

100 Wellington St. W. – TD Centre Tower 3,
Toronto, Ontario

Greenhouse Gas Inventory Report

July 26, 2011



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1 SUMMARY

This report details the greenhouse gas (GHG) emissions inventory of 100 Wellington St. W. (Tower 3), Toronto, Ontario. A GHG inventory lists the sources¹ of GHG emissions and the quantity of emissions released from each source during the reporting period².

Tower 3 is owned and managed by Cadillac Fairview Corporation (Cadillac Fairview). Cadillac Fairview is registering Tower 3 in the Canada 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. Cadillac Fairview will use the data from this report to disclose the building's emissions in the CSA CleanStart™ Registry and also as part of Tower 3's LEED EB Credit EAc6 documentation package.

Loop Initiatives (Loop) is the Agent to Tower 3's property management company, Cadillac Fairview, and is responsible for the completion of Tower 3's GHG inventory and reporting in accordance with CAN/CSA-ISO Standard 14064-1-06⁴. 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 Standard⁵ 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 Tower 3 emitted 9,319 tonnes of CO₂e for the June 2010 to May 2011 reporting year. Direct GHG (Scope 1) emissions account for 1% of the reported emissions from building energy use. Energy indirect GHG (Scope 2) emissions account for 99% of the reported emissions from building energy use. Other indirect GHG emissions (Scope 3) were not reported. The emissions were

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, Canada 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.

calculated from data and other documentation collected from Cadillac Fairview and Halsall Associates Limited.

Please refer to Section 5 and Appendix A for Tower 3's detailed GHG inventory.

2 ORGANIZATION PROFILE

Tower 3, located in Toronto, Ontario and built in 1974, is a 33-storey office tower with 2 levels of underground parking. This building is owned and managed by Cadillac Fairview.

As reported by Halsall Associates Limited (Halsall), the office space gross floor area (GFA) is 673,492 ft². This includes:

- 478,046 ft.² of occupied office space;
- 103,743 ft.² of vacant office space;
- 60,000 ft.² data centre; and
- 31,703 ft.² of retail concourse.

As reported by Halsall:

"Tower 3 is located at 100 Wellington Street West, at the heart of downtown Toronto's Financial District. It is surrounded by buildings of similar size, occupancy and space-type.

Tower 3 is a 32-storey building, with one mechanical floor, one level of retail concourse below grade and two levels of underground parking.

Primary air heating is provided via district steam generated by the Enwave Corporation. Cooling is provided via district deep lake chilled water, which is also provided by Enwave.

Outdoor air is introduced and mixed with return air at the four main air handling units (AHUs) on the 33rd floor mechanical penthouse. Air is distributed to the interior zones via conditioned air from the supply air fan systems. Perimeter zones are supplied with conditioned air from the supply air fan systems as well as by constant volume induction units. The basement mechanical room services the concourse and parking levels.

The concourse level at 100 Wellington consists predominantly of food-court restaurants. The energy required for the restaurants' cooking is supplied from the tower's natural gas line provided by Enbridge."

The following figure (Figure 1) shows the breakdown of Tower 3’s tenants by industry sector:

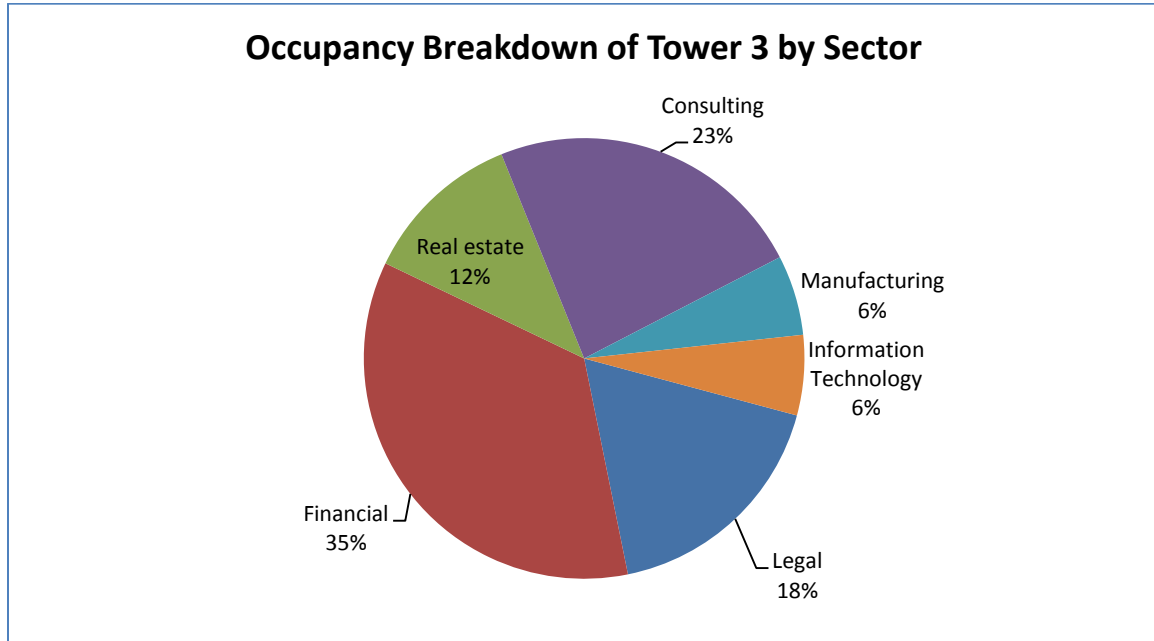


Figure 1: Sectoral Breakdown of Tenants at Tower 3 by Number of Companies

Cadillac Fairview 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, Cadillac Fairview is reporting Tower 3’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 used⁶:

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

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

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 Tower 3 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 were included in the GHG inventory without taking into consideration whether Cadillac Fairview 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.

