Mississauga Executive Centre 2 and 4

2, 4 Robert Speck Parkway, Mississauga, ON

Greenhouse Gas Inventory Report

April 12, 2011

loop initiatives

Table of Contents

PART A – 2 Robert Speck Parkway

PART B – 4 Robert Speck Parkway

APPENDICES

PART A:
2 Robert Speck Parkway, Mississauga

1 SUMMARY

This report details the greenhouse gas (GHG) emissions inventory of 2 Robert Speck Parkway – Mississauga Executive Centre (MEC 2) Mississauga, Ontario. A GHG inventory lists the sources[1] of GHG emissions and the quantity of emissions released from each source during the reporting period[2].

MEC 2 is managed by Oxford Properties (Oxford). Oxford is registering MEC 2 in the Canadian Green Building Council's (CaGBC) LEED Canada EB: O&M Program (LEED EB) and is targeting this rating system's Energy and Atmosphere Credit 6: Emission Reduction Reporting (EAc6)[3]. Oxford will use the data from this report to disclose the building's emissions in the CSA CleanStart™ Registry and to provide information for the MEC 2's LEED EB Credit EAc6 documentation package.

Oxford is also targeting an innovation credit by including the emissions from building tenant commuting in its GHG inventory.

Loop Initiatives (Loop) is the Agent to MEC 2's property management company, Oxford, and is responsible for the completion of MEC 2's GHG inventory and reporting in accordance with CAN/CSA-ISO Standard 14064-1-06[4]. 3P Analysis and Consulting has been engaged to provide independent third party verification.

This report has been written in accordance with CAN/CSA-ISO Standard 14064-1-06 *Greenhouse Gases - Part 1: Specification with Guidance at the Organization Level for Quantification and Reporting of Greenhouse Gas Emissions and Removals*. In addition, the World Resource Institute (WRI)/World Business Council for Sustainable Development (WBCSD) Standard: Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard[5] and CAN/CSA-ISO Standard 14064-3-06 *Greenhouse Gases - Part 3: Specification with Guidance for the Validation of Greenhouse Gas Assertions* have been used as additional resources.

We have determined that MEC 2 emitted 2,162 tonnes of CO_2e from building energy use for the January 2010 to December 2010 reporting year. Direct GHG (Scope 1) emissions account for 31% of the reported building emissions. Energy indirect GHG (Scope 2) emissions account for 69% of the reported building emissions. Other indirect GHG (Scope 3) emissions from building tenant commuting

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[1] Examples of GHG sources include: boilers (natural gas combustion), electricity production (mixed fossil fuel combustion), etc.
[2] The reporting period is defined as the one year duration for which the quantity of GHG emissions from all sources is calculated.
[3] *LEED Canada for Existing Buildings: Operations and Maintenance 2009 Reference Guide.* 2009, Canadian Green Building Council.
[4] *CAN/CSA ISO 14064-1 Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals*. March 2006, International Standards Organization.
[5] *Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard.* March 2004. World Resources Institute and World Business Council for Sustainable Development.

produced 4,293 tCO_2e. The emissions were calculated from utility consumption records, survey data and other documentation collected from Oxford and Halsall.

Please refer to Section 5 and Appendix A for MEC 2's detailed GHG inventory.

2 ORGANIZATION PROFILE

MEC 2, located in Mississauga, ON and built in 1978, is a 15-storey office tower (excluding a mechanical penthouse) with 2 levels below grade (predominantly storage and mechanical rooms). This building is managed by Oxford.

As reported by Halsall Associates Limited (Halsall), the office space gross floor area (GFA) is 342,509 ft^2. This includes:

- 311,377 ft^2 of occupied office space;
- 1,737 ft^2 of vacant office space;
- 2,805 ft^2 of retail concourse; and
- 26,590 ft^2 parking.

As reported by Halsall:

"The building mechanical system is original and was installed in 1978. The fresh air is provided by a dedicated fresh air fan, located in the penthouse.

The outdoor air (OA) is filtered, tempered and directed to the dedicated fresh air shaft. Each floor is equipped with a constant speed, variable vane compartmental air handling unit, where fresh air and floor return air are mixed, filtered, treated and supplied back to the floor. A VAV distribution is used to modulate the air delivery to the space based on the heating and cooling demand. Mechanical cooling is provided at the compartmental air handling unit, using chilled water from the chiller plant. Perimeter heating is provided with induction units, using a hot water loop from the boiler plant.

The chiller plant is located in the mechanical penthouse and consists of two Trane centrifugal chillers, which supply the chilled water to the compartmental fans. Heat recovery from the condenser loop is used in the shoulder seasons to preheat the boiler hot water loop, while free cooling is used in the colder seasons.

The boiler plant is located in the mechanical penthouse and consists of three equally sized atmospheric Raytherm boilers, which supply the hot water to the perimeter induction units. The hot water supply temperature is reset based on the outdoor air temperature.

Base building lighting was converted to T8s in 2006. Lighting schedules are typically 7am – 7pm, Monday to Friday. Additional schedules are present where required."

The office and retail tenants at MEC 2 include:

- Bank of Nova Scotia
- Centrilogic
- Century Dry Cleaners
- Citizenship and Immigration Canada
- Country Style
- CPC
- D. Mason
- Department of Public Works
- Dr. Banducci
- Jet Airways
- JLR Management
- Maple Trade
- Peel Board of Education
- Resolve Corporation
- RGN – Toronto
- SI Systems
- Spectrum
- Symcor Inc.
- The Mason Group
- Tri-Gem
- Turkstra Mazza Reininger

Oxford has made a commitment to "greening" this facility, including participating in the LEED Canada EB: O&M Program, which includes evaluating energy, water efficiency and waste management. To achieve LEED EB EAc6, Oxford is reporting MEC 2's GHG emissions to the CSA Clean Start™ Registry.

3 GHG INVENTORY DESIGN AND DEVELOPMENT

3.1 Organizational Boundaries

For any GHG inventory, an organizational boundary is used to determine how GHG emissions are accounted for. Typically, one of the following approaches is used[6]:

1. Equity share approach: accounts for GHG emissions based on share of equity in the operation;

2. Financial control approach: accounts for GHG emissions based on the financial control over the operation; or

3. Operational control approach: accounts for GHG emissions based on the control of operations. The organization must report emissions from the sources over which it has operational control.

CAN/CSA-ISO Standard 14064-1-06 Section 4.1 states that the organization may use a different consolidation methodology where specific arrangements are defined by a GHG program or legal contract.

[6] *Hot Climate, Cool Commerce: A Service Sector Guide to Greenhouse Gas Management*. May 2009, World Resources Institute.

Since LEED-EB evaluates facilities rather than organizations, to meet EAc6 requirements, the MEC 2 facility was used as a physical boundary, rather than using any of the organizational boundaries described above. As such, the emissions from the base building equipment and the tenant equipment (including energy) were included in the GHG inventory without taking into consideration whether Oxford or the tenants have control or ownership. In addition, since LEED EB: O&M credit EAc6 does not take transportation into consideration; emissions from building-owned or leased vehicles are excluded from the inventory. However, since Oxford is applying for an innovation credit, emissions from building tenant commuting have also been calculated.

3.2 Operational Boundaries

Operational boundaries are defined to prevent double counting of reported emissions. These boundaries can be separated into the following three emission types:

Direct GHG emissions (Scope 1):

Direct emissions within the organizational boundary are released from fuel combustion, emissions from refrigerant leakage, generation of electricity, steam, or heat in equipment, business travel or employee commuting in company owned or leased vehicles.

Energy Indirect GHG emissions (Scope 2):

Indirect GHG emissions are released by the production of electricity, steam and/or chilled water, purchased by the facility users.

Other Indirect GHG emissions (Scope 3):

Other indirect GHG emissions are released from all other activities outside of the organizational boundaries .They may include business travel, employee commuting, third party production or manufacture of materials and resources, outsourced activities, and/or combustion of fuel in boilers or furnaces and electricity, steam or chilled water use excluded from the organizational boundary.

3.2.1 Direct GHG Emissions at MEC 2

Direct GHG emissions released from sources at the facility level include MEC 2's emissions from the combustion of natural gas and diesel and the release of refrigerant gases.

Natural gas is supplied by Enbridge Gas Distribution Inc. (Enbridge Gas). As reported in CFMS's energy breakdown calculations, the majority of natural gas

consumption is associated with space heating and heating of ventilation air, and a small amount is used for domestic hot water.

As reported by Halsall, 2 chillers (installed in 1979) containing refrigerant R-123 are on site. Each chiller has a refrigerant charge of 770 lbs (reported by Oxford). The emissions from the refrigerant are limited to the leakage from the refrigerant loop. R-123 is a refrigerant that has been identified as not having a "global warming potential" (GWP) by the UN Intergovernmental Panel on Climate Change (IPCC) and has therefore not been included in the GHG inventory. Oxford also reported on all emission sources found in MEC 2, there were no PFC's or SF_6's reported in the building.

There is one 600 gallon diesel tank on site. The last time it was refilled was in June of 2008 and as such, would have been included in the GHG inventory for the 2008-2009 period. For the accounting year, diesel generator consumption values were provided by Oxford.

As transportation emissions are excluded in LEED EB credit EAc6, fuel combustion from Oxford-owned vehicles, was not included in this GHG inventory.

3.2.2 Energy Indirect GHG Emissions at MEC 2

The GHG inventory includes MEC 2's indirect GHG emissions from purchased electricity. Imported chilled water or steam is not used at the facility.

Electricity at MEC 2 is purchased from EnerSource Hydro Mississauga (EnerSource). Consumption is measured by one main meter and is not submetered for any of the tenants. As reported by CFMS's energy analysis, the building's energy breakdown is as follows:

- Miscellaneous heating contribute the highest load at 31%;
- Miscellaneous electricity uses 25% of energy (including plug loads);
- Lighting use 18% of energy;
- Air handling units and fans use 9% of energy;
- Make up air heating use 6% of energy;
- Chillers use 5% of energy; and
- The remaining 6% energy is consumed by cooling towers, domestic hot water, duct heaters and hot water heaters.

3.2.3 Other Indirect GHG Emissions at MEC 2

Oxford has chosen to include Scope 3 emissions from building tenant commuting in the MEC 2 GHG inventory. This was done to demonstrate sustainability leadership and to achieve an innovation credit under the LEED Canada EB: O&M Rating System.

In order to include GHG emissions from tenant commuting, Oxford needed to collect the following tenant information:

- Weekly number of trips to and from work;
- The distance between home and work; and
- The mode(s) of transportation used for commuting.

Halsall sub-contracted Advitek, a market research company, to conduct a Commuting Survey of MEC 2's employees. The survey collected data from 536 tenant employees. This meets the sample size minimum requirement as outlined in LEED Canada EB: O&M Reference Guide under credit SSc4 (Alternate Transportation). The sample data was then linearly extrapolated over an annual working period of 49 weeks to account for all 1780 tenant employees that work at the building.

3.2.4 GHG Removals and Biomass Combustion at MEC 2

GHG removals or combustion of biomass are not present at MEC 2

3.3 Baseline Year Selection

Emissions were calculated for the time period between January 2010 and December 2010 to meet LEED-EB's 12 month Performance Period requirement. In addition, 2010 tenant commuting patterns were used to calculate scope 3 emissions.

Since this is the first year that MEC 2 is calculating its GHG emissions, this GHG inventory becomes the building's "base year"[7] emissions. Future annual inventories should be compared to this base year to track the results of emissions reduction efforts.

4 QUANTIFICATION

The GHG inventory calculation requires two types of data. As per CAN/CSA-ISO Standard 14064-1-06 Section 4.3.6, we obtained the appropriate "activity data" and "emission factor" to apply to the following equation:

$$\text{activity data} \times \text{emission factor} = \text{GHG emissions}$$

Activity data was collected from site utility bills. Emission factors from Canada's National Inventory Report (1990-2008)[8] were used.

[7] The base year is the first reporting period for which a GHG inventory is reported.
[8] *National Inventory Report (1990-2008) Greenhouse Gas Sources and Sinks in Canada*. April 2010, Environment Canada GHG division.

4.1 Natural Gas

4.1.1 Activity Data

Activity data for natural gas is based on Enbridge Gas monthly utility bills. Natural gas consumption is metered and reported by the utility in m^3.

4.1.2 Emission Factor

Loop used the National Inventory Report (1990-2008)[8] natural gas emission factors to calculate MEC 2's GHG emissions. Ontario-specific CO_2 emission factors from Part 2, Annex 8, Table A8-1 were used. Since CH_4 and N_2O emissions are dependent on a specific sector rather than regional fuel properties, national commercial CH_4 and N_2O data from Part 2, Annex 8, Table A8-2 were used.

The natural gas emission factor units are in metric tonnes of emission per m^3.

4.2 Refrigerant R-123

4.2.1 Activity Data

Activity data for refrigerant R-123 has not been included in this report since R-123 is a refrigerant that has been identified as having a GWP by the UN's IPCC and is therefore not required to be reported.

4.2.2 Emission Factor

Loop used the ISO-14064-1:2006 Annex C refrigerant global warming potential (GWP) factors for MEC 2's GHG calculations. The refrigerant GWP factor is a quantity without a physical unit. This document confirms that R-123 is a refrigerant that has been identified as not having a GWP by the UN's IPCC.

