master Plan, Urban Forestry Strategy and Urban Agriculture Strategy. Both climate change mitigation and adaptation goals are achieved through the implementation of enhanced tree canopy goals, local food initiatives and active transportation achievements.

Upcoming Action – Immediate Next Steps

In the next nine months, actions in the following areas will occur:

- Engage London Conservation Authorities, community institutions and businesses to consider timely adaptation measures to safeguard against negative climate change impacts.
- Partner with 25 Canadian cities involved in the Federation of Canadian Municipalities program “Showcase Cities Pilot Project” to peer review existing climate change work and collaborate on areas needing further work specifically regarding climate change adaptation at the municipal level.
- Work with London’s multiple sectors to finalize the Climate Change / Severe Weather Adaptation Strategy for London’s built infrastructure (as per Council’s Strategic Plan 2019 - 2023).
- Work with City Planning staff to further Climate Change Adaptation initiatives in conjunction with projects dealing with planning for sustainability and resiliency as part of the Green and Healthy Component (Green City Strategy) of the London Plan.

(<https://www.ontario.ca/page/climate-change>)

Climate change

Learn how we're protecting our environment and addressing climate change.

A Made-in-Ontario Environment Plan

Ontario has made significant progress to address climate change. Our total greenhouse gas emissions have dropped by 22 per cent since 2005 – even while the rest of Canada saw emissions increase by 3 per cent during that same time. Ontario will continue to do its part.

On November 29, 2018, we released our [Made-in-Ontario Environment Plan](#) that considers our province's specific priorities, challenges and opportunities, and commits to reducing our emissions to 30 per cent below 2005 levels by 2030, a target that aligns with the Federal Government's Paris commitments.

We will address climate change by:

Building resilience: helping families and communities prepare

We are committed to preparing families and communities for the costs and impacts of climate change, and to protecting our natural environment, communities, businesses and municipalities. We will improve our understanding of how climate change will impact Ontario.

- The government will be following through on its commitment to undertake Ontario's first-ever broad, multi-sector provincial climate change impact assessment to identify where the province is vulnerable and which regions and economic sectors are most likely to be impacted.
- Ontario is helping make information available to homeowners on the practical and affordable actions they can take to help lower their risk of basement flooding, such as by supporting the [Home Flood Protection Program](#).

Making polluters accountable

We will ensure polluters pay their fair share for their greenhouse gas emissions, while also ensuring industry continues to make advances to help Ontario achieve its share of reductions.

- On July 4, 2019, Ontario finalized its new emissions performance standards to reduce greenhouse gas emissions from large polluters, without a carbon tax.
- We are finalizing amendments to Ontario fuel regulations to increase access to clean and affordable energy for families and encourage the uptake of lower carbon fuels to help reduce emissions from the transportation sector.

Activating the private sector

We recognize that our private sector has the capital, capability and know-how to transform clean technology markets and transition Ontario to a low-carbon economy. This is why we intend to help facilitate the private sector's best projects and ideas to drive emission reductions at the lowest cost to taxpayers. Our plan will ensure the prudent and responsible use of public resources to drive private sector investment.

Government of Ontario Ecological Concerns

The Government of Ontario list the following concerns for Climate Change and Ecological effects.

Plants and animals

As the climate changes, some species will adapt by:

- migrating to new locations
- changing their breeding seasons
- seeking new food sources

Less adaptable species may even disappear from their current habitats.

Biodiversity

- the way certain species interact with one another and their environment may change
- the geographic range of plants and wildlife is predicted to move north as the temperature increases. Moose, gray jays, and polar bear populations are expected to shift north
- species at risk and isolated habitats may be the most sensitive to changes
- less ice cover and changes to lake freeze-up and break-up times may affect the food supply for aquatic species and may also affect fish spawning
- changes in water and air temperature may make conditions more favorable for diseases and invasive species, which puts pressure on native species