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:

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

Energy Indirect GHG emissions:

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

Other Indirect GHG emissions:

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 transmission and distribution losses from the electricity network.

3.2.1 Direct GHG Emissions at Tower 3

Direct GHG emissions released from sources at the facility level include Tower 3's emissions from the combustion of natural gas and diesel.

Natural gas is supplied by Enbridge Gas Distribution (Enbridge). As reported in Halsall's energy breakdown calculations, natural gas is only used for cooking by restaurants in the retail-concourse.

As reported by Halsall, there are no refrigerants in use at Tower 3.

There are 5 emergency generators on site that use diesel. These were filled in June and September 2010. For the accounting year, diesel generator consumption values were provided by Cadillac Fairview.

As transportation emissions are excluded in LEED EB credit EA6, Cadillac Fairview-owned vehicles, considered direct GHG emissions, were not included in the GHG inventory.

3.2.2 Energy Indirect GHG Emissions at Tower 3

This report includes Tower 3's indirect GHG emissions inventory from electricity and imported chilled water and steam.

Electricity at Tower 3 is purchased from the Toronto Hydro Electric System (Toronto Hydro). Consumption is measured from one main meter that services four towers and is submetered for the data centre, office plug load and lighting, retail tenant electricity, domestic hot water, elevators, fans and pumps. Energy @ Work provides separate electricity consumption totals for each tower at the TD Centre complex. As reported by Halsall's energy breakdown calculations, the building's electricity breakdown is as follows:

- Data centre electricity contributes the highest load at 65%;
- Office plug loads and lighting together contribute 11%;
- Fans account for 9%;
- Domestic hot water accounts for 5%;
- Retail tenant electricity accounts for 4%;
- Elevators account for 3%; and
- Pumps account for 3%.

Chilled water at Tower 3 is purchased from the Enwave Energy Corporation (Enwave) and is used to cool the building. Chilled water consumption is measured by one meter servicing three towers, including Tower 3.

Steam at Tower 3 is purchased from Enwave and is used for building heating. Steam consumption is measured by one meter servicing four towers, including Tower 3.

3.2.3 Other Indirect GHG Emissions at Tower 3

Other indirect GHG emissions were not included as part of the GHG inventory.

3.2.4 GHG Removals and Biomass Combustion at Tower 3

GHG removals or combustion of biomass are not present at Tower 3.

3.3 History of Emissions at Tower 3

Emissions were calculated for the time period between June 1, 2010 and May 31, 2011 to meet LEED-EB's 12 month Performance Period requirement.

Since this is the first year that Tower 3 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

Direct measurement is typically not practical in cases like this. The alternate is to calculate the GHG inventory that requires two general 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.

4.1 Natural Gas

4.1.1 Activity Data

Activity data for natural gas is based on Enbridge monthly utility bills. Natural gas consumption is metered and reported by the utility in m³.

4.1.2 Emission Factor

Loop Initiatives used the National Inventory Report (1990-2008)⁸ natural gas emission factors to calculate Tower 3's GHG emissions. Ontario-specific CO₂ emission factors from Part 2, Annex 8, Table A8-1 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.

Since CH₄ and N₂O emissions are dependent on a specific sector rather than regional fuel properties, national commercial CH₄ and N₂O data from Part 2, Annex 8, Table A8-2 were used.

The natural gas emission factor units are in metric tonnes of emission per m³.

4.2 Diesel

4.2.1 Activity Data

Activity data for diesel is based on 2010 consumption reports provided by Cadillac Fairview.

4.2.2 Emission Factor

Loop Initiatives used the National Inventory Report (1990-2008)⁸ diesel emission factors. The calculations used CO₂, CH₄ and N₂O emission factors from the National Inventory Report's Part 2, Annex 8, Table A8-4.

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

4.3 Electricity

4.3.1 Activity Data

Activity data for electricity is based on Toronto Hydro monthly utility bills. Electricity is provided through one main meter to Tower 3 and three other towers. Energy @ Work "shadow" bills allocate appropriate usage for Tower 3. 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.

4.3.2 Emission Factors

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

As Cadillac Fairview is reporting on only one facility in Ontario, the calculations used provincial CO₂, CH₄ and N₂O emission factors from the National Inventory Report's Part 3, Annex 13, Table A13-7.

The electricity emission factor is measured in metric tonnes of emissions 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 Tower 3.