4.3 Diesel

4.3.1 Activity Data

Activity data for diesel is based on 2009 consumption reports that Oxford has provided. Oxford has confirmed that their usage schedule for the diesel generator was similar for the reporting year.

4.3.2 Emission Factor

Loop used the National Inventory Report (1990-2008)[8] diesel emission factors. The calculations used CO_2, CH_4 and N_2O emission factors from the National Inventory Report's Part 2, Annex 8, Table A8-4.

The diesel emission factor is measured in metric tonnes emission per L.

4.4 Electricity

4.4.1 Activity Data

Activity data for electricity is based on EnerSource Hydro Mississauga monthly utility bills. Electricity is provided through one main meter to MEC 2 Electricity consumption is metered and reported on by the utility in unadjusted kWh and adjusted kWh. As required by Energy Star and consequently the LEED-EB Program, unadjusted kWhs were used for this GHG inventory.

4.4.2 Emission Factor

Loop used the National Inventory Report (1990-2008)[8] electricity emission factors.

As Oxford is reporting on only one facility in Ontario, the calculations used provincial CO_2, CH_4 and N_2O emission factors from the National Inventory Report's Part 3, Annex 13, Table A13-7. The emissions factors used were from 2007, as these are the most recent figures which have been confirmed (2008 figures provided in the National Inventory Report are preliminary, so may be subject to revision).

The electricity emission factor is measured in metric tonnes emission per kWh.

Published electricity grid emission factors do not account for Transmission and Distribution (T & D) losses. As per the Greenhouse Gas Protocol, companies that purchase electricity from a T & D grid but do not own any part of the system should not include T & D losses in a scope 2 inventory. For this reason, T & D losses have not been included in the calculations for MEC 2.

4.5 Building Tenant Commuting

4.5.1 Activity Data

Activity data was provided by Advitek, a market research company that was sub-contracted by Halsall to conduct a Commuting Survey of MEC2's employees.

4.5.2 Emission Factors

Loop use the National Inventory Report (1990-2008)[8] for vehicle emission factors and the World Resource Institute "Compilation of Emission Factors" used in the "Cross-Sector Tool" for bus, subway, train and taxi emissions.

For car emissions, Light-Duty Gasoline Vehicles Tier 1 emission factors were used for CO_2, CH_4 and N_2O. They were taken from Part 2, Annex 8, Table A8-11. Where the respondent did not specify city or highway driving, city driving was assumed as it has the higher emissions factor.

For bus, subway and taxi emission factors CO_2, CH_4 and N_2O were taken from the Mobile-Public Transport tab on the WRI Compilation of Emission Factors used in the Cross-Sector Tool, Table 13.

In order to account for vacation time and statutory holidays it was assumed that all employees commuted to and from work for 49 weeks per year.

Please refer to Appendix C for summary of data collection sources and emission factor sources.

5 GHG INVENTORY COMPONENTS

5.1 Emissions

5.1.1 Building Emissions

The total emissions from direct and indirect building GHG emission sources during the reporting year are 2,162 tonnes of CO_2e. Building natural gas, diesel consumption and electricity account for 100% of the MEC 2's reported emissions. The breakdown is as follows (Table 1):

Table 1: Emissions Results

Source of GHG Emissions	CO_2e (tonnes)	% of total
Scope 1 and 2 (used for LEED EB EAc6 Credit)		
Natural Gas	669.1	30.9%
Diesel	3.7	0.2%
Electricity	1,489.3	68.9%
TOTAL	**2,162.1**	**100.0%**

CO_2 emissions account for 99% of the total GHG emissions, while CH_4 and N_2O emissions are negligible (they account for less than 1% of total GHG emissions). However, to meet CAN/CSA-ISO 14064-1-06[9] requirements, they have been included in the greenhouse gas inventory.

Refer to Figure 1 for the monthly building energy consumption and Figure 2 for a detailed GHG breakdown (Scope 1 and 2 only).

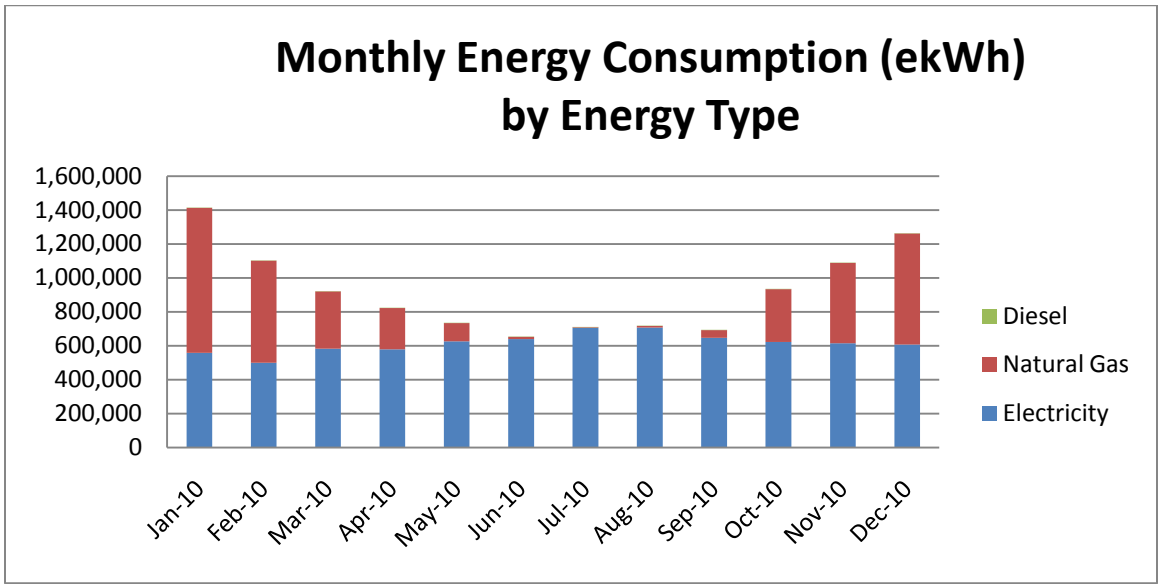

Figure 1: Energy Consumption Breakdown
Annual Energy Consumption is approximately 11,064,000 ekWh.

Note the lack of natural gas use from June 2010 until September 2010. This is due to natural gas only being used for heating purposes (Section 3.2.1).

[9] *CAN/CSA ISO 14064-1 Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals.* March 2006, International Standards Organization.

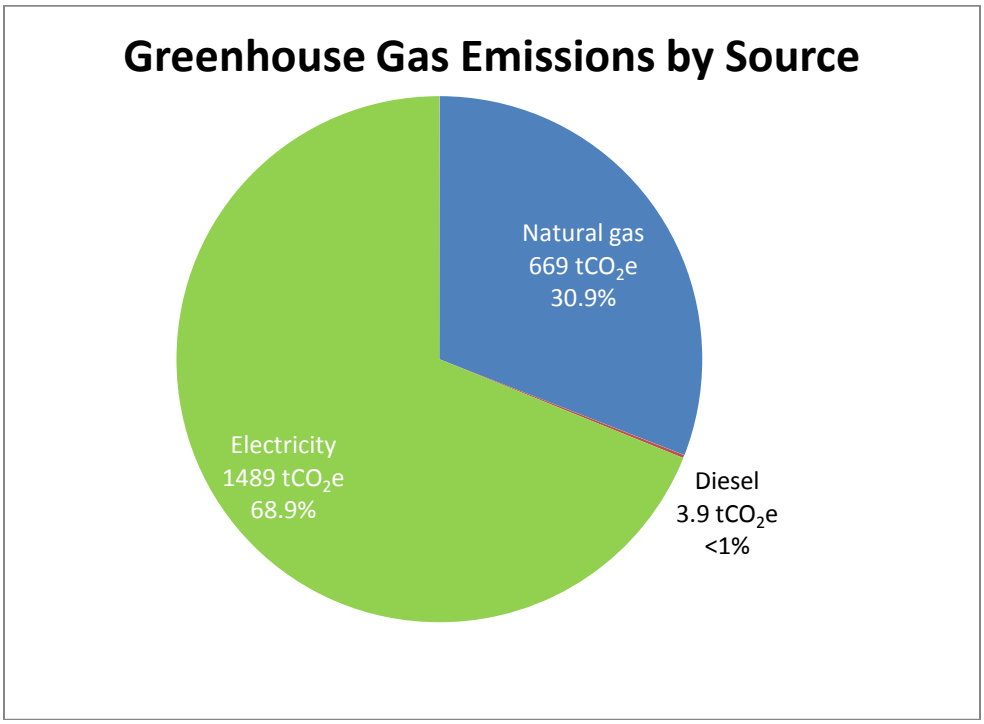

Figure 2: Greenhouse Gas Breakdown
Annual GHG emissions are 2,162 tCO_2e

With a carbon intensity of 6.9 CO_2e/ft^2, MEC 2's carbon footprint is lower than the average of other office buildings/portfolios in Mississauga and Toronto that Loop has worked with. Within the buildings reviewed, Loop has observed a range of carbon intensities between 4.4 kg CO_2e/ft^2 and 10.3 kg CO_2e/ft^2, averaging at 6.4

kg CO_2e/ft^2.

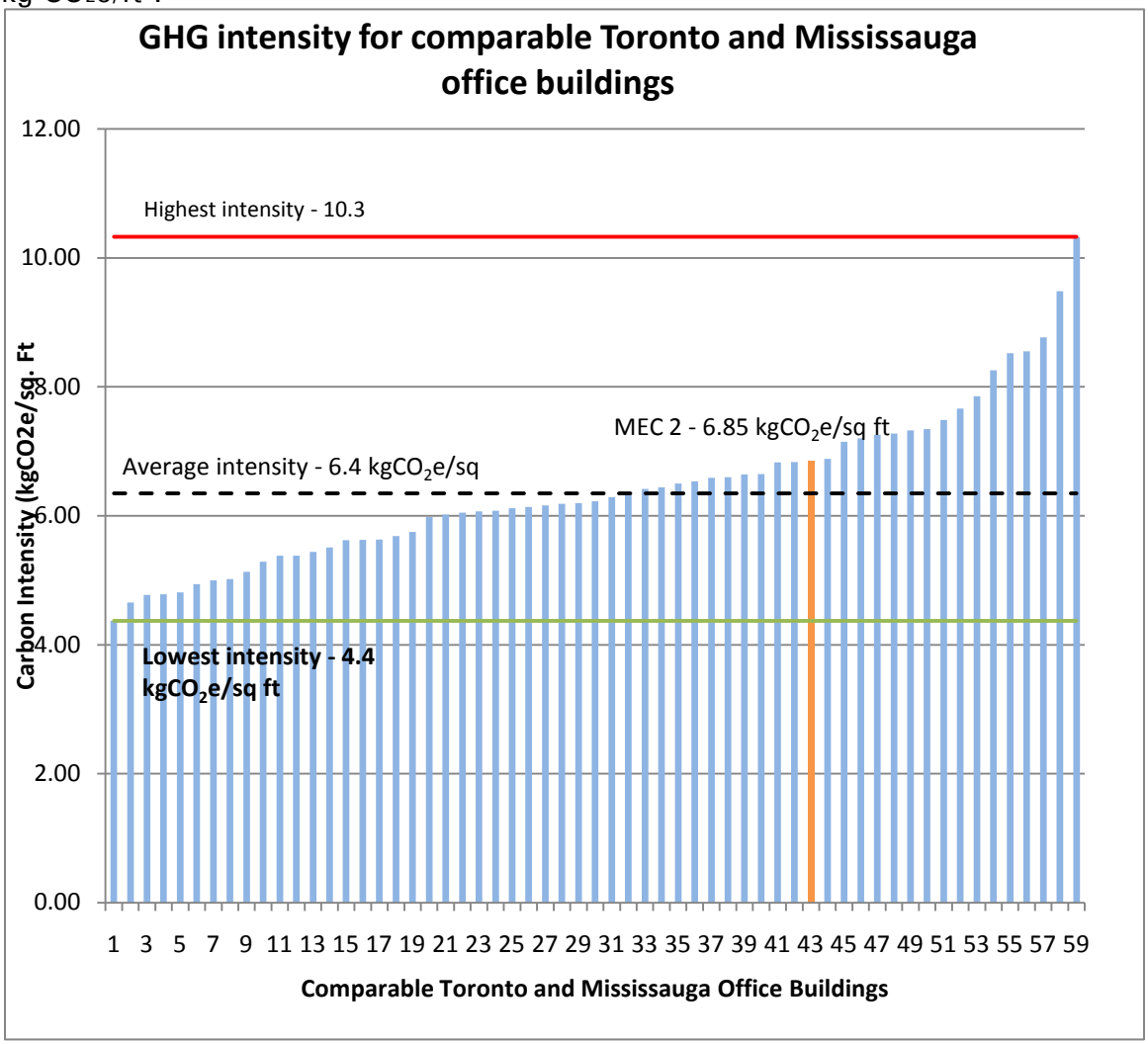

Figure 3: GHG Intensity for Comparable Mississauga and Toronto Office Buildings[10]

5.1.2 Tenant Commuting Emissions

Employee commuting at MEC 2 results in the emission of 4,293 tonnes of CO_2e per year, equating to an emissions intensity of 2.4 tCO_2e per full time employee.

