



180 Wellington Street West, Toronto Greenhouse Gas Inventory Report

March 2, 2015

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1 SUMMARY

Manulife Financial (Manulife) is registering 180 Wellington Street West, Toronto (180 Wellington) in the Canada Green Building Council (CaGBC) LEED Canada for Existing Building: Operations and Maintenance Program (LEED-EB) and is targeting the rating system's Energy and Atmosphere Credit 6: Emissions Reduction Reporting (EAc6)¹. To qualify for EAc6, Manulife is reporting the building's greenhouse gas (GHG) emissions in a public GHG registry.

180 Wellington is owned and managed by Manulife, which has retained HH Angus & Associates Limited (HH Angus) and Stantec to support 180 Wellington's LEED submission. Loop Initiatives (Loop) has been retained by Manulife to compile 180 Wellington's GHG inventory and corresponding reporting in accordance with *CAN/CSA-ISO Standard 14064-1-06*². Manulife and HH Angus have provided Loop with property specific information to complete the Emissions Reduction Reporting credit submission. 3P Analysis and Consulting has been engaged to provide independent third party verification of the building's GHG inventory.

This report details 180 Wellington's GHG inventory. A GHG inventory lists the sources³ of GHG emissions and the quantity of emissions released from each source during the reporting period⁴.

180 Wellington emitted 707 tonnes of CO₂e for the January 1 to December 31, 2014 reporting year. Direct GHG (scope 1) emissions account for 51% of the reported emissions from building energy use. Energy indirect GHG (scope 2) emissions account for 49% of the reported emissions. No indirect GHG emissions (scope 3) were reported. Please refer to section 6 and Appendix A for 180 Wellington's detailed GHG inventory.

The GHG inventory has been developed 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 team has consulted 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* as additional resources.

¹ *LEED Canada for Existing Buildings: Operations and Maintenance 2009 Reference Guide*. 2009, Canada Green Building Council.

² *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.

³ Examples of GHG sources include consumption of natural gas for space and water heating and electricity consumption for building system operations, lighting and plug loads.

⁴ The reporting period is defined as the one year duration for which the quantity of GHG emissions from all sources is calculated.

⁵ *Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard*. March 2004. World Resources Institute and World Business Council for Sustainable Development.

2 PURPOSE

Manulife has made a commitment to incorporate sustainability in to the ongoing operation of 180 Wellington. One important initiative is to participate in LEED-EB, which, among other performance enhancement initiatives, includes evaluating building energy and water efficiency and total GHG emissions. To achieve LEED-EB credit EAc6, Manulife is reporting 180 Wellington's verified GHG emissions to the CSA CleanStart™ Registry.

3 ORGANIZATION PROFILE

180 Wellington, located in Toronto, Ontario and originally built 1971, is a 12-storey office tower with three levels of below grade parking. The building had a major renovation in 2012 and 2013. The building is owned and operated by Manulife.

As reported by HH Angus, the office space gross floor area (GFA) is 217,000 sq.ft. (100% of GFA) and includes a small amount of kitchen and café area.

180 Wellington also has 51,000 sq. ft. of underground parking (not included in GFA).⁶

Building system characteristics that influence the energy use and GHG emissions are:

- ▶ HVAC:
 - Four central variable air volume (VAV) air handling units (AHU) provide air and water conditioning to the interior of the building.
 - AHUs are individually controlled by the building automation system (BAS).
 - Fan coil units and hydronic wall-fins condition the perimeter of the building.
- ▶ Heating:
 - Three gas-fired boilers provide heating to a primary loop.
 - A secondary loop circulates heated water through AHUs, fan coil units and radiant fins.
- ▶ Cooling:
 - Three chillers circulate cooled water through AHUs and fan coils.
- ▶ Domestic Hot Water:
 - Two boilers heat domestic hot water.
- ▶ Humidification:
 - One boiler provides steam for humidification.
- ▶ Lighting:
 - High-efficiency fluorescent lighting is installed throughout the building.
 - Lights are operated on an occupancy schedule.
 - Parking lighting⁷

180 Wellington is occupied by approximately 1,800 tenant staff members.

⁶ Gross floor area is calculated using the Energy Star™ definition, which excludes parking areas.

⁷ While parking area is not included in the gross floor area, energy associated with parking garage lighting and conditioning is included in total building energy use, as per Energy Star™ definitions. This methodology ensures that all site energy is captured and that large parking garages do not overly reduce the energy intensity of the main building.