4.4 **Chilled Water**

4.4.1 Activity Data

Activity data for chilled water is based on Enwave monthly utility bills. Chilled water is provided through one main meter to Tower 3 and two other towers. Cadillac Fairview's submeters allocate appropriate usage for each tower. Chilled water consumption is metered and reported by the utility in Ton Hours (TnHr).

4.4.2 Emission Factor

Enwave provided Loop Initiatives with an emission factor for chilled water. The emission factor was derived from August 2004 to July 2007 data. The data was provided in CO₂e/ton hour. A breakdown of CH₄ and N₂O was not provided. The chilled water emission factor units are in metric tonnes of emissions per ton hour.

Refer to Appendix B for summary of data collection sources and emission factor sources.

4.5 **Steam**

4.5.1 Activity Data

Activity data for steam is based on Enwave monthly utility bills. Steam is provided through one main meter that services Tower 3 and three other buildings. Cadillac Fairview's submeters allocated appropriate usage for each building. Steam consumption is metered and reported to the utility in pounds (lb).

4.5.2 Emission Factor

Enwave provided Loop Initiatives with an emission factor for steam. The emission factor was derived from 2003 to 2006 heating year data. The data was provided in CO₂e/Mlb. A breakdown of CH₄ and N₂O was not provided. The steam emission factor units are in metric tonnes of emissions per Mlb.

5 GHG INVENTORY COMPONENTS

5.1 Emissions

The total emissions from direct and indirect GHG emissions sources during the reporting year are 9,319 tonnes of CO_{2e}. Building electricity, steam, chilled water, natural gas and diesel account for 100% of Tower 3's reported emissions. The breakdown is as follows (Table 1):

Table 1: Emissions from Building Energy Use

Source of GHG Emissions	CO _{2e} (tonnes)	% of total
Electricity	6,325	68%
Steam	2,676	29%
Chilled Water	198	2%
Natural Gas	116	1%
Diesel	4	0%
TOTAL	9,319	100%

CO₂ emissions account for more than 99% of the total GHG emissions, while CH₄ and N₂O emissions are negligible (they account for less than 1% of total GHG emissions). However, to meet CAN/CSA-ISO 14064-1-06⁹ requirements, they have been included in the greenhouse gas inventory.

Refer to Figure 2 for the monthly energy consumption and Figure 3 for a detailed GHG breakdown.

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.

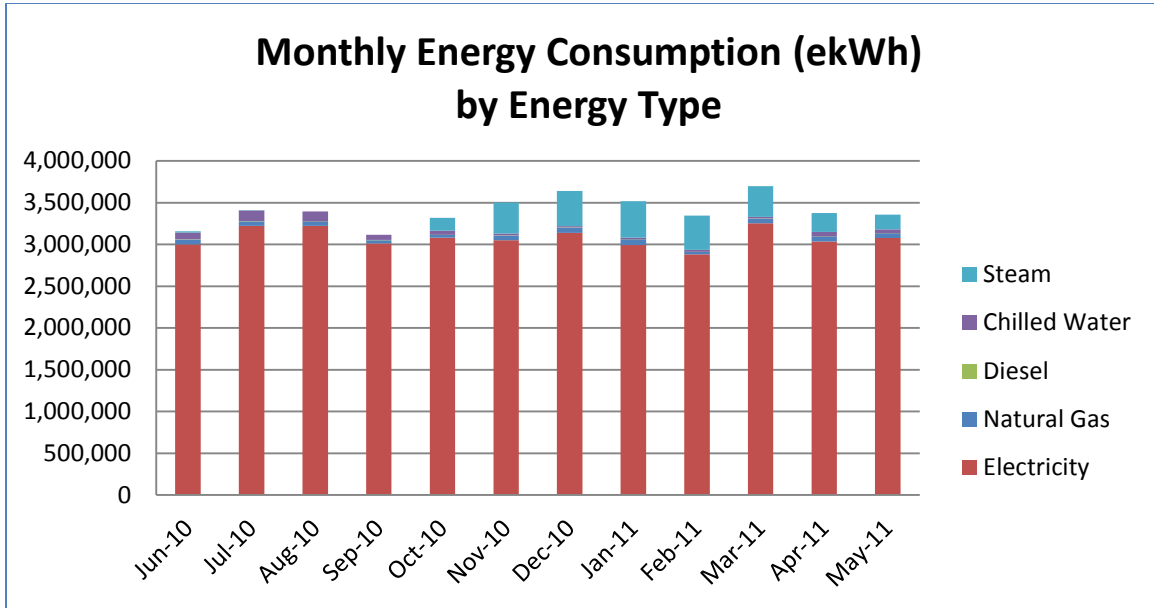


Figure 2: Energy Consumption Breakdown

Annual Energy Consumption is approximately 40,830,000 ekWh

**Note:* Electricity use is particularly high because a data centre uses 65% of the building electricity (and 50% of the building's total energy). Steam is only used between October and May for space heating purposes.