[10] Halsall Associates Ltd./Loop Initiatives Inc. Energy and Carbon database (2006-2009). Data is not weather normalized. Intensity is calculated using the Energy Star™ definition of gross floor area.

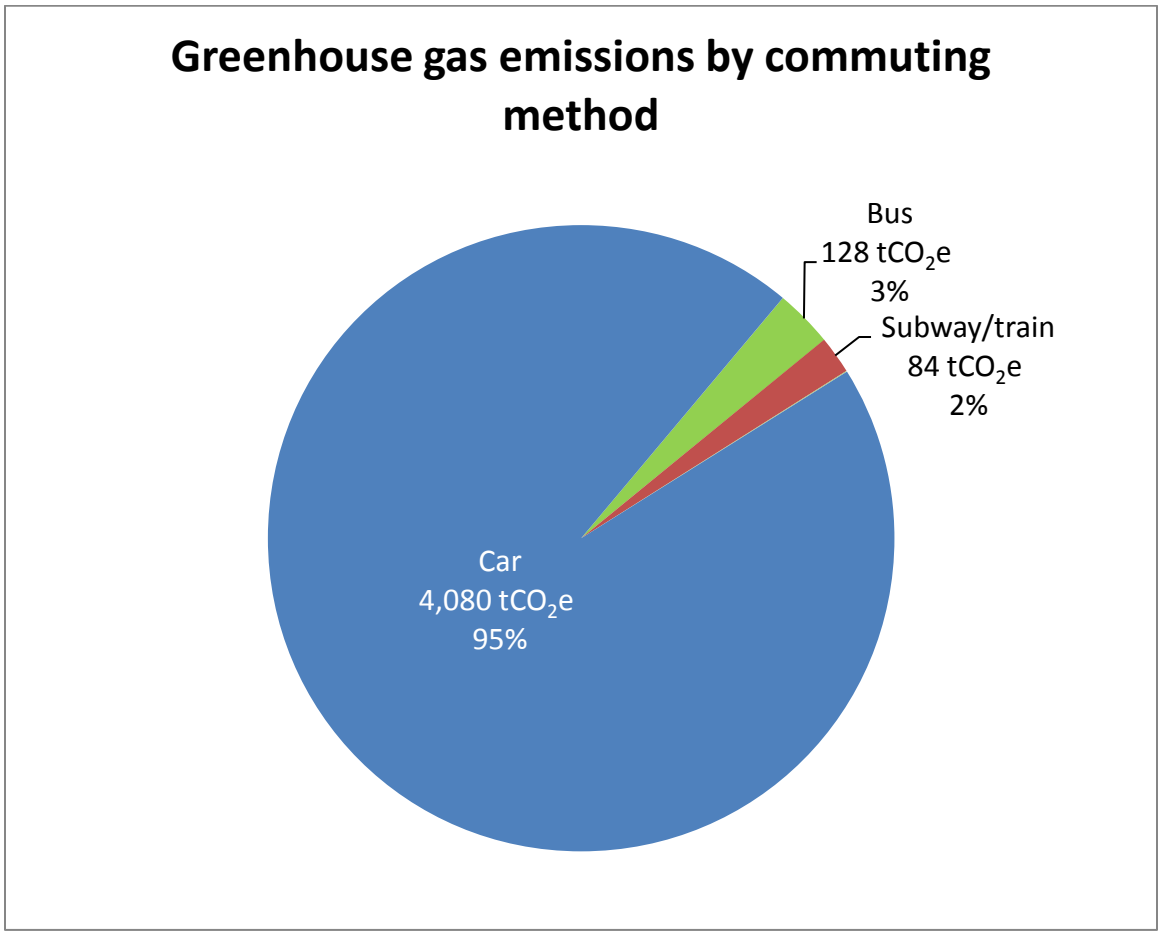

Figure 4: Breakdown of emissions from employee commuting by commuting method

Emissions from employee commuting were largely from car use. 84% of employee commuting was by car, accounting for 95% of commuting emissions. 11% of employee travel was by bus, accounting for 3% of commuting emissions, while 5% of employee travel was by commuter train or subway, accounting for 2% of commuting emissions. The impact of taxi travel was small, accounting for less than 1% of commuting emissions.

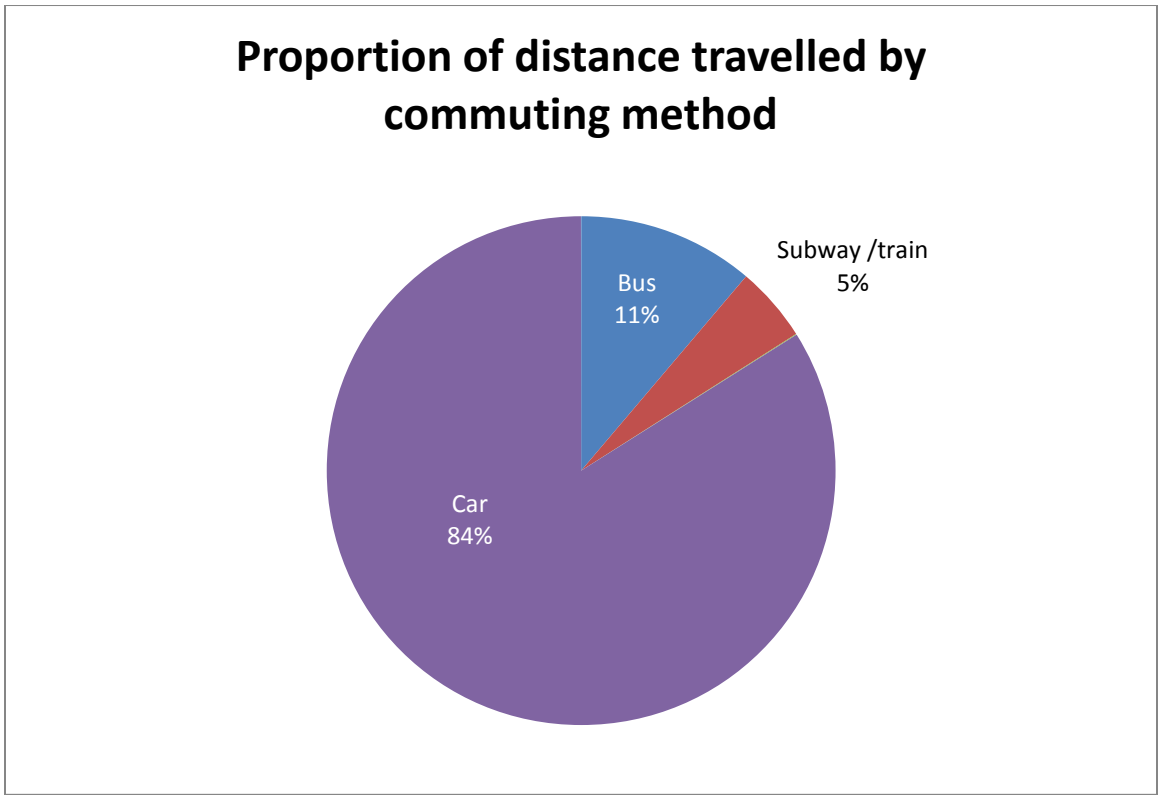

Figure 5: Breakdown of distance travelled by employees by commuting method

Employee commuting is responsible for 67% of the total greenhouse gas emissions at the MEC 2 site. In the following figure (Figure 5) Scope 3 emissions are employee commuting emissions, whereas Scopes 1 and 2 both relate to building energy use. This proportion of Scope 3 emissions is consistent with other organizations' GHG inventories, which include building and employee commuting emissions in their inventories.

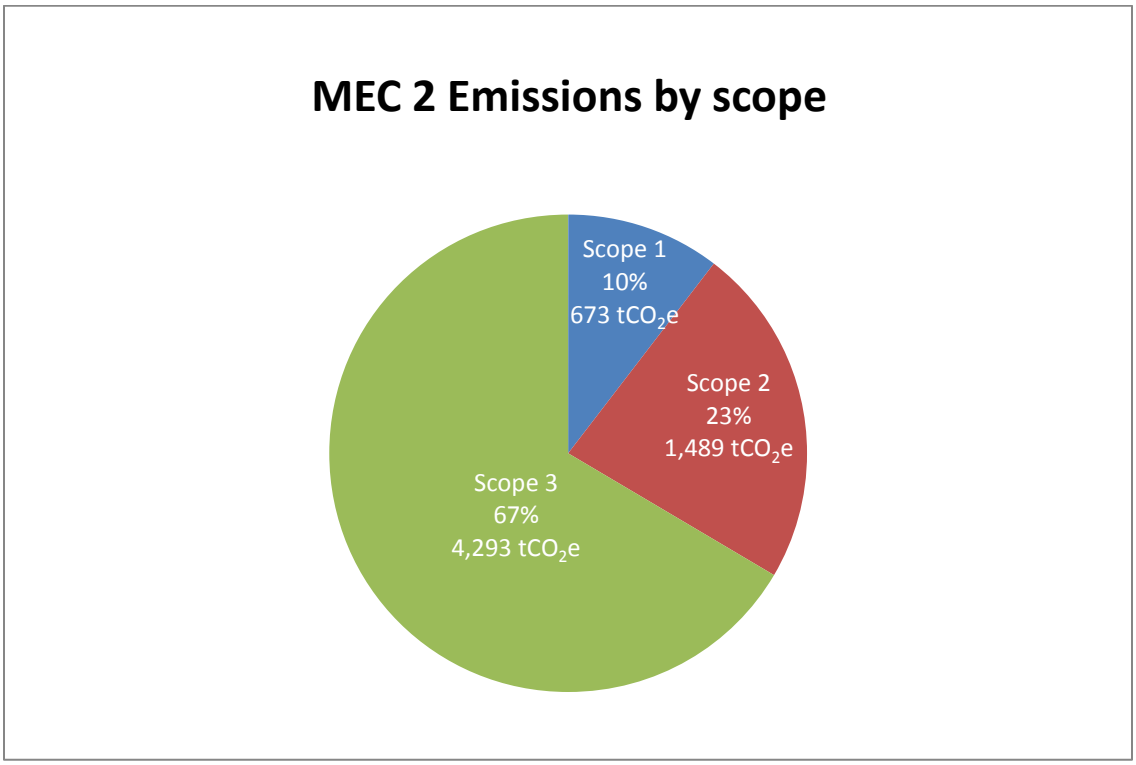

Figure 6: Breakdown of emissions by Scope

5.2 Activities to Reduce GHG Emissions

GHG reduction strategies for this facility have focused on energy measures. In MEC 2's current baseline, implemented energy saving retrofits have resulted in energy and carbon reductions compared to the previous years. An emissions reduction of approximately 0.3 tonnes of CO_2e (less than 1%) was calculated between the January 2010 – December 2010 reporting year and the 2007 calendar year.

CFMS prepared a LEED retro-commissioning plan in which several strategies for energy conservation have been recommended. Oxford has not yet decided which measures will be implemented in the future. The suggested strategies include:

- Adjusting the make-up air unit time of day schedule
- Adjusting the compartment units time of day schedule
- Adjusting the supply air reset schedule
- Lighting control system upgrade
- Upgrade of terminal unit controls from pneumatic to DDC
- Boiler replacement

In addition, as noted in section 5.1.2, a large share of the MEC 2 GHG inventory comes from automobile transport. Subsequently, emissions can be reduced by employee commuting initiatives, such as awareness programs about carpooling (e.g. "SmartCommute") and transit options, and providing bicycle storage and change room areas.

5.3 Estimation of Uncertainty[11]

Table 3 presents our opinion of the level of uncertainty related to this GHG inventory. Our opinion of uncertainty is based on *Table 3: Certainty Ranking for Common Emission Sources*, found in "Measurement and Estimation Uncertainty of GHG Emissions" by the Greenhouse Gas Protocol Initiative.

Table 3 – Uncertainty Ranking

Major Emission Category	Certainty Ranking
Natural Gas	High – The meter is calibrated and verified by Enbridge Gas. Natural gas emission factors are less dependent on location and are almost always standard and accurate. Uncertainty may be derived from fluctuations in measurement equipment.
Refrigerant	High – Refrigerant leakage has not been included since R-123 is a refrigerant that has been identified as not having a GWP by the UN's IPCC
Diesel	Poor- The only data provided was an annual figure for 2009 provided by Oxford. They confirmed that similar usage patterns occurred during the reporting year. No bills or other evidence were provided to verify this figure. To obtain an estimate of monthly usage it was assumed diesel consumption was evenly distributed throughout the year.
Electricity	Fair – The emission factor is based on an annual provincial grid average, containing multiple fuel sources such as coal, natural gas, hydro and nuclear.
Employee Commuting	Fair – The survey data included a 30% sample of employees. The emission factors are based on National and North American average data from the WRI and from Canada's National Inventory Report.

[11] *Measurement and Estimation Uncertainty of GHG Emissions.* 2003, The Greenhouse Gas Protocol Initiative.