4 GHG INVENTORY BOUNDARIES

4.1 Organizational Boundaries

For any GHG inventory, an organizational boundary is used to determine how GHG emissions are accounted for and reported. Typically, one of the following approaches is used⁸:

- ▶ Equity share approach: accounts for GHG emissions based on share of equity in the operation
- ▶ Financial control approach: accounts for GHG emissions based on the financial control over the operation
- ▶ Operational control approach: accounts for GHG emissions based on the control of operations

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 buildings rather than organizations, to meet EAc6 requirements the physical 180 Wellington building was used as a physical boundary, rather than using one of the organizational boundaries described above. As such, the emissions from the base building equipment and the tenant equipment (including HVAC energy, tenant plug loads and refrigerant GHG emissions) are included in the GHG inventory without taking into consideration whether Manulife or the tenants have control or ownership. In addition, since LEED-EB credit EAc6 does not take transportation into consideration, emissions from building owned or leased vehicles are excluded from the inventory.

4.2 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):** emissions released from sources owned or controlled by the building. They may include fuel combustion, refrigerants emissions, generation of electricity and/or steam or heat in equipment.
- ▶ **Energy Indirect GHG emissions (scope 2):** indirect emissions from the generation of purchased energy for the building. They may include the purchase of electricity, steam and/or chilled water).
- ▶ **Other Indirect GHG emissions (scope 3):** emissions that are released from activities outside the organizational boundaries of the building. They may include business travel, employee commuting, third party manufacture of materials and resources, outsourced services, and transmission and/or distribution losses from the electricity network.

4.3 Direct GHG Emissions

Direct GHG emissions released from sources at the building level include emissions from the combustion of natural gas and diesel.

Natural gas is supplied by Enbridge Gas Distribution (Enbridge). As reported in HH Angus' mechanical description, natural gas is primarily used for producing hot water, heating domestic water and producing steam for humidification.

⁸ *Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard*. March 2004. World Resources Institute and World Business Council for Sustainable Development.

There are two diesel generators on site. For the accounting year, diesel generator consumption values were provided by Manulife.

As reported by Manulife, two centrifugal chillers containing refrigerant type HFC-123 and one screw compressor chiller containing refrigerant HFC-22 are on site. HCF-123 and HFC-22 are not refrigerants that have been identified as greenhouse gases in *CAN/CSA-ISO Standard 14064-1-06* or the *WRI/WBCSD Greenhouse Gas Protocol Corporate Standard*, and have therefore not been included in the GHG inventory. Manulife also reported that there were no PFC's or SF₆'s in the building.

As transportation emissions are excluded in LEED-EB credit EAc6, direct emissions from Manulife owned or leased vehicles are not included in the GHG inventory.

4.4 Energy Indirect GHG Emissions

The GHG inventory includes 180 Wellington's indirect GHG emissions inventory from electricity. Imported chilled water and steam are not used in the building.

Electricity at 180 Wellington is purchased from Toronto Hydro-Electric System Limited (Toronto Hydro). Consumption is measured from one main meter. As reported by HH Angus' energy calculations, the building's energy breakdown is shown in Figure below.