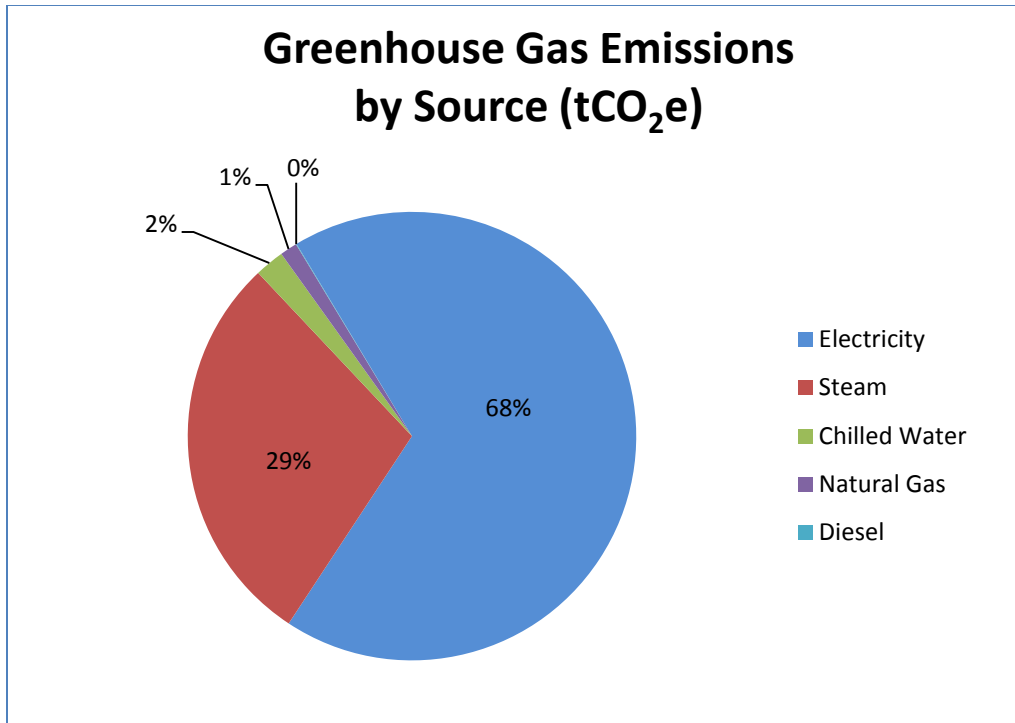


Figure 3: Greenhouse Gas Breakdown by Source
Annual GHG emissions from building energy use are 9,319 tCO_{2e}

With a carbon intensity of 13.8 kg CO_{2e}/ ft², Tower 3's carbon footprint is higher than the other office buildings in Toronto that Loop has analyzed energy and carbon intensity for. Within the Loop building database, Loop has observed a range of carbon intensities between 2.2 kg CO_{2e}/ ft² and 10.3 kg CO_{2e}/ft²., averaging 6.0 kg CO_{2e}/ ft² (Figure 4).

Tower 3's high carbon intensity can be attributed in large part to energy use from the data centre. This energy-intensive tenant accounts for 65% of the building's electricity and 50% of its total energy. Between 2009 and 2010, electricity use in the data centre increased, while base building electricity use decreased. In addition, steam consumption increased in the base building between 2009 and 2010.

GHG Intensity for Comparable Toronto Office Buildings

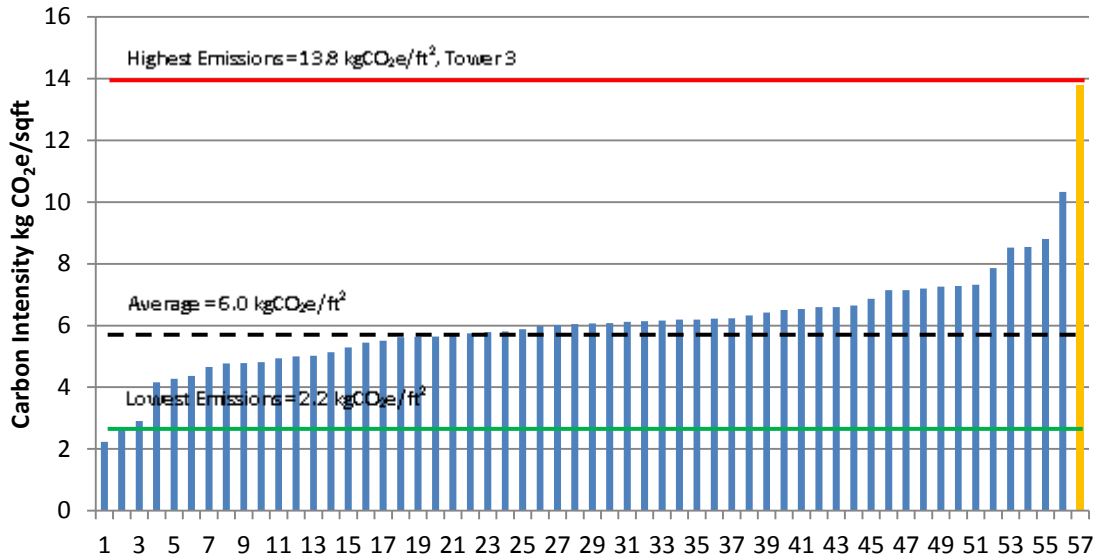


Figure 4: GHG Intensity for Comparable Toronto Office Buildings¹⁰

5.2 Emissions Excluding Data Centre Activity

As mentioned in Section 5.1, Tower 3’s data centre is the main consumer of electricity in the building. This “tenant” accounts for 65% of Tower 3’s electricity consumption and 50% of its total energy. This is not surprising as data centres have a very high demand for electricity and cooling. It is estimated that data centres consume over 0.2%¹¹ of the world production of electricity; the average data centre is expected to use as much electricity as 25,000 households¹².