6 GHG INVENTORY QUALITY MANAGEMENT

6.1 GHG Information Management

In an effort to develop a credible GHG inventory, roles and responsibilities were assigned to ensure consistency, accuracy, completeness, transparency and conformance with CAN/CSA-ISO Standard 14064-1-06.

Name	Role	Company
Wade Warner	Operations Manager	Oxford Properties[12]

Responsibilities:

- To provide Halsall/Loop with required energy data (via utility bills);
- To provide Halsall with refrigerant data information; and,
- To approve and sign the CSA CleanStart™ Registry application form.

Name	Role	Company
Doug Webber	Project Principal	Halsall Associates[13]
Emma Rohmann	Project Manager	Halsall Associates
Ryan Zizzo	Project Associate	Halsall Associates
Lori Matos	Project Associate, Energy	Halsall Associates

Responsibilities:

- To provide Loop with required energy data (via utility bills); and,
- To provide Loop with refrigerant data information.

Name	Role	Company
Francisca Quinn	Project Director	Loop Initiatives
Jia Shin	Project Manager	Loop Initiatives
Caryn Levin	Project Analyst	Loop Initiatives
Jennifer Hearn	Project Analyst	Loop Initiatives

Responsibilities:

- To request and analyze received activity data for acceptable accuracy;
- To collect appropriate emission factors and perform GHG calculations; and
- To produce a report consistent with both the CSA CleanStart™ Registry requirements and CAN/CSA-ISO Standard 14064-1-06.

[12] Oxford is the Owner's Representative
[13] Halsall is the LEED-EB Consultant for MEC 2

Name	Role	Company
Evan Jones	Independent Verifier	3P Analysis and Consulting

Responsibilities:

- To verify that Loop Initiative's 14064-1 report meets CSA CleanStart™ Registry requirements and CAN/CSA-ISO Standard 14064-3-06; and
- To issue a verification statement.

6.2 Document Retention and Record Keeping

The following activities, conducted by the property management company, maintain credible GHG inventory and reporting:

- Oxford compiles a record of MEC 2's utility bills and maintains them through spreadsheet tracking. This has a dual purpose in that it tracks both energy and operating costs.

This is the first year that Oxford calculates and publically registers MEC 2's greenhouse gas emissions. This inventory contains emission factors, January 2010 to December 2010 activity data, refrigerant history, GHG emissions and other important information. Oxford should keep this GHG inventory report for their records, should they choose to register MEC 2 or other organizations within MEC 2 next year with the CSA CleanStart™ Registry.

7 ORGANIZATION'S ROLE IN VERIFICATION ACTIVITIES

Evan Jones from 3P Analysis and Consulting was engaged to provide independent third party verification as per CAN/CSA-ISO Standard 14064-3-06. The verification is to be completed at a reasonable level of assurance.

Loop Initiatives prepared for MEC 2's verification by:

- Engaging a third party verifier to provide a reasonable level of assurance;
- Agreeing to verification objectives, scope, materiality and criteria with the verifier;
- Reviewing each section using the CSA Registry checklist; and
- Using an internal review process for quality control of the inventory and the document.

Third party verification is required by LEED EB. This provides an impartial and objective review of the reported GHG emissions.

Reporting content summary for declarations to the CSA standard is presented in Appendix D.

We hope this report meets your expectations and will assist Oxford in successfully managing your ongoing efforts to reduce GHG emissions. Loop Initiatives would be pleased to contribute further if you wish, by proceeding with a GHG reduction plan.

Please do not hesitate to contact us at (416) 644-0625.

Yours truly,
LOOP INITIATIVES

Jia Shin, M.Sc.(Eng.), P.Eng., LEED AP
Project Manager

Francisca Quinn, M. Sc.
Project Director

PART B:
4 ROBERT SPECK PARKWAY, MISSISSAUGA

1 SUMMARY

This report details the greenhouse gas (GHG) emissions inventory of 4 Robert Speck Parkway – Mississauga Executive Centre,(MEC 4), Mississauga, Ontario. A GHG inventory lists the sources[14] of GHG emissions and the quantity of emissions released from each source during the reporting period[15].

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We have determined that MEC 4 emitted 1,772 tonnes of CO_2e for the January 2010 to December 2010 reporting year from building energy use. Direct GHG (Scope 1) emissions account for 39% of the reported building emissions. Energy indirect GHG (Scope 2) emissions account for 61% of the reported building emissions. Other indirect GHG (Scope 3) emissions from building tenant commuting

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[16] *LEED Canada for Existing Buildings: Operations and Maintenance 2009 Reference Guide.* 2009, Canadian Green Building Council.
[17] *CAN/CSA ISO 14064-1 Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals*. March 2006, International Standards Organization.
[18] *Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard.* March 2004. World Resources Institute and World Business Council for Sustainable Development.

produced 2,324 tCO_2e. The emissions were calculated from utility consumption data and other documentation collected from Oxford and Halsall.

Please refer to Section 5 and Appendix B for MEC 4's detailed GHG inventory.

2 ORGANIZATION PROFILE

MEC 4, located in Mississauga, Ontario and built in 1981, is a 16-storey office tower without any underground parking garage. This building is managed by Oxford.

As reported by Halsall Associates Limited (Halsall), the office space gross floor area (GFA) is 460,539 ft^2. This includes:

- 306,666 $ft.^2$ of occupied office space;
- 20,623 $ft.^2$ of vacant office space;
- 2,235 $ft.^2$ of retail concourse;
- 131,015 $ft.^2$ parking.

As reported by Halsall:

"The primary heating is provided by the boiler plant, located in the mechanical penthouse. The boiler plant consists of three 3,291MBH gas-fired boilers that are original to the building construction.

Primary cooling is provided by two 380 ton centrifugal chillers located in the mechanical penthouse, chilled water circulation pumps, two condenser water circulation pumps, a free cooling automatic cyclo-strainer, two 44 ton rooftop air cooled chillers and two chilled glycol/water solution circulation pumps. The heat is dissipated by 2 rooftop cooling towers.

The chillers are original to the building construction but have been converted to handle R-123. No R-11 is currently being used in the building.

Outdoor air is delivered to the building via a dedicated outdoor air fan (AHU-2), located in the mechanical penthouse. The fresh air entering the fan is controlled by a damper that modulates based on the outdoor ambient conditions.

The fresh air is filtered, tempered and delivered to each floor via a dedicated fresh air shaft that extends thru the building core and feeds into the floor compartment unit. At the compartment level, fresh air is mixed with the floor recirculation air (through an open ceiling plenum), where it is then filtered, cooled and supplied to the floor. All compartment fans are variable air volume using variable inlet vanes (VIVs) to modulate the flow and maintain desired static pressure. Supply air is ducted to ceiling VAV boxes, where the flow is pneumatically controlled to satisfy the space temperature.

Mechanical cooling is provided at the compartment air handling unit, using chilled water from the chiller plant. Perimeter heating is provided by fin radiators, located under the windows, supplied by the boiler plant.

The HVAC components are monitored and controlled by a Siemens "Apogee 600" DDC Building Automation System with pneumatic controls.

Domestic water is heated by two gas-fired boilers, located in the mechanical penthouse. The washrooms are original to the building. The urinals and lavatories have recently been retrofitted with sensor controls.

Base building lighting is T8 throughout. Lighting schedules are typically 7am - 11:30pm, Monday to Friday."

The office and retail tenants at MEC 4 include:

- Baxter Corporation
- Canada Revenue Agency
- Century 21
- Ciber
- Detour Gold
- Keyser Mason Ball
- KMB
- Knightbridge Human Capital
- Ministry of Community and Social Services
- Ministry of Energy and Infrastructure New Toronto Group
- Oxford Properties Group
- Paradise Café
- Public Works and Government Services
- RBC Dominion Securities
- RGN Toronto
- Rogers Campbell
- Shadlock
- Shipping Corporation
- Spectrum Canada
- Solvtech
- Sun Life Assurance Company of Canada
- Thane

Oxford is has made a commitment to "greening" this facility, including participating in the LEED Canada EB: O&M Program, which includes evaluating energy, water efficiency and waste management. To achieve LEED EB EAc6, Oxford is reporting MEC 4's GHG emissions to the CSA Clean Start™ Registry.

3 GHG INVENTORY DESIGN AND DEVELOPMENT

3.1 Organizational Boundaries

For any GHG inventory, an organizational boundary is used to determine how GHG emissions are accounted for. Typically, one of the following approaches is used[19]:

1. Equity share approach: accounts for GHG emissions based on share of equity in the operation;

2. Financial control approach: accounts for GHG emissions based on the financial control over the operation; or

3. Operational control approach: accounts for GHG emissions based on the control of operations. The organization must report emissions from the sources over which it has operational control.

CAN/CSA-ISO Standard 14064-1-06 Section 4.1 states that the organization may use a different consolidation methodology where specific arrangements are defined by a GHG program or legal contract.

Since LEED-EB evaluates facilities rather than organizations, to meet EAc6 requirements, the MEC 4 facility was used as a physical boundary, rather than using any of the organizational boundaries described above. As such, the emissions from the base building equipment and the tenant equipment (including energy and refrigerant GHG emissions) were included in the GHG inventory without taking into consideration whether Oxford or the tenants have control or ownership. In addition, since LEED EB: O&M credit EAc6 does not take transportation into consideration, emissions from building-owned or leased vehicles are excluded from the inventory. However, since Oxford is applying for an innovation credit, emissions from building tenant commuting have also been calculated.

3.2 Operational Boundaries

Operational boundaries are defined to prevent double counting of reported emissions. These boundaries can be separated into the following three emission types:

Direct GHG emissions (Scope 1):
Direct emissions within the organizational boundary are released from fuel combustion, emissions from refrigerant leakage, generation of electricity,

[19] *Hot Climate, Cool Commerce: A Service Sector Guide to Greenhouse Gas Management*. May 2009, World Resources Institute.

steam, or heat in equipment, business travel or employee commuting in company owned or leased vehicles.

Energy Indirect GHG emissions (Scope 2):
Indirect GHG emissions are released by the production of electricity, steam and/or chilled water, purchased by the facility users.

Other Indirect GHG emissions (Scope 3):
Other indirect GHG emissions are released from all other activities outside of the organizational boundaries .They may include business travel, employee commuting, third party production or manufacture of materials and resources, outsourced activities, and/or combustion of fuel in boilers or furnaces and electricity, steam or chilled water use excluded from the organizational boundary.

3.2.1 Direct GHG Emissions at MEC 4

Direct GHG emissions released from sources at the facility level include MEC 4's emissions from the combustion of natural gas and diesel and the release of refrigerant gases.

Natural gas is supplied by Enbridge Gas Distribution Inc. (Enbridge Gas). As reported in CFMS's energy breakdown calculations, the majority of natural gas consumption is associated with space heating and heating of ventilation air, and a small amount is used for domestic hot water.

As reported by Halsall 2 chillers (installed in 1983) containing refrigerant R-123 are on site. Each chiller has a refrigerant charge of 770 lbs (reported by Oxford). The emissions from the refrigerant are limited to the leakage from the refrigerant loop. R-123 is not considered a Scope 1 emission and has therefore not been included in the GHG inventory. Oxford also reported on all emission sources found in MEC 2, there were no PFC's or SF_6's reported in the building.

There are two 248 gallon diesel tanks on site. The last time these were refilled was in June of 2008 and as such, would have been included in the GHG inventory for the 2008-2009 period. For the accounting year, diesel generator consumption values have been provided by Oxford.

As transportation emissions are excluded in LEED EB credit EAc6, fuel combustion from Oxford-owned vehicles, was not included in this GHG inventory.

3.2.2 Energy Indirect GHG Emissions at MEC 4

The GHG inventory includes MEC 2's indirect GHG emissions from purchased electricity. Imported chilled water or steam is not used at the facility.

Electricity at MEC 4 is purchased from EnerSource Hydro Mississauga (EnerSource). Consumption is measured by one main meter and is not submetered for any of the tenants. As reported by CFMS's energy analysis, the building's energy breakdown is as follows:

- Miscellaneous heating contribute the highest load at 35%;
- Lighting use 21% of energy;
- Miscellaneous electricity uses 16% of energy (including plug loads);
- Air handling units and fans use 10% of energy;
- Chillers use 7% of energy;
- Make up air heating use 6% of energy; and
- The remaining 5% of energy is consumed by pumps, cooling towers, domestic hot water and hot water heaters.

3.2.3 Other Indirect GHG Emissions at MEC 4

Oxford has chosen to include Scope 3 emissions from building tenant commuting in the MEC 2 GHG inventory. This was done to demonstrate sustainability leadership and to achieve an innovation credit under the LEED Canada EB: O&M Rating System.

In order to include GHG emissions from tenant commuting, Oxford needed to collect the following tenant information:

- Weekly number of trips to and from work;
- The distance between home and work; and
- The mode(s) of transportation used for commuting.

In order to collect this data, Halsall sub-contracted Advitek, a market research company to conduct a Commuting Survey of MEC 4's employees. The survey collected data from 420 employees. The means to obtain this sample size is outlined in LEED Canada EB: O&M Reference Guide under credit SSc4 (Alternate Transportation), which also requires a survey to successfully meet credit requirements. The sample data was then linearly extrapolated over an annual working period of 49 weeks to account for all 862 employees that work at the building.