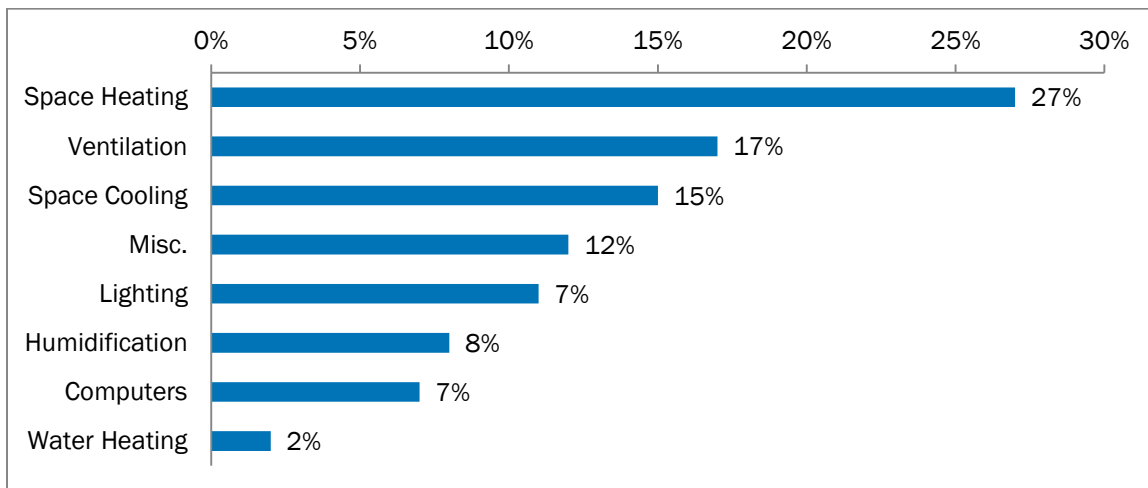


Figure 1: Energy Breakdown

4.5 Other Indirect GHG Emissions

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

4.6 GHG Removals and Biomass Combustion

GHG removals or combustion of biomass are not present at 180 Wellington

4.7 Base year GHG Inventory

Emissions are calculated for the accounting period January 1 to December 31, 2014 to meet LEED-EB's 12 month performance period requirement.

Since this is the first year that 180 Wellington GHG emissions are calculated, this GHG inventory describes the building's "base year"⁹ emissions. Future annual inventories should be compared to this year to track the results of emissions reduction efforts.

4.8 Base year recalculation policy

As per ISO 14064-1, subsequent GHG inventories will recalculate baseline activity data and emissions to account for changes to the following factors:

1. Changes to operational boundaries (see 4.2)
2. Changes to the ownership and control of GHG sources or sinks transferred into or out of organizational boundaries
3. Changes to GHG quantification methodologies that result in significant changes to quantified GHG emissions or removals.

The base-year GHG inventory will not be recalculated to account for changes in facility use or occupancy.

5 INVENTORY QUANTIFICATION

Measuring GHG emissions directly is impractical for a project of this size. Therefore, as per CAN/CSA-ISO Standard 14064-1-06 Section 4.3.6, we obtained the appropriate GHG emissions using activity data and emission factors to apply to the following equation:

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

Activity data was collected from site (natural gas, diesel and electricity) bills. Emission factors from Canada's *National Inventory Report (1990-2012)*¹⁰ were used.

5.1 Natural Gas

5.1.1 Activity Data

Activity data for natural gas is based on Enbridge monthly natural gas bills. Natural gas consumption is metered and reported by the natural gas provider in cubic metres (m³).

5.1.2 Emission Factor

Loop used the *National Inventory Report (1990-2012)*⁸ natural gas emission factors to calculate 180 Wellington's GHG emissions. Ontario-specific CO₂ emission factors from Part 2, Annex 8, Table A8-1 were used. 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 kilograms of emission per cubic metre (kg of emission/m³).

⁹ The base year is the first reporting period for which a GHG inventory is reported.

¹⁰ *National Inventory Report (1990-2012) Greenhouse Gas Sources and Sinks in Canada*. April 2014, Environment Canada GHG division.

5.2 Refrigerant HFC-123 & HFC-22

5.2.1 Activity Data

Activity data for refrigerant HFC-123 and HFC-22 have not been included in this report since they are not greenhouse gases regulated under the Kyoto Protocol¹¹, and are not listed as reportable greenhouse gases in *CAN/CSA-ISO Standard 14064-1-06* or the *WRI/WBCSD Greenhouse Gas Protocol Corporate Standard*.

5.2.2 Emission Factor

Loop used the *ISO-14064-1-06 Annex C* refrigerant global warming potential (GWP) factors for 180 Wellington's GHG calculations.

5.3 Diesel

5.3.1 Activity Data

Activity data for diesel is based on consumption reports that Manulife has provided.

5.3.2 Emission Factor

Loop used the *National Inventory Report (1990-2012)*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 emission per litre (tonnes/L).

5.4 Electricity

5.4.1 Activity Data

Activity data for electricity is based on Toronto Hydro monthly electricity bills. Electricity is provided through one main meter to 180 Wellington. Electricity bills report actual metered consumption in kilowatt hours (kWh), and an adjusted kWh figure that takes into account transmission and distribution losses. In accordance with GHG Protocol guidance, Loop has used the former unadjusted consumption figure is metered and reported on by the electricity utility in unadjusted kWh as required by Energy Star and in this inventory.

5.4.2 Emission Factor

Loop used the *National Inventory Report (1990-2012)*⁸ electricity emission factors.

As Manulife is reporting on only one building 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 finalised 2011 emission factors found in the 2014-published inventory are used. 2012 emission factors are not used since they are preliminary.

¹¹ The Kyoto Protocol regulates seven GHGs: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF₆), nitrogen trifluoride (NF₃).

The electricity emission factor is measured in metric grams emission per kilowatt-hour (g/kWh).