If Tower 3’s data centre is removed from the building, the building’s overall carbon footprint would be reduced to 4,958 tCO₂e. The breakdown between different sources (refer to Figure 5) is now similar to its sister buildings 77 King St. W. (Tower 2) and 79 Wellington St. W. (Tower 1). Please refer to their separate reports for further details.

¹⁰ Halsall Associates Ltd. /Loop Initiatives Inc. Energy and Carbon database (2006-2011). Data is not normalized for weather or occupancy. Intensity is calculated using the Energy Star™ definition of gross floor area.

¹¹ *Revolutionizing Data Centre Energy Efficiency*. July 2008, McKinsey & Company.

¹² See previous footnote.

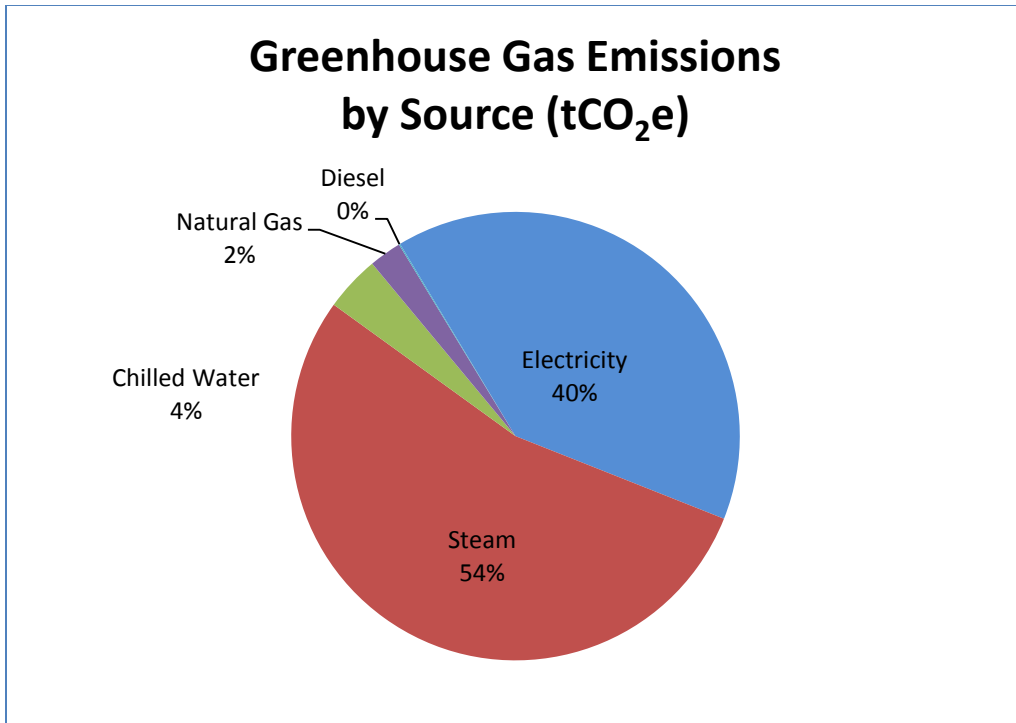


Figure 5: Greenhouse Gas Breakdown by Source, excluding data centre
Annual GHG emissions from building energy use are 4,958 tCO₂e

Tower 3's carbon intensity also decreases significantly to 8.1 kgCO₂e/ ft². While this value is still higher than the average Toronto office building in the Loop data base, the emissions quantity is more in line with expectations.