Halsall sub-contracted Advitek, a market research company, to conduct a Commuting Survey of MEC 2's employees. The survey collected data from 420 employees. This meets the sample size minimum requirement as outlined in LEED Canada EB: O&M Reference Guide under credit SSc4 (Alternate Transportation).

The sample data was then linearly extrapolated to account for all 1780 tenant employees that work at the building.

3.2.4 GHG Removals and Biomass Combustion at MEC 4

GHG removals or combustion of biomass are not present at MEC 4

3.3 Baseline Year Selection

Emissions were calculated for the time period between January 2010 and December 2010 to meet LEED-EB's 12 month Performance Period requirement. In addition, 2010 tenant commuting patterns were used to calculate scope 3 emissions.

Since this is the first year that MEC 4 is calculating its GHG emissions, this GHG inventory becomes the building's "base year"[20] emissions. Future annual inventories should be compared to this base year to track the results of emissions reduction efforts.

4 QUANTIFICATION

The GHG inventory calculation requires two types of data. As per CAN/CSA-ISO Standard 14064-1-06 Section 4.3.6, we obtained the appropriate "activity data" and "emission factor" to apply to the following equation:

$$\text{activity data} \times \text{emission factor} = \text{GHG emissions}$$

Activity data was collected from site utility bills. Emission factors from Canada's National Inventory Report (1990-2008)[21] were used.

4.1 Natural Gas

4.1.1 Activity Data

Activity data for natural gas is based on Enbridge Gas monthly utility bills. Natural gas consumption is metered and reported by the utility in m^3.

4.1.2 Emission Factor

Loop used the National Inventory Report (1990-2008)[8] natural gas emission factors to calculate MEC 2's GHG emissions. Ontario-specific CO_2 emission factors from Part 2, Annex 8, Table A8-1 were used. Since CH_4 and N_2O emissions are

[20] The base year is the first reporting period for which a GHG inventory is reported.
[21] *National Inventory Report (1990-2008) Greenhouse Gas Sources and Sinks in Canada*. April 2010, Environment Canada GHG division.

dependent on a specific sector rather than regional fuel properties, national commercial CH_4 and N_2O data from Part 2, Annex 8, Table A8-2 were used.

The natural gas emission factor units are in metric tonnes of emission per m^3.

4.2 Refrigerant R-123

4.2.1 Activity Data

Activity data for refrigerant R-123 has not been included in this report since R-123 is a refrigerant that has been identified as having a GWP by the UN's IPCC and is therefore not required to be reported.

4.2.2 Emission Factor

Loop used the ISO-14064-1:2006 Annex C refrigerant global warming potential (GWP) factors for MEC 2's GHG calculations. The refrigerant GWP factor is a quantity without a physical unit. The refrigerant GWP factor is a quantity without a physical unit. This document confirms that R-123 is a refrigerant that has been identified as not having a GWP by the UN's IPCC.

4.3 Diesel

4.3.1 Activity Data

Activity data for diesel is based on 2009 consumption reports that Oxford has provided. Oxford has confirmed that their usage schedule for the diesel generator was similar for the reporting year.

4.3.2 Emission Factor

Loop used the National Inventory Report (1990-2008)[8] diesel emission factors. The calculations used CO_2, CH_4 and N_2O emission factors from the National Inventory Report's Part 2, Annex 8, Table A8-4.

The diesel emission factor is measured in metric tonnes emission per L.

4.4 Electricity

4.4.1 Activity Data

Activity data for electricity is based on EnerSource monthly utility bills. Electricity is provided through one main meter to MEC 4 Electricity consumption is metered and reported on by the utility in unadjusted kWh and adjusted kWh. As required by

Energy Star and consequently the LEED-EB Program, unadjusted kWhs were used for this GHG inventory.

4.4.2 Emission Factor

Loop used the National Inventory Report (1990-2008)[8] electricity emission factors.

As MEC 4 is reporting on only one facility in Ontario, the calculations used provincial CO_2, CH_4 and N_2O emission factors from the National Inventory Report's Part 3, Annex 13, Table A13-7. The emissions factors used were from 2007, as these are the most recent figures which have been confirmed (2008 figures provided in the National Inventory Report are preliminary, so may be subject to revision).

The electricity emission factor is measured in metric tonnes emission per kWh.

Published electricity grid emission factors do not account for Transmission and Distribution (T & D) losses. As per the Greenhouse Gas Protocol, companies that purchase electricity from a T & D grid but do not own any part of the system should not include T & D losses in a scope 2 inventory. For this reason, T & D losses have not been included in the calculations for MEC 4.

4.5 Building Tenant Commuting

4.5.1 Activity Data

Activity data was provided by Advitek, a market research company that was sub-contracted by Halsall to conduct a Commuting Survey of MEC4's employees.

4.5.2 Emission Factors

Loop use the National Inventory Report (1990-2008)[8] for vehicle emission factors and the World Resource Institute "Compilation of Emission Factors" used in the "Cross-Sector Tool" for bus, subway, train and taxi emissions.

For car emissions, Light-Duty Gasoline Vehicles Tier 1 emission factors were used for CO_2, CH_4 and N_2O. They were taken from Part 2, Annex 8, Table A8-11.

For bus, subway and taxi emission factors CO_2, CH_4 and N_2O were taken from the Mobile-Public Transport tab on the WRI Compilation of Emission Factors used in the Cross-Sector Tool, Table 13.

In order to account for vacation time and statutory holidays it was assumed that all employees commuted to and from work for 49 weeks per year.

Please refer to Appendix C for summary of data collection sources and emission factor sources.

5 GHG INVENTORY COMPONENTS

5.1 Emissions

5.1.1 Building Emissions

The total emissions from direct and indirect building GHG emission sources during the reporting year were 1,772 tonnes of CO_2e. Building natural gas, diesel and electricity account for 100% of the MEC 4's reported emissions from building energy use. The breakdown of building emissions is as follows (Table 1):

Table 2: Emissions Results

Source of GHG Emissions	CO_2e (tonnes)	% of total
Natural Gas	696.4	39.3%
Diesel	0.8	<1%
Electricity	1074.9	60.7%
TOTAL	**1,772.1**	**100%**

CO_2 emissions account for 99.3% of the total GHG emissions, while CH_4 and N_2O emissions are negligible (they account for less than 1% of total GHG emissions). However, to meet CAN/CSA-ISO 14064-1-06[22] requirements, they have been included in the greenhouse gas inventory.
Refer to Figure 1 for the monthly energy consumption and Figure 2 for a detailed GHG breakdown (Scope 1 and 2 only).

[22] *CAN/CSA ISO 14064-1 Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals.* March 2006, International Standards Organization.

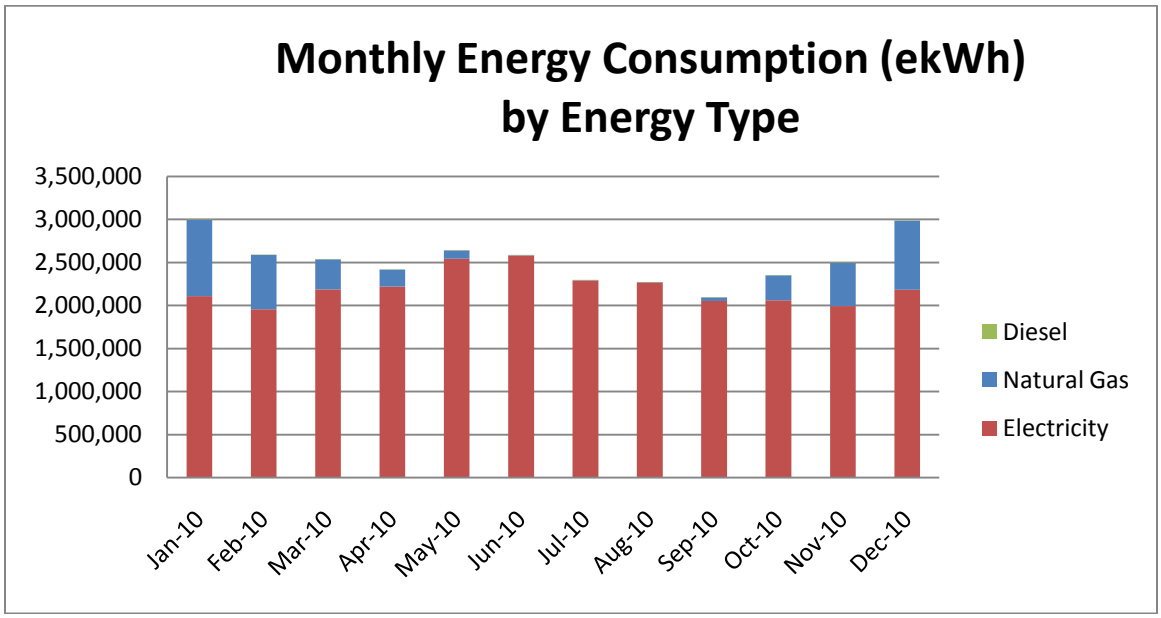

Figure 4: Energy Consumption Breakdown
Annual Energy Consumption is approximately 30,254,357 ekWh

Note also the lack of natural gas use from May 2010 – September 2010. This is due to natural gas only being used for heating purposes (Section 3.2.1).

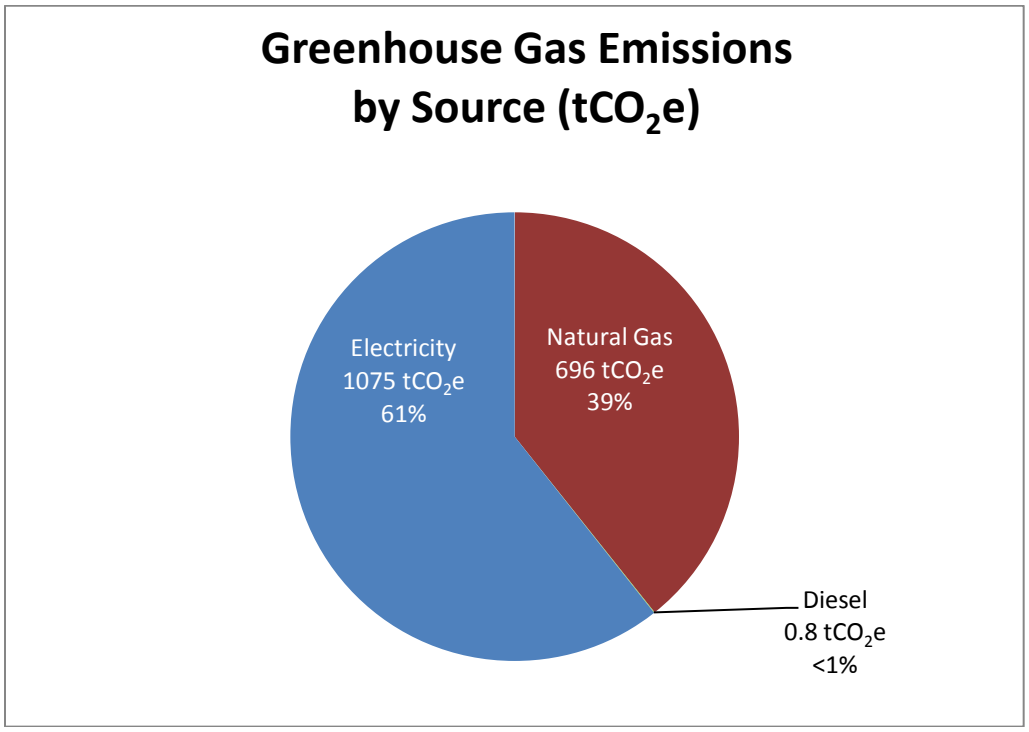

Figure 5: Greenhouse Gas Breakdown
Annual GHG emissions are 1,772 tonnes CO_2e

With a carbon intensity of 5.4 kg CO_2e/ ft^2, MEC 4's carbon footprint is lower than the average of other office buildings/portfolios in Mississauga and Toronto that Loop has worked with. Within the buildings reviewed, Loop has observed a range of carbon intensities between 4.4 kg CO_2e/ ft^2 and 10.3 kg CO_2e/ft^2., averaging at 6.4 kg CO_2e/ ft^2.