Published electricity grid emission factors do not account for Transmission and Distribution (T & D) losses. As noted in section 5.3.1, per the Greenhouse Gas Protocol, guidance indicates that organizations 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 their scope 2 inventory. For this reason, T & D losses have not been included in the calculations for 180 Wellington.

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

6 GHG INVENTORY RESULTS

6.1 Emissions

The total emissions from direct and indirect GHG emissions sources during the reporting year are 705 tonnes of CO₂e. Building natural gas, diesel and electricity consumption account for 100% of 180 Wellington's emissions. The breakdown is as shown in Figure 2. The emissions relate to the approximately 5.6 million ekWh consumed over the course of the reporting year. The trending by month is shown in Figure 3.

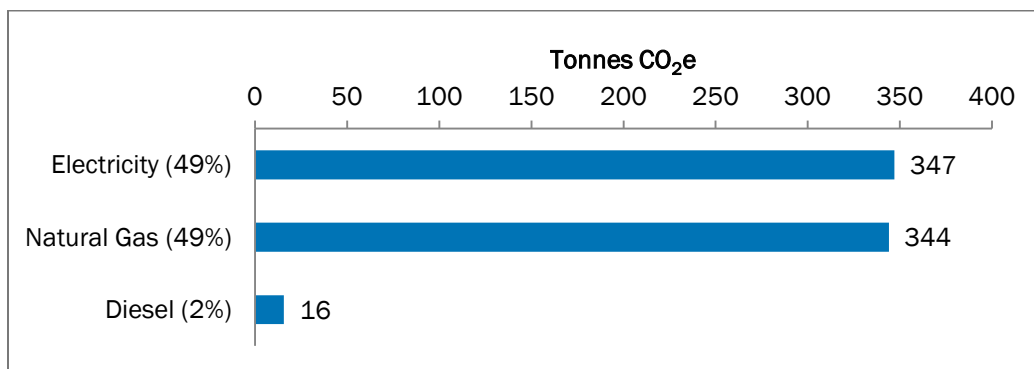


Figure 2: Greenhouse Gases by Emission Source

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 14064-1-06¹² requirements, they have been included in the greenhouse gas inventory.

¹² 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.

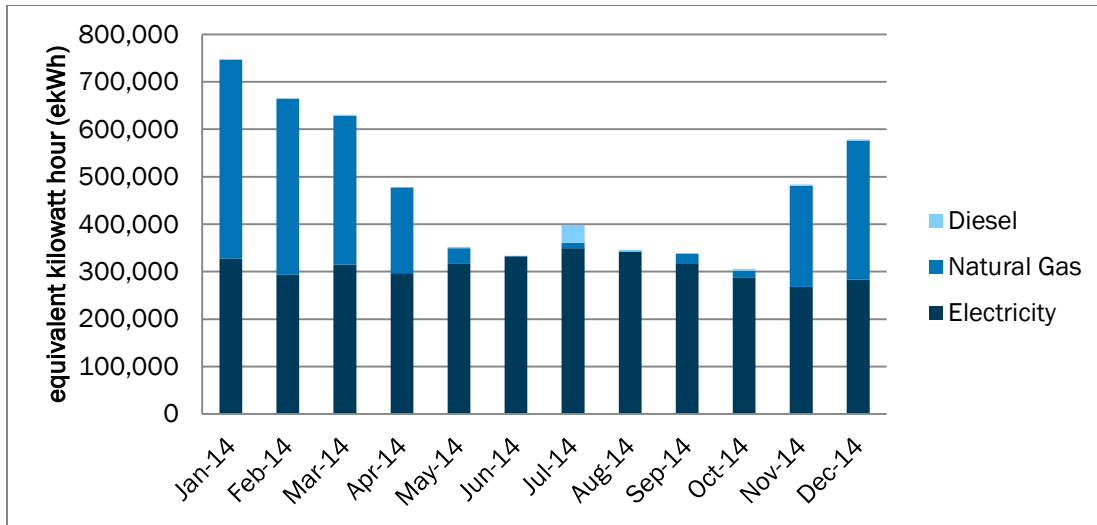


Figure 3: Energy Consumption by Month and Source

6.2 Emissions Reductions

180 Wellington has focused on energy conservation measures (ECMs) to achieve GHG reductions. The following table outlines ECMs that 180 Wellington is considering to undertake; the associated annual emissions savings are estimated.