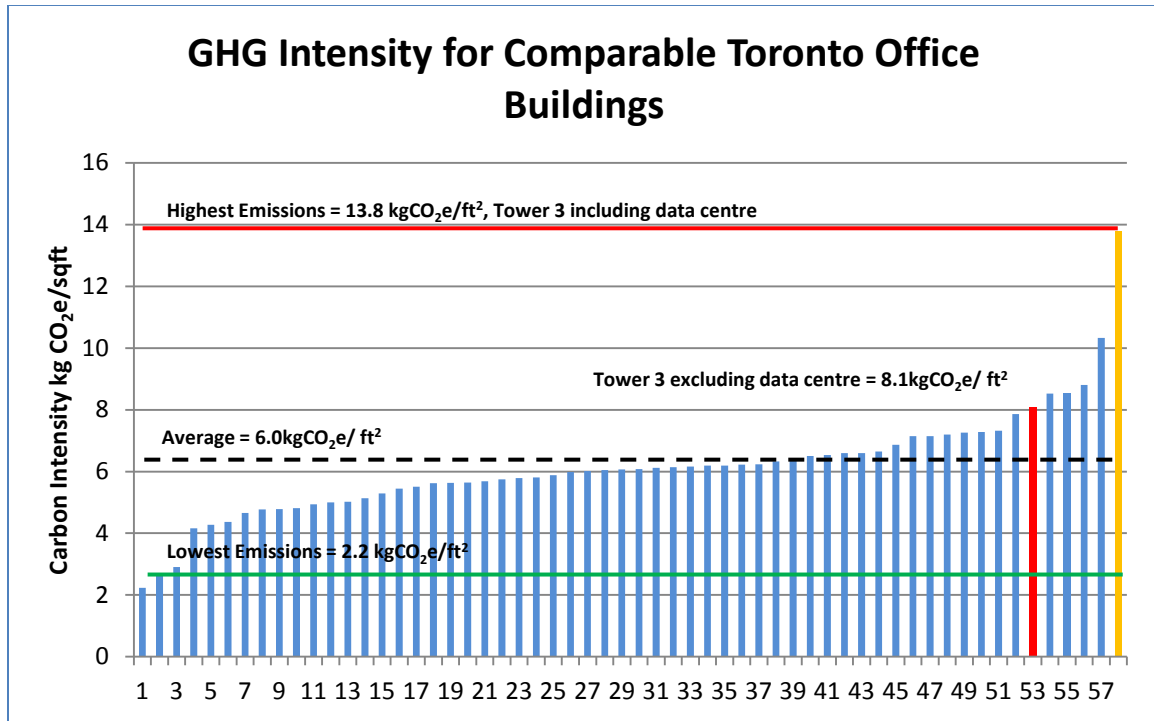


Figure 6: GHG Intensity for Comparable Toronto Office Buildings¹³

5.3 Activities to Reduce GHG Emissions

GHG reduction strategies for this facility have focused on energy measures. In Tower 3's current baseline, implemented energy saving retrofits have resulted in some energy and carbon reductions to the base building compared to the previous year. However, overall an emissions increase of approximately 560 tonnes of CO₂e (6%) was calculated between the June 1, 2010 – May 31, 2011 reporting year and the previous 12 month period.

Hunter Facilities Management (HFM) prepared an ASHRAE Level 1 Walk-Through Analysis in which several strategies for energy conservation have been recommended. Cadillac Fairview has implemented many of the recommended measures; some of the past major GHG reduction strategies include:

- Fix VFD controls to prevent cycling of pumps;
- Operate fan on normal schedule;
- Ensure that air handling units are not simultaneously heating and cooling;
- Ensure dampers can close properly; and

¹³ Halsall Associates Ltd. /Loop Initiatives Inc. Energy and Carbon database (2006-2011). Data is not normalized for weather or occupancy. Intensity is calculated using the Energy Star™ definition of gross floor area.

- Shut down steam use in summer.

Table 2 indicates the potential emissions savings of suggested strategies that have not yet been implemented.

Table 2: Carbon Saving Strategies

Building Performance Parameter	Estimated Emissions Savings	Activity Unit
Option B (if Option A not chosen): Adjust air flow rate on F-301, F-302	57	t CO ₂ e
Recover energy from condensate water (steam)	29	t CO ₂ e
Install new VFD on Domestic Water Booster Pump P320 & P321	18	t CO ₂ e
Annual Carbon Savings Implementation	104	t CO₂e

5.4 Estimation of Uncertainty¹⁴

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.
Diesel	Fair- Two diesel bills were provided for top-ups of back-up generators. 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.
Chilled Water	Fair – The emission factor was provided by the chilled water provider. Calculations and limitations of the data are unknown.

¹⁴ *Measurement and Estimation Uncertainty of GHG Emissions*. 2003, The Greenhouse Gas Protocol Initiative.

Steam	Fair – The emission factor was provided by the steam provider. Calculations and limitations of the data are unknown.
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6 GHG INVENTORY QUALITY MANAGEMENT

6.1 GHG Information Management

In an effort to maintain 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
Melissa Potter	Operations Coordinator	Cadillac Fairview ¹⁵
Jadi Wang	Manager, Tenant Projects	Cadillac Fairview

Responsibilities:

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

Name	Role	Company
Jenny McMinn	Project Principal	Halsall Associates ¹⁶
Kieran Waugh	Project Manager	Halsall Associates
Aislinn McCarry	Project Associate	Halsall Associates

Responsibilities:

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

Name	Role	Company
Francisca Quinn	Project Director	Loop Initiatives
Jia Shin	Project Manager	Loop Initiatives
Jessica Fisher	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.

¹⁵ Cadillac Fairview is the building owner and manager.

¹⁶ Halsall is the LEED-EB Consultant for Tower 3.

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

Responsibilities:

- To verify that Loop Initiatives' 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:

- Cadillac Fairview compiles a record of Tower 3's utility bills and maintains them through spreadsheet tracking. This has a dual purpose in that it tracks both energy and operating costs; and,
- This is the first year that Cadillac Fairview will calculate and register Tower 3's greenhouse gas emissions. This inventory contains emission factors, June 1, 2010 to May 31, 2011 activity data, GHG emissions and other important information. Cadillac Fairview should keep this GHG inventory report for their records, should they choose to register Tower 3 or other organizations within Tower 3 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 Tower 3'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 for 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 C.