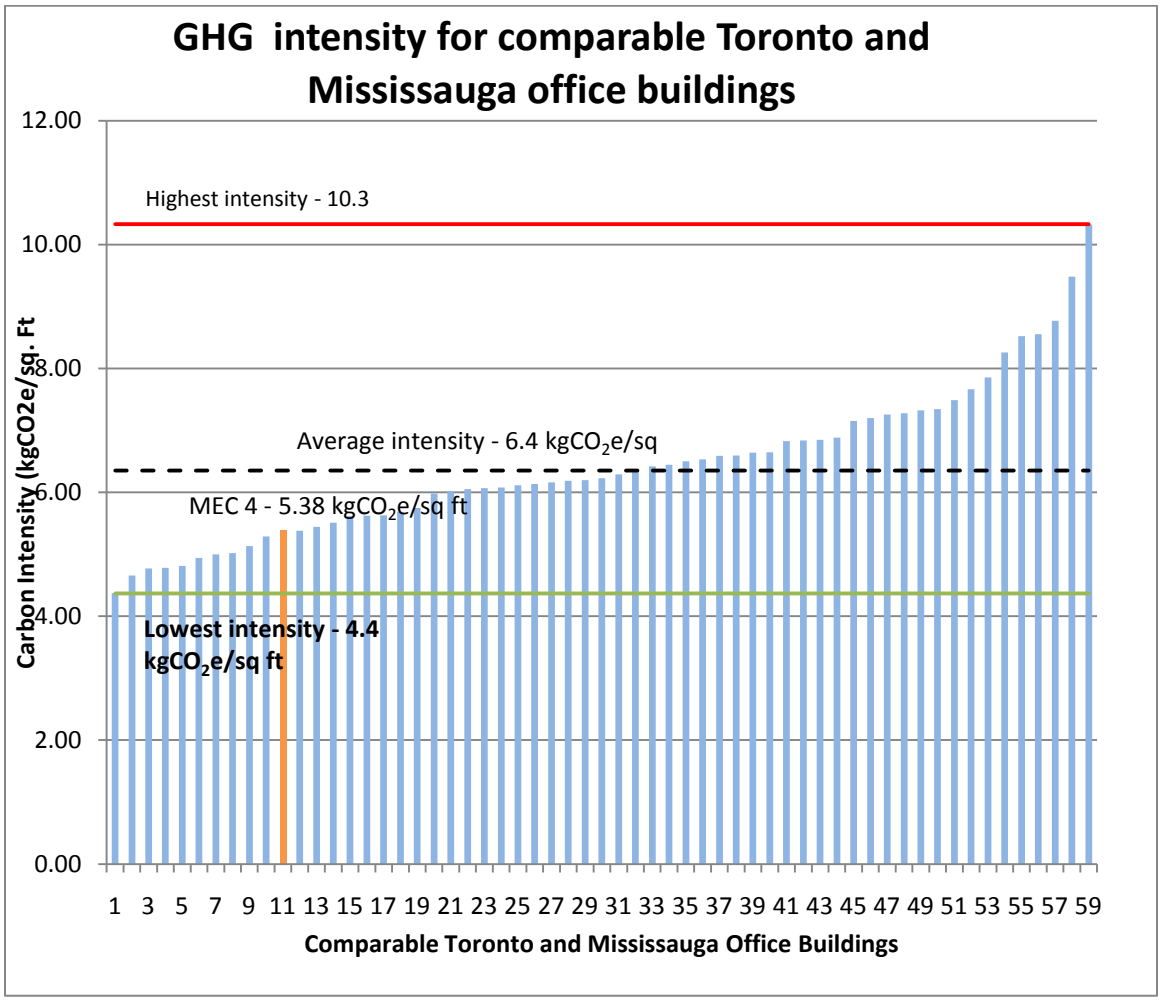

Figure 6: GHG Intensity for Comparable Mississauga and Toronto Office Buildings[23]

[23] Halsall Associates Ltd./Loop Initiatives Inc. Energy and Carbon database (2006-2009). Data is not weather normalized. Intensity is calculated using the Energy Star™ definition of gross floor area.

5.1.2 Tenant Commuting Emissions

Employee commuting at MEC 4 results in the emission of 2,324 tonnes of CO_2e per year, equating to an emissions intensity of 2.7 tCO_2e per full time employee.

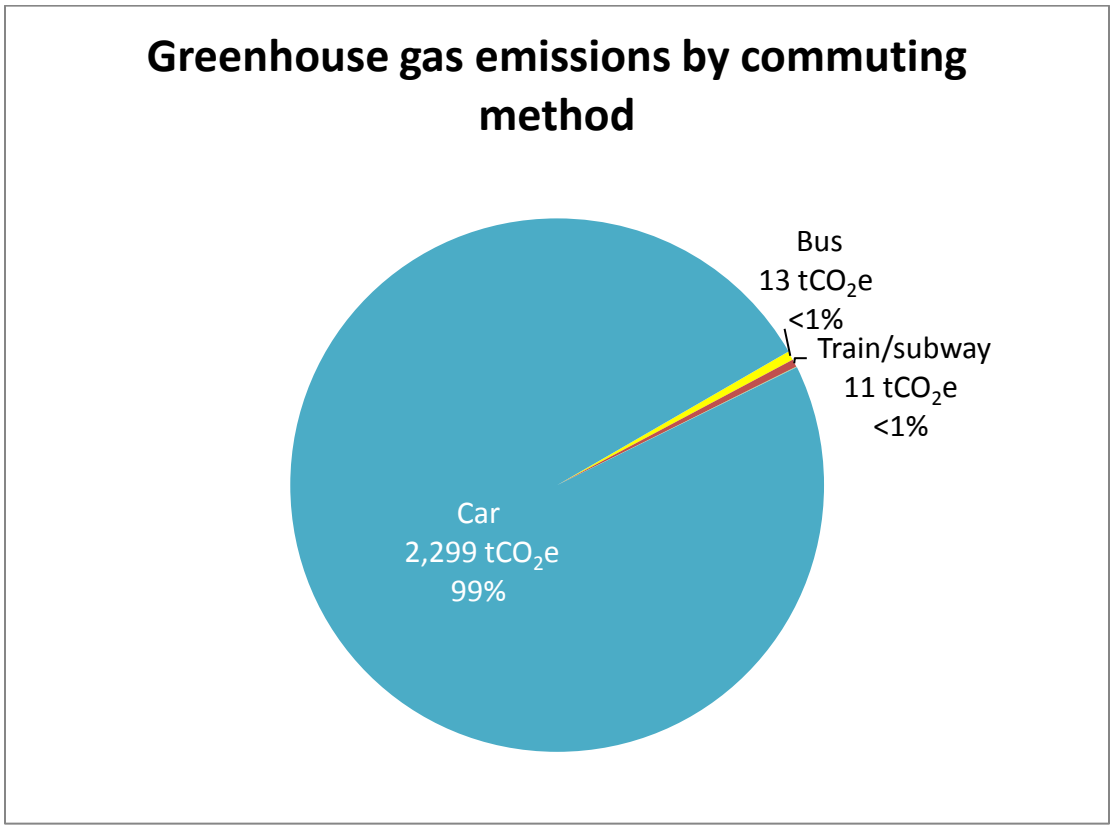

Figure 4: Breakdown of emissions from employee commuting by commuting method

Emissions from employee commuting were largely from car use. 96% of employee commuting was by car, accounting for 99% of commuting emissions. 3.5% of employee travel was by subway and bus, accounting for 1% of commuting emissions. The impact of taxi travel was small, accounting for less than 1% of commuting emissions.

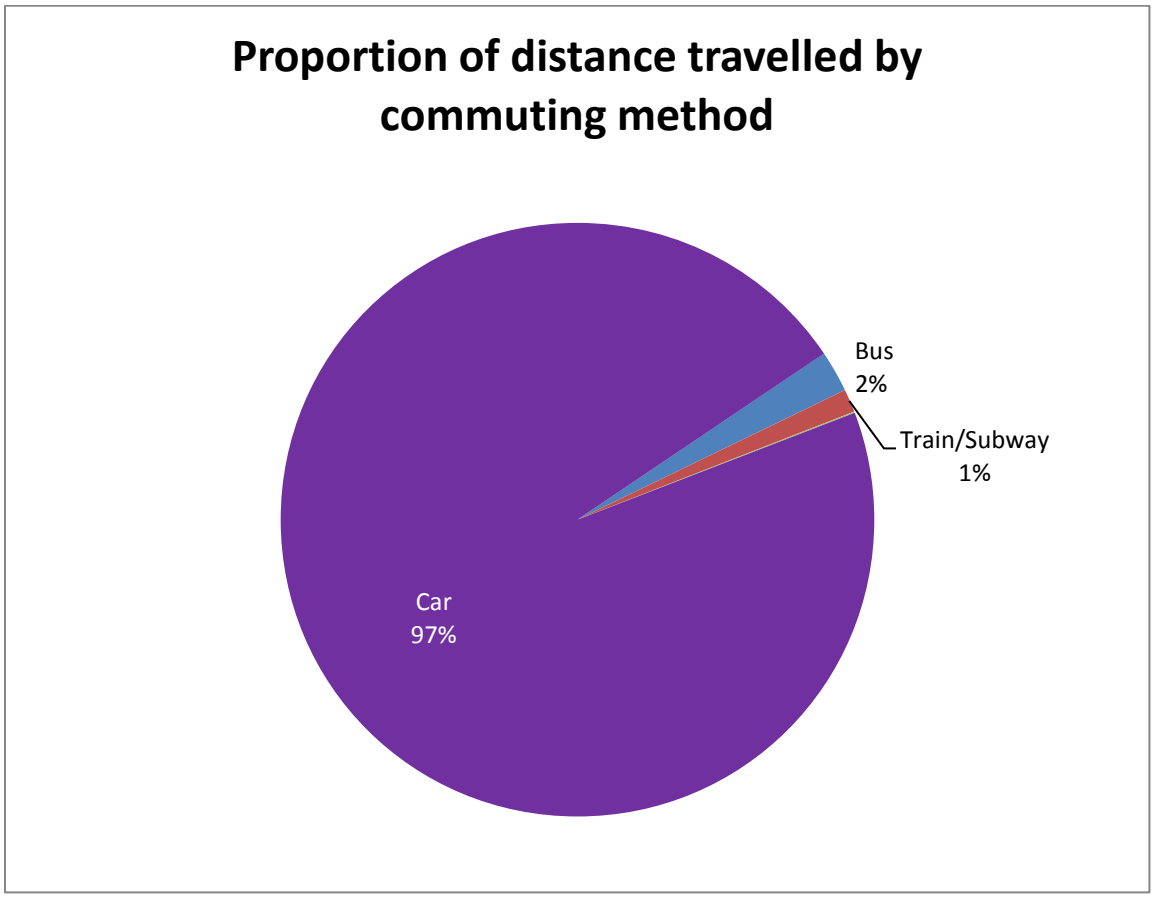

Figure 5: Breakdown of emissions from employee commuting by commuting method

Employee commuting is responsible for 57% of the total greenhouse gas emissions at the MEC 2 site. In the following figure (Figure 5) Scope 3 emissions are employee commuting emissions, whereas Scopes 1 and 2 both relate to building energy use. This proportion of Scope 3 emissions is consistent with other organizations' GHG inventories, which include building and employee commuting emissions in their inventories.

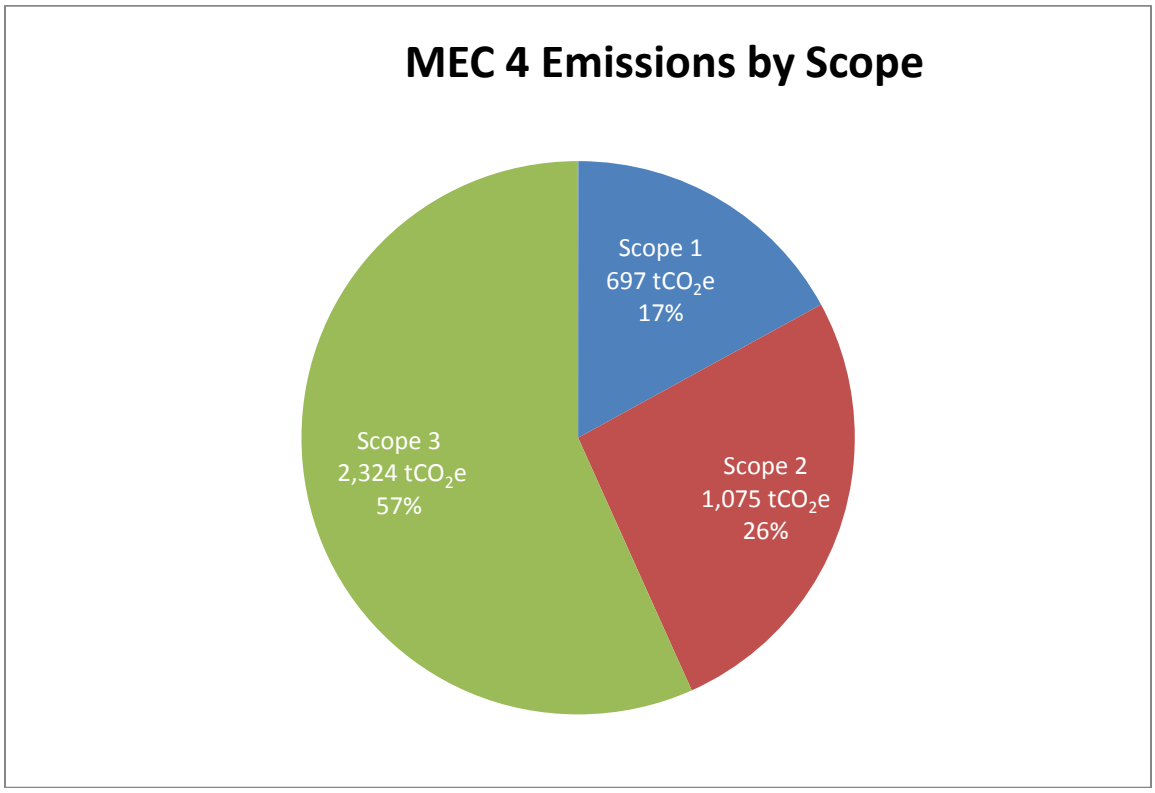

Figure 6: Breakdown of emissions by Scope

5.2 Activities to Reduce GHG Emissions

GHG reduction strategies for this facility have focused on energy measures. In MEC 4's current baseline, implemented energy saving retrofits have resulted in energy and carbon reductions compared to the previous years. An emissions reduction of approximately 165.3 tonnes of CO_2e (9%) was calculated between the January 2010 – December 2010 reporting year and the 2007 calendar year.