Forests

- there may be more insect and disease outbreaks
- increased tree stress may affect forest growth
- drier forests will lead to more intense and frequent forest fires
- local tree species will be less suited to local conditions. Climate conditions may change faster than local trees can migrate, which may cause them to die off in some areas
- healthy forests store carbon; damaged and unhealthy forests will be less effective at this
- healthy forests can withstand – and reduce – the impacts of climate change

Water

- milder, shorter winters lead to:
 - earlier snowmelt
 - less ice cover on lakes
 - changing rainfall patterns
 - changes in water's movement between air, soil, plants and bodies of water
- there may be less water available for renewable energy production and waterways
- increasing water temperatures may result in lower water quality as more micro-organisms are found in lakes
- warm-water species may spread into new northern habitats
- more extreme weather may result in more frequent flooding, erosion, shoreline damage, infrastructure failures and decreased water quality.

Fish

- most aquatic species' growth and reproduction are strongly influenced by water temperatures
- higher temperatures in the Great Lakes and inland lakes could result in fewer cold water species in Ontario (e.g., lake trout, yellow perch, largemouth bass)
- at-risk fish species such as lake sturgeon may disappear from Ontario completely
- changes in the composition and availability of phytoplankton and zooplankton (organisms in the water that are an important food source for many fish) may favour some fish species over others
- changes to water quality, water levels and ice cover may affect the type and number of fish in lakes and rivers

- lake conditions are expected to be more favourable for invasive species (e.g., zebra mussels, round goby)
- fish diseases such like viral hemorrhagic septicemia may become more common

Wildlife

- some wildlife species will be forced to move further north to a more favourable habitat
- species in southern areas will live in a smaller area due to increased parasites and competition
- hybridization between different animal species (e.g., northern and southern flying squirrels) is already being observed due to climate change
- while some animals will adapt, species that require a narrow range of temperature and precipitation conditions are most likely to decline or die out completely
- climate change may affect:
 - wildlife reproduction
 - relationships between predators and prey
 - survival
 - rates of disease in wildlife species
 - the availability of food and habitat

For example, if migratory songbirds arrive at their breeding grounds earlier, the food they need for successful reproduction may be unavailable.

Wetlands

- wetlands help reduce the effects of climate change by capturing and storing carbon
- climate change alters wetlands and the native species living there
- changes in precipitation and temperature may change wetland water systems, causing flooding and droughts
- when there is a decrease in precipitation and increased evaporation due to warmer air, wetlands may dry up or disappear
- it is likely that as wetlands dry up, plants living in the area will shift and marshes may become more swamp-like as woody plants move into marsh areas.

Appendix D-2 – Overview of Federal Government- Canada’s Action on Climate Change

(<https://www.canada.ca/en/services/environment/weather/climatechange/climate-action.html>)

Canada’s action on climate change

Carbon pricing, clean electricity, transportation, buildings, innovation, Pan-Canadian Framework.

Most requested

- [Expert panel on sustainable finance](#)
- [Pan-Canadian Framework on Clean Growth and Climate Change](#)

Services and information

Actions to reduce emissions

Clean electricity, buildings, transportation, industry, forestry, agriculture and waste, short-lived climate pollutants (SLCPs), methane regulations for the oil and gas sector.

Funding for reducing emissions

Low Carbon Economy Fund, allocations to provinces and territories, Pan-Canadian Framework on Clean Growth and Climate Change.

Putting a price on pollution

Guidance on carbon pollution pricing benchmark, federal carbon pricing backstop.

Modelling and reporting

Greenhouse gas emissions, inventories and reporting, modelling, projections, science activities, federal actions for a clean growth economy.

Adaptation and climate resilience

Adapting to the effects of climate change.

Clean technology, innovation and jobs

Innovating for clean growth and a low-carbon future.

Parks and protected areas

Canada's national parks and national marine conservation areas, protecting our lands and waters

Canadian Council of Ministers of the Environment

Federal, provincial and territorial ministers of the environment, jointly working on environmental issues.

Women and climate change

Effects of climate change on women and girls, profiles of women leaders.

Climate Action Fund

Support for projects that raise awareness of climate change.