We hope this report meets your expectations and will assist Cadillac Fairview 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

Table A1.1 – Summary by Source Greenhouse Gas Inventory
(June 2010 to May 2011) – Base Year

Source and Fuel	Quantity of Activity	Activity Unit	Emissions (t CO ₂ e)
DIRECT GHG EMISSIONS			
Natural Gas			
Jun-10	5,832	m ³	11
Jul-10	5,435	m ³	10
Aug-10	5,156	m ³	10
Sep-10	3,911	m ³	7
Oct-10	3,285	m ³	6
Nov-10	5,175	m ³	10
Dec-10	6,068	m ³	12
Jan-11	6,733	m ³	13
Feb-11	2,882	m ³	5
Mar-11	5,395	m ³	10
Apr-11	5,796	m ⁴	11
May-11	5,616	m ⁵	11
Total Natural Gas	61,284	m³	116
Diesel			
Total Diesel	1,532	L	4
ENERGY INDIRECT EMISSIONS			
Electricity - Mixed Fossil Fuels			
Jun-10	2,998,575	kWh	513
Jul-10	3,221,178	kWh	551
Aug-10	3,221,747	kWh	552
Sep-10	3,011,396	kWh	515
Oct-10	3,079,617	kWh	527
Nov-10	3,051,833	kWh	522
Dec-10	3,137,799	kWh	537
Jan-11	2,991,963	kWh	512
Feb-11	2,881,298	kWh	493
Mar-11	3,252,803	kWh	557
Apr-11	3,034,378	kWh	519
May-11	3,076,481	kWh	527
Total Electricity	36,959,068	kWh	6,325

Chilled Water			
Jun-10	282,179	TnHr	25
Jul-10	446,131	TnHr	40
Aug-10	409,706	TnHr	37
Sep-10	211,274	TnHr	19
Oct-10	179,000	TnHr	16
Nov-10	77,929	TnHr	7
Dec-10	55,057	TnHr	5
Jan-11	61,847	TnHr	6
Feb-11	73,022	TnHr	7
Mar-11	67,194	TnHr	6
Apr-11	182,612	TnHr	16
May-11	158,455	TnHr	14
Total Chilled Water	2,204,406	TnHr	198
Steam			
Jun-10	219	MIb	16
Jul-10	22	MIb	2
Aug-10	0	MIb	0
Sep-10	0	MIb	0
Oct-10	2,153	MIb	156
Nov-10	5,361	MIb	388
Dec-10	6,041	MIb	437
Jan-11	6,224	MIb	451
Feb-11	5,887	MIb	427
Mar-11	5,286	MIb	383
Apr-11	3,262	MIb	236
May-11	2,495	MIb	181
Total Steam	36,949	MIb	2,676
TOTAL EMISSIONS			9,319
CARBON INTENSITY			13.8 kg CO_{2e} / sq. ft.
			4.8 t CO_{2e} / FTE

**Table A1.2 – Summary by Emission Type Greenhouse Gas Inventory
(June 2010 to May 2011) – Base Year**

Source and Fuel	Quantity of Activity	Activity Unit	CO ₂ Emissions		CH ₄ Emissions		N ₂ O Emissions	
DIRECT GHG EMISSIONS								
Natural Gas								
Breakdown Conversion	61,284	m ³	115	tCO ₂	0.00	tCH ₄	0.00	tN ₂ O
CO ₂ e emissions	116	tCO ₂ e	115	tCO ₂ e	0.05	tCO ₂ e	0.66	tCO ₂ e
Diesel								
Breakdown Conversion	1,532	L	4	tCO ₂	0.00	tCH ₄	0.00	tN ₂ O
CO ₂ e emissions	4	tCO ₂ e	4	tCO ₂ e	0.00	tCO ₂ e	0.19	tCO ₂ e
ENERGY INDIRECT EMISSIONS								
Electricity - Mixed Fossil Fuels								
Breakdown Conversion	36,959,068	kWh	6,283	tCO ₂	0.37	tCH ₄	0.11	tN ₂ O
CO ₂ e emissions	6,325	tCO ₂ e	6,283	tCO ₂ e	7.76	tCO ₂ e	34.37	tCO ₂ e
Chilled Water								
Breakdown Conversion	2,204,406	TnHr	198	tCO ₂	0.00	tCH ₄	0.00	tN ₂ O
CO ₂ e emissions	198	tCO ₂ e	198	tCO ₂ e	0.00	tCO ₂ e	0.00	tCO ₂ e
Steam								
Breakdown Conversion	36,949	Mlb	2,675	tCO ₂	0.00	tCH ₄	0.00	tN ₂ O
CO ₂ e emissions	2,676	tCO ₂ e	2,676	tCO ₂ e	0.00	tCO ₂ e	0.00	tCO ₂ e
TOTAL Breakdown Conversion			9,276	tCO₂	0.37	tCH₄	0.11	tN₂O
TOTAL CO₂e emissions	9,319	tCO₂e	9,276	tCO₂e	7.81	tCO₂e	35.23	tCO₂e

APPENDIX B – ACTIVITY DATA AND EMISSION FACTORS

1 ACTIVITY DATA

Activity data was collected by Loop Initiatives using the methodology summarized in Table B1.