CFMS prepared a LEED retro-commissioning plan in which several strategies for energy conservation have been recommended. Oxford has not yet decided which measures will be implemented in the future. The suggested strategies include:

- Adjusting the make-up air unit time of day schedule
- Adjusting the compartment units time of day schedule
- Adjusting lighting controls
- Lighting control system upgrade
- Boiler replacement
- Main Make-up air unit replacement

In addition, as noted in section 5.1.2, a large share of the MEC 2 GHG inventory comes from automobile transport. Subsequently, emissions can be reduced by employee commuting initiatives, such as awareness programs about carpooling (e.g. "SmartCommute") and transit options, and providing bicycle storage and change room areas.

5.3 Estimation of Uncertainty[24]

Table 3 presents our opinion of the level of uncertainty related to this GHG inventory. Our opinion of uncertainty is based on *Table 3: Certainty Ranking for Common Emission Sources*, found in "Measurement and Estimation Uncertainty of GHG Emissions" by the Greenhouse Gas Protocol Initiative.

Table 3 – Uncertainty Ranking

Major Emission Category	Certainty Ranking
Natural Gas	High – The meter is calibrated and verified by Enbridge Gas. Natural gas emission factors are less dependent on location and are almost always standard and accurate. Uncertainty may be derived from fluctuations in measurement equipment.
Refrigerant	High – Refrigerant leakage has not been included since R-123 is a refrigerant that has been identified as not having a GWP by the UN's IPCC.
Diesel	Poor- The only data provided was an annual figure for 2009 provided by Oxford. They confirmed that similar usage patterns occurred during the reporting year. No bills or other evidence were provided to verify this figure. To obtain an estimate of monthly usage it was assumed diesel consumption was evenly distributed throughout the year.
Electricity	Fair – The emission factor is based on an annual provincial grid average, containing multiple fuel sources such as coal, natural gas, hydro and nuclear.
Employee Commuting	Fair – The survey data included a 49% sample of employees. The emission factors are based on National and North American average data from the WRI and from Canada's National Inventory Report.

[24] *Measurement and Estimation Uncertainty of GHG Emissions.* 2003, The Greenhouse Gas Protocol Initiative.

6 GHG INVENTORY QUALITY MANAGEMENT

6.1 GHG Information Management

In an effort to develop a credible GHG inventory, roles and responsibilities were assigned to ensure consistency, accuracy, completeness, transparency and conformance with CAN/CSA-ISO Standard 14064-1-06.

Name	Role	Company
Wade Warner	Operations Manager	Oxford Properties [25]

Responsibilities:

- To provide Halsall/Loop with required energy data (via utility bills);
- To provide Halsall with refrigerant data information; and,
- To approve and sign the CSA CleanStart™ Registry application form.

Name	Role	Company
Doug Webber	Project Principal	Halsall Associates[26]
Emma Rohmann	Project Manager	Halsall Associates
Ryan Zizzo	Project Associate	Halsall Associates
Aislinn McCarry	Project Associate, Energy	Halsall Associates

Responsibilities:

- To provide Loop with required energy data (via utility bills); and,
- To provide Loop with refrigerant data information.

Name	Role	Company
Francisca Quinn	Project Director	Loop Initiatives
Jia Shin	Project Manager	Loop Initiatives
Caryn Levin	Project Analyst	Loop Initiatives
Jennifer Hearn	Project Analyst	Loop Initiatives

Responsibilities:

- To request and analyze received activity data for acceptable accuracy;
- To collect appropriate emission factors and perform GHG calculations; and
- To produce a report consistent with both the CSA CleanStart™ Registry requirements and CAN/CSA-ISO Standard 14064-1-06.

[25] Oxford is the Owner's Representative
[26] Halsall is the LEED-EB Consultant for MEC 4

Name	Role	Company
Evan Jones	Independent Verifier	3P Analysis and Consulting

Responsibilities:

- To verify that Loop Initiative's 14064-1 report meets CSA CleanStart™ Registry requirements and CAN/CSA-ISO Standard 14064-3-06; and
- To issue a verification statement.

6.2 Document Retention and Record Keeping

The following activities, conducted by the property management company, maintain credible GHG inventory and reporting:

- Oxford compiles a record of MEC 4's utility bills and maintains them through spreadsheet tracking. This has a dual purpose in that it tracks both energy and operating costs.

This is the first year that Oxford calculates and publically registers MEC 4's greenhouse gas emissions. This inventory contains emission factors, January 2010 to December 2010 activity data, refrigerant history, GHG emissions and other important information. Oxford should keep this GHG inventory report for their records, should they choose to register MEC 4 or other organizations within MEC 4 next year with the CSA CleanStart™ Registry.

7 ORGANIZATION'S ROLE IN VERIFICATION ACTIVITIES

Evan Jones from 3P Analysis and Consulting was engaged to provide independent third party verification as per CAN/CSA-ISO Standard 14064-3-06. The verification is to be completed at a reasonable level of assurance.

Loop Initiatives prepared for MEC 4's verification by:

- Engaging a third party verifier to provide a reasonable level of assurance;
- Agreeing to verification objectives, scope, materiality and criteria with the verifier;
- Reviewing each section using the CSA Registry checklist; and
- Using an internal review process for quality control of the inventory and the document.

Third party verification is required by LEED EB. This provides an impartial and objective review of the reported GHG emissions.

Reporting content summary for declarations to the CSA standard is presented in Appendix D.

We hope this report meets your expectations and will assist Oxford in successfully managing your ongoing efforts to reduce GHG emissions. Loop Initiatives would be pleased to contribute further if you wish, by proceeding with a GHG reduction plan.

Please do not hesitate to contact us at (416) 644-0625.

Yours truly,
LOOP INITIATIVES

Jia Shin, M.Sc.(Eng.), P.Eng., LEED AP
Project Manager

Francisca Quinn, M. Sc.
Project Director

APPENDIX A – GREENHOUSE GAS INVENTORY, MEC 2

1. Scope 1 and 2 Emissions

Table A1.1 – Summary by Source (Building Energy) Greenhouse Gas Inventory (January 2010 to December 2010) – Base Year

Source and Fuel	Quantity of Activity	Activity Unit	Emissions (t CO_2e)
DIRECT GHG EMISSIONS			
Natural Gas			
Jan-10	82,715	m^3	156
Feb-10	58,152	m^3	110
Mar-10	32,708	m^3	62
Apr-10	23,617	m^3	45
May-10	10,442	m^3	20
Jun-10	1,286	m^3	2
Jul-10	391	m^3	1
Aug-10	931	m^3	2
Sep-10	4,326	m^3	8
Oct-10	30,036	m^3	57
Nov-10	45,894	m^3	87
Dec-10	63,421	m^3	120
Total Natural Gas	**353,919**	**m^3**	**669**
Diesel			
	1,395	L	**4**
ENERGY INDIRECT EMISSIONS			
Electricity - Mixed Fossil Fuels			
Jan-10	559,189	kWh	113
Feb-10	500,474	kWh	101
Mar-10	583,182	kWh	117
Apr-10	579,147	kWh	117
May-10	626,465	kWh	127
Jun-10	638,871	kWh	129
Jul-10	705,077	kWh	142
Aug-10	707,979	kWh	143
Sep-10	647,340	kWh	130
Oct-10	623,160	kWh	126
Nov-10	615,304	kWh	124
Dec-10	606,851	kWh	122
Total Electricity	**7,393,038**	**kWh**	**1,489**
TOTAL OFFICE EMISSIONS			**2,162**
CARBON INTENSITY			6.84 **kg CO_2e / sq. ft.**
			1.21 **t CO_2e /full time Occupant**

Table A1.2 – Summary by Emission Type (Building Energy) Greenhouse Gas Inventory
(January 2010 to December 2010) – Base Year

Source and Fuel	Quantity of Activity	Activity Unit	Emissions (t CO_2e)	Emissions (t CO_2)	Emissions (t CH_4)	Emissions (t N_2O)
DIRECT GHG EMISSIONS						
Natural Gas						
Total Natural Gas	**353,919**	**m^3**	**669**	**665**	**0.01**	**0.01**
Diesel						
Total Diesel	**1,395**	**L**	**3.89**	**3.71**	**0.00**	**0.00**
ENERGY INDIRECT EMISSIONS						
Electricity – Mixed Fossil Fuels						
Total Electricity	**7,393,038**	**kWh**	**1,489**	**1,479**	**0.07**	**0.03**
TOTAL emissions			**2,162**	**2,147**	**0.09**	**0.04**

2. Scope 3 Emissions

Table A2.1 – Summary by Commuting Type Greenhouse Gas Inventory
(January 2010 to December 2010, Based on survey June 2010)

Commuting Type	Quantity of Activity	Activity Unit	Emissions (t CO_2e)
Bus	580,389	km	38.65
Subway or Light Rail	247,190	km	25.14
Taxi	2,847	km	0.42
Car Highway	30,345	km	5.63
Car City	4,317,225	km	1,222.96
TOTAL Emissions (536 employees)			1,292.81
TOTAL Emissions per FTE			2.41
TOTAL Emissions (1780 employees)			**4,293.29**

3. Combined Emissions – Scopes 1, 2 and 3

Table A3.1 – Summary by Scope Greenhouse Gas Inventory
(January 2010 to December 2010)

Emissions Scope	Emissions (t CO_2e)	Proportion of emissions
Scope 1	673.0	10.4%
Scope 2	1,489.3	23.1%
Scope 3	4,293.3	66.5%
TOTAL emissions	6,455.6	100.0%

APPENDIX B – GREENHOUSE GAS INVENTORY, MEC 4

1. Scope 1 and 2 Emissions

Table B1.1 – Summary by Source Greenhouse Gas Inventory (January 2010 – December 2010) - Base Year

Source and Fuel	Quantity of Activity	Activity Unit	Emissions (t CO_2e)
DIRECT GHG EMISSIONS			
Natural Gas			
Jan-10	85,759	m^3	162
Feb-10	61,177	m^3	116
Mar-10	33,881	m^3	64
Apr-10	19,078	m^3	36
May-10	9,419	m^3	18
Jun-10	330	m^3	1
Jul-10	310	m^3	1
Aug-10	304	m^3	1
Sep-10	3,837	m^3	7
Oct-10	27,921	m^3	53
Nov-10	48,447	m^3	92
Dec-10	77,854	m^3	147
Total Natural Gas	**368,317**	**m^3**	**696**
Diesel			
Total Diesel	**300**	**L**	**1**
ENERGY INDIRECT EMISSIONS			
Electricity - Mixed Fossil Fuels			
Jan-10	494,151	kWh	100
Feb-10	446,213	kWh	90
Mar-10	444,488	kWh	90
Apr-10	387,374	kWh	78
May-10	419,064	kWh	84
Jun-10	445,556	kWh	90
Jul-10	521,105	kWh	105
Aug-10	498,388	kWh	100
Sep-10	423,964	kWh	85
Oct-10	394,214	kWh	79
Nov-10	381,905	kWh	77
Dec-10	479,573	kWh	97
Total Electricity	**5,335,996**	**kWh**	**1,075**
TOTAL OFFICE EMISSIONS			**1,772**
CARBON INTENSITY			**5.4 kg CO_2e / sq. ft.**
			2.1 t CO_2e / Occupant

Table B1.2 – Summary by Emission Type Greenhouse Gas Inventory (January 2010 – December 2010) – Base Year

Source and Fuel	Quantity of Activity	Activity Unit	Emissions (t CO_2e)	Emissions (t CO_2)	Emissions (t CH_4)	Emissions (t N_2O)
DIRECT GHG EMISSIONS						
Natural Gas						
Total Natural Gas	**368,317**	**m^3**	**696**	**692**	**0.014**	**0.013**
Diesel						
Total Diesel	**300**	**L**	**0.84**	**0.80**	**0.00**	**0.00**
ENERGY INDIRECT EMISSIONS						
Electricity - Mixed Fossil Fuels						
Total Electricity	**5,335,996**	**kWh**	**1075**	**1,067**	**0.05**	**0.02**
TOTAL emissions			**1,772**	**1,760**	**0.07**	**0.03**

2. Scope 3 Emissions

Table B2.1 – Summary by Commuting Type Greenhouse Gas Inventory (January 2010 to December 2010, Based on survey June 2010)

Fuel Type and Location	Quantity of Activity	Activity Unit	Emissions (t CO_2e)
Bus (Employee Commute)	93,045	km	6.20
Subway or Light Rail (Employee Commute)	51,566	km	5.25
Taxi	2,376	km	0.35
Car Highway	11,143	km	2.07
Car City	3,947,533	km	1,118.24
TOTAL Emissions (420 employees)			1,132.10
TOTAL Emissions per FTE			2.70
TOTAL Emissions (862 employees)			**2,323.50**

3. Combined Emissions – Scopes 1, 2 and 3

Table B3.1 – Summary by Scope Greenhouse Gas Inventory (January 2010 to December 2010)

Emissions Scope	Emissions (t CO_2e)	Proportion of emissions
Scope 1	697.2	17.0%
Scope 2	1,074.9	26.2%
Scope 3	2,323.5	56.7%
TOTAL emissions	4,095.6	100.0%

APPENDIX C – ACTIVITY DATA AND EMISSION FACTORS

ACTIVITY DATA

Activity data was collected by Loop Initiatives using the methodology summarized in Table C1.

Table C1 – Activity Data

Activity Data	Collection Methodology
Natural Gas	Halsall submitted MEC 2 and 4's Enbridge Gas monthly utility bills to Loop Initiatives on behalf of Oxford.
Refrigerant	Halsall provided the number of chillers and their respective refrigerant charge as well as information indicating that no PFC's or SF_6 exist on the premises. This was provided to Loop Initiatives on behalf of Oxford. Note the type of refrigerant used by the chillers is a refrigerant that has been identified as not having a GWP by the UN's IPCC.
Diesel	Halsall submitted 2009 diesel usage data to Loop Initiatives on behalf of Oxford along with confirmation that usage habits had not changed since then.
Electricity	Halsall submitted MEC 2 and 4's EnerSource electricity monthly utility bill to Loop Initiatives on behalf of Oxford.
Employee Commuting	Halsall provided building tenants' employee commuters data on behalf of Oxford. The data was provided as results of a Commuting Survey conducted by Advitek, a market research company. An annual working time of 49 weeks was used in order to account for vacation time and statutory holidays.

EMISSION FACTORS

Table C2 summarizes the emission factors and sources used in the calculations completed for the Oxford MEC 2 and 4 GHG inventory.

Table C2 – Emission Factors

Emission Source	Emission Factor	Source of Emissions Factor
Natural gas (Carbon Dioxide) (Ontario)	1.879 kg/m^3	Canada's National Inventory Report, 2010, Part 2, Annex 8, Table A8-1
Natural gas (Methane) (Residential, Construction, Commercial, Institutional and Agricultural)	0.037 g/m^3	Canada's National Inventory Report, 2010, Part 2, Annex 8, Table A8-2
Natural gas (Nitrous Oxide) (Residential, Construction, Commercial, Institutional and Agricultural)	0.035 g/m^3	Canada's National Inventory Report, 2010, Part 2, Annex 8, Table A8-2
Diesel (Carbon Dioxide)	2663 g CO_2/L	Canada's National Inventory Report, 2010, Part 2, Annex 8, Table A8-4
Diesel (Methane)	0.133 g CH_4/L	Canada's National Inventory Report, 2010, Part 2, Annex 8, Table A8-4
Diesel (Nitrous Oxide)	0.4 g $N_2$0/L	Canada's National Inventory Report, 2010, Part 2, Annex 8, Table A8-4
Electricity (Carbon Dioxide) (Ontario): 2007	200 g CO_2/kWh	Canada's National Inventory Report, 2010, Part 3, Annex 13, Table A13-7 (most recent year: 2007)
Electricity (Methane) (Ontario): 2007	0.01 g CH_4/kWh[4]	Canada's National Inventory Report, 2010, Part 3, Annex 13, Table A13-7 (most recent year: 2007)
Electricity (Nitrous Oxide) (Ontario): 2007	0.004 g N_2O /kWh[4]	Canada's National Inventory Report, 2010, Part 3, Annex 13, Table A13-7 (most recent year: 2007)
Car (Carbon Dioxide)	2.29 kg CO_2/L	National Inventory Report 1990-2008, Annex 8, A8-11, written in 2010
Car (Methane)	0.00012 kg CH_4/L	National Inventory Report 1990-2008, Annex 8, A8-11, written in 2010
Car (Nitrous Oxide)	0.00016 kg N_2O /L	National Inventory Report 1990-2008, Annex 8, A8-11, written in 2010
Bus (Carbon Dioxide)	0.066 kg CO_2/km	WRI compilation of emission factors used in the cross-sector tool V1.0 July 2009, Table 13
Bus (Methane)	0.00037 g CH_4/km	WRI compilation of emission factors used in the cross-sector tool V1.0 July 2009, Table 13

Emission Source	Emission Factor	Source of Emissions Factor
Bus (Nitrous Oxide)	0.00031 g N_2O/ km	WRI compilation of emission factors used in the cross-sector tool V1.0 July 2009, Table 13
Subway (Carbon Dioxide)	0.10 kg CO_2/km	WRI compilation of emission factors used in the cross-sector tool V1.0 July 2009, Table 13
Subway (Methane)	0.0025 g CH_4/km	WRI compilation of emission factors used in the cross-sector tool V1.0 July 2009, Table 13
Subway (Nitrous Oxide)	0.0012 g N_2O/ km	WRI compilation of emission factors used in the cross-sector tool V1.0 July 2009, Table 13
Taxi (Carbon Dioxide)	0.14 kg CO_2/km	WRI compilation of emission factors used in the cross-sector tool V1.0 July 2009, Table 13
Taxi (Methane)	0.012 g CH_4/km	WRI compilation of emission factors used in the cross-sector tool V1.0 July 2009, Table 13
Taxi (Nitrous Oxide)	0.013 g N_2O/ km	WRI compilation of emission factors used in the cross-sector tool V1.0 July 2009, Table 13
Carbon Dioxide Conversion (100-yr)	1	CAN/CSA ISO 14064-1 Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals. Annex C. March 2006, International Standards Organization.
Methane Conversion (100-yr)	21	
Nitrous Oxide Conversion (100-yr)	310	

APPENDIX D – STANDARD REPORTING DECLARATION

1 REPORTING INFORMATION

The following tables provide a summary of the reporting information required by CAN/CSA-ISO Standard 14064-1-06 provided in the "declaration" column in Oxford's assertion for MEC 2 and 4's inventory.

Note: This GHG inventory report is the first GHG inventory report issued by Oxford for MEC 2 and 4.

Table D1 – Reporting Information, MEC 2

No.	CSA Reporting Requirement	Declaration
A	Description of the reporting organization.	Oxford is the property management company for MEC2. Oxford is registered in the Canadian Green Building Council's LEED-EB Program and is targeting LEED-EB Energy and Atmosphere credit 6: Emission Reduction Reporting. As part of Oxford's initiative to green this 15 floor facility, they are reporting the MEC 2 greenhouse gas ("GHG") emissions with the CSA Registry. MEC 2 emits GHG's through their use of natural gas, diesel and electricity. The total gross floor area of the building is approximately 315,919 sq. ft. (excluding the parking) and the building occupancy is approximately 1780 people. In addition, they have reported on GHG emissions associated with building tenants' employee commutes in order to achieve an innovation credit.
B	Person responsible	Francisca Quinn, Project Director and Agent to Wade Warner, Operations Manager at MEC 2.
C	Reporting period covered	January 2010 to December 2010
D	Documentation of organizational boundary.	"Physical facility approach" defined by the LEED-EB Canada Energy and Atmosphere credit 6 Emissions Reduction Reporting Program; this is a different consolidation methodology than typically defined, but is still within CSA/ISO14064-1guidelines.
E	Direct GHG emissions, quantified separately for each GHG, in tonnes of CO_2e.	See Appendix A.

No.	CSA Reporting Requirement	Declaration
F	A description of how CO_2 emissions from the combustion of biomass are treated in the GHG inventory.	Not applicable to this inventory.
G	If quantified, GHG removals, quantified in tonnes of CO_2e.	Not applicable to this inventory.
H	Explanation for the exclusion of any GHG sources or sinks from quantifications.	This inventory includes all energy indirect GHG emissions. GHG sinks are not applicable to this inventory.
I	Energy indirect GHG emissions associated with the generation of imported electricity, heat or steam, quantified separately in tonnes of CO_2e.	See Appendix A.
J	The historical base year selected and the base-year GHG inventory.	Base year: January 2010 to December 2010 This base year for the CSA CleanStart Registry was chosen due to the performance period requirements of the Canadian Green Building Council LEED-program. It is a starting point for potential future GHG inventories. See Appendix A for the CSA CleanStart Registry's base year GHG emission summary.
K	Explanation of any change to the base year or other historical GHG data, and any recalculation of the base year or other historical GHG inventory.	Not applicable to this inventory.
L	Reference to, or description of, quantification methodologies including reasons for their selection.	Calculations are based on GHG activity data multiplied by GHG emission factors.
M	Explanation of any change to quantification methodologies previously used.	Not applicable to this inventory.
N	Reference to, or documentation of, GHG emission or removal factors used.	See Appendix C for details.
O	Description of the impact of uncertainties on the accuracy of the GHG emissions and removals data.	Uncertainties in calculations include error margins in emissions factors and measured activity data. Emission factors were determined by the most local and credible source available at the time of reporting. Activity data is based on utility bills and survey data received by Halsall from Oxford. Based on these sources, the level of uncertainty is assumed to be fair.

No.	CSA Reporting Requirement	Declaration
P	A statement that the GHG report has been prepared in accordance with ISO Standard 14064-1.	This report has been prepared in accordance with the following standard: CAN/CSA-ISO Standard 14064-1-06 - Part 1: Specification with Guidance at the Organization Level for Quantification and Reporting of Greenhouse Gas Emissions and Removals.
Q	A statement describing whether the GHG inventory, report or assertion has been verified, including the type of verification and level of assurance achieved	Evan Jones at 3P Analysis and Consulting will provide third party verification for this GHG inventory report and will provide a reasonable level of assurance. See the third party verification report for further details.

Table D2 – Reporting Information, MEC 4

No.	CSA Reporting Requirement	Declaration
A	Description of the reporting organization.	Oxford is the property management company for MEC 4. Oxford is registered in the Canadian Green Building Council's LEED-EB Program and is targeting LEED-EB Energy and Atmosphere credit 6: Emission Reduction Reporting. As part of Oxford's initiative to green this 16 floor facility, they are reporting the MEC 4 greenhouse gas ("GHG") emissions with the CSA Registry. MEC 4 emits GHG's through their use of natural gas, diesel, and electricity. The total gross floor area of the building is approximately 329,524 sq. ft. (excluding the parking) and the building occupancy is approximately 862 people. In addition, they have reported on GHG emissions associated with building tenants' employee commutes in order to achieve an innovation credit.
B	Person responsible	Francisca Quinn, Project Director and Agent to Wade Warner, Operations Manager at MEC 4.
C	Reporting period covered	January 2010 to December 2010
D	Documentation of organizational boundary.	"Physical facility approach" defined by the LEED-EB Canada Energy and Atmosphere credit 6 Emissions Reduction Reporting Program; this is a different consolidation methodology than typically defined, but is still within CSA/ISO14064-1guidelines.

No.	CSA Reporting Requirement	Declaration
E	Direct GHG emissions, quantified separately for each GHG, in tonnes of CO_2e.	See Appendix B.
F	A description of how CO_2 emissions from the combustion of biomass are treated in the GHG inventory.	Not applicable to this inventory.
G	If quantified, GHG removals, quantified in tonnes of CO_2e.	Not applicable to this inventory.
H	Explanation for the exclusion of any GHG sources or sinks from quantifications.	This inventory includes all energy indirect GHG emissions. GHG sinks are not applicable to this inventory.
I	Energy indirect GHG emissions associated with the generation of imported electricity, heat or steam, quantified separately in tonnes of CO_2e.	See Appendix B.
J	The historical base year selected and the base-year GHG inventory.	Base year: January 2010 to December 2010 This base year for the CSA CleanStart Registry was chosen due to the performance period requirements of the Canadian Green Building Council LEED-program. It is a starting point for potential future GHG inventories. See Appendix B for the CSA CleanStart Registry's base year GHG emission summary.
K	Explanation of any change to the base year or other historical GHG data, and any recalculation of the base year or other historical GHG inventory.	Not applicable to this inventory.
L	Reference to, or description of, quantification methodologies including reasons for their selection.	Calculations are based on GHG activity data multiplied by GHG emission factors.
M	Explanation of any change to quantification methodologies previously used.	Not applicable to this inventory.
N	Reference to, or documentation of, GHG emission or removal factors used.	See Appendix C for details.

No.	CSA Reporting Requirement	Declaration
O	Description of the impact of uncertainties on the accuracy of the GHG emissions and removals data.	Uncertainties in calculations include error margins in emissions factors and measured activity data. Emission factors were determined by the most local and credible source available at the time of reporting. Activity data is based on utility bills received by Halsall from Oxford. Based on these sources, the level of uncertainty is assumed to be fair.
P	A statement that the GHG report has been prepared in accordance with ISO Standard 14064-1.	This report has been prepared in accordance with the following standard: CAN/CSA-ISO Standard 14064-1-06 - Part 1: Specification with Guidance at the Organization Level for Quantification and Reporting of Greenhouse Gas Emissions and Removals.
Q	A statement describing whether the GHG inventory, report or assertion has been verified, including the type of verification and level of assurance achieved	Evan Jones at 3P Analysis and Consulting will provide third party verification for this GHG inventory report and will provide a reasonable level of assurance. See the third party verification report for further details.