Table B1 – Activity Data

Activity Data	Collection Methodology
Natural Gas	Halsall submitted Tower 3's Enbridge Gas monthly utility bills to Loop Initiatives on behalf of Cadillac Fairview.
Diesel	Halsall submitted 2010 diesel usage data to Loop Initiatives on behalf of Cadillac Fairview. The generators have not been filled since October 2010.
Electricity	Halsall submitted Tower 3's Toronto Hydro and Energy @ Work electricity monthly utility bills to Loop Initiatives on behalf of Cadillac Fairview.
Steam	Halsall submitted Tower 3's Enwave monthly steam bills to Loop Initiatives on behalf of Cadillac Fairview.
Chilled Water	Halsall submitted Tower 3's Enwave monthly chilled water bills to Loop Initiatives on behalf of Cadillac Fairview.

2 EMISSION FACTORS

Table B2 summarizes the emission factors and sources used in the calculations completed for the Cadillac Fairview Tower 3 GHG inventory.

Table B2 – Emission Factors

Emission Source	Emission Factor	Source of Emissions Factor
Natural gas (Carbon Dioxide) (Ontario)	1,879 g/m	Canada's National Inventory Report, 2011, Part 2, Annex 8, Table A8-1
Natural gas (Methane) (Ontario)	0.037 g/m	Canada's National Inventory Report, 2011, Part 2, Annex 8, Table A8-2
Natural gas (Nitrous Oxide) (Ontario)	0.035 g/m	Canada's National Inventory Report, 2011, Part 2, Annex 8, Table A8-2
Electricity (Carbon Dioxide) (Ontario): 2008	170 g CO ₂ /kWh	Canada's National Inventory Report, 2011, Part 3, Annex 13, Table A13-7 (most recent year: 2008)
Electricity (Methane) (Ontario): 2008	0.01 g CH ₄ /kWh	Canada's National Inventory Report, 2011, Part 3, Annex 13, Table A13-7

Emission Source	Emission Factor	Source of Emissions Factor
		(most recent year: 2008)
Electricity (Nitrous Oxide) (Ontario): 2008	0.003* g N ₂ O /kWh	Canada's National Inventory Report, 2011, Part 3, Annex 13, Table A13-7 (most recent year: 2008)
Diesel (Carbon Dioxide) (Canada): 2009	2,663 g/L	Canada's National Inventory Report, 2011, Part 2, Annex 8, Table A8-4
Diesel (Methane) (Ontario): 2009	0.133 g/L	Canada's National Inventory Report, 2011, Part 2, Annex 8, Table A8-4
Diesel (Nitrous Oxide) (Ontario): 2009	0.4 g/L	Canada's National Inventory Report, 2011, Part 2, Annex 8, Table A8-4
Steam	72.4 kg CO _{2e} /Mlb	Peter Harasti, Customer Accounts Manager at Enwave Energy Corporation (Tel#: 416.338.8941)
Chilled Water	0.09 kg CO _{2e} /TnHr	Peter Harasti, Customer Accounts Manager at Enwave Energy Corporation (Tel#: 416.338.8941)
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 C – STANDARD REPORTING DECLARATION

1 REPORTING INFORMATION

The following table provides a summary of the reporting information required by CAN/CSA-ISO Standard 14064-1-06. Provided in the “declaration” column is Cadillac Fairview’s assertion for Tower 3’s inventory.

Note: This GHG inventory report is the first GHG inventory report issued from Cadillac Fairview for Tower 3.

Table C1 – Reporting Information

No.	CSA Reporting Requirement	Declaration
A	Description of the reporting organization.	Cadillac Fairview is the property management company for Tower 3. Cadillac Fairview is registered in the Canada Green Building Council’s LEED-EB Program and is targeting LEED-EB Energy and Atmosphere credit 6: Emission Reduction Reporting. As part of Cadillac Fairview’s initiative to green this 33-floor facility, they are reporting the Tower 3 greenhouse gas (“GHG”) emissions with the CSA Registry. Tower 3 emits GHGs through its use of natural gas, diesel, electricity, steam and chilled water. The total gross floor area of the building is approximately 643,920 sq. ft. (excluding parking) and the building occupancy is approximately 1,961 people.
B	Person responsible	Francisca Quinn, Project Director and Agent to Cadillac Fairview’s Melissa Potter, Operations Coordinator at Tower 3.
C	Reporting period covered	June 1, 2010 to May 31, 2011
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/ISO14064-1 guidelines.
E	Direct GHG emissions, quantified separately for each GHG, in tonnes of CO ₂ e.	See Appendix A.
F	A description of how CO ₂ emissions from the combustion of biomass are treated in the GHG inventory.	Not applicable to this inventory.

No.	CSA Reporting Requirement	Declaration
G	If quantified, GHG removals, quantified in tonnes of CO ₂ e.	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 ₂ e.	See Appendix A.
J	The historical base year selected and the base-year GHG inventory.	Base year: June 1, 2010 to May 31, 2011 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 B 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 received by Halsall from Cadillac Fairview. 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.