Table 1: GHG Emissions Reduction Strategies

Energy Conservation Measure	Potential Electricity Savings (kWh/yr)	Potential Natural Gas Savings (m ³ /yr)	Estimated Emissions Savings (tCO ₂ e /yr)
Add Motion Sensors and Emergency LED Lighting to Mechanical Penthouse	42,923		4
Add VFD to Sanitary Exhaust Fan	14,697		1
Balance Ground Floor Wall Fin Control Valves	7,030	3,374	7
Total Savings	64,650	3,374	12

6.3 Inventory Uncertainty¹³

Table 2 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.

¹³ *Measurement and Estimation Uncertainty of GHG Emissions*. 2003, The Greenhouse Gas Protocol Initiative.

Table 2 – Uncertainty Ranking

Major Emission Category	Certainty Ranking
Natural Gas	High – The meter is calibrated and verified by Enbridge. 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 HFC-123 and HFC-22 are refrigerants that have been identified as not having GWP by ISO 14064-1-06 Annex C.
Diesel	High – Diesel generator consumption values were provided by Manulife.
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.

7 QUALITY MANAGEMENT

7.1 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
Johann Klein	Property Director	Manulife Financial
Christina Harricharran	Property Administrator	Manulife Financial

Responsibilities:

- ▶ To provide Loop with required energy data (via natural gas, diesel and electricity bills)
- ▶ To provide Loop with refrigerant data information
- ▶ To approve and sign the CSA CleanStart™ Registry application form

Name	Role	Company
Matt Pinder	Mechanical Designer	HH Angus ¹⁴

Responsibilities:

- ▶ To provide Loop with required energy data (via natural gas, diesel and electricity bills)
- ▶ To provide Loop with refrigerant data information

Name	Role	Company
Regan Smith	Project Principal	Loop Initiatives
Caryn Levin	Project Manager	Loop Initiatives
Anna Melnik	Project Analyst	Loop Initiatives

¹⁴ HH Angus is supporting 180 Wellington's LEED-EB submission

Responsibilities:

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

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

Responsibilities:

- ▶ To verify that the Loop14064-1 report meets CSA CleanStart™ Registry requirements and *CAN/CSA-ISO Standard 14064-3-06*
- ▶ To issue a verification statement

7.2 Document Retention and Record Keeping

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

- ▶ Manulife should continue to record 180 Wellington’s natural gas, diesel and electricity cost and consumption; and
- ▶ Manulife should keep this GHG inventory report for its records as it contains boundary definitions, emission factors, base year activity data, refrigerant history, and GHG emission quantities. This information is required should Manulife choose to again register 180 Wellington with the CSA CleanStart™ Registry or externally report on its emissions.

8 GHG INVENTORY VERIFICATION

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 completed at a reasonable level of assurance.

Loop prepared for 180 Wellington’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
- ▶ Using an internal review process for quality control for the inventory and the document
- ▶ Clarifying anomalous data with HH Anugus

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 will assist Manulife to successfully manage and further reduce 180 Wellington's GHG emissions.

If you have any questions, please do not hesitate to contact us at (the numbers below).

Yours truly,
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APPENDIX A – GREENHOUSE GAS INVENTORY

A.1 Emissions

Table A1.1 – Summary by Source Greenhouse Gas Inventory
Base Year (January 1 to December 31, 2014)

Source	Quantity of Activity	Activity Unit	Emissions (tCO ₂ e)
DIRECT GHG EMISSIONS			
Natural Gas			
Jan-14	40,770	m ³	77
Feb-14	36,137	m ³	68
Mar-14	30,549	m ³	58
Apr-14	17,559	m ³	33
May-14	3,206	m ³	6
Jun-14	136	m ³	<1
Jul-14	1,105	m ³	2
Aug-14	91	m ³	<1
Sep-14	1,987	m ³	4
Oct-14	1,253	m ³	2
Nov-14	20,772	m ³	39
Dec-14	28,389	m ³	54
Total Natural Gas	181,954	m³	344
Diesel			
Jan-14	109	L	<1
Feb-14	114	L	<1
Mar-14	174	L	<1
Apr-14	111	L	<1
May-14	223	L	<1
Jun-14	0	L	0
Jul-14	3,528	L	10
Aug-14	300	L	<1
Sep-14	114	L	<1
Oct-14	380	L	1
Nov-14	272	L	<1
Dec-14	357	L	1
Total Diesel	5,682	L	16
ENERGY INDIRECT EMISSIONS			
Electricity - Mixed Fossil Fuels			
Jan-14	327,948	kWh	30
Feb-14	293,429	kWh	27
Mar-14	314,861	kWh	29
Apr-14	296,957	kWh	28
May-14	316,580	kWh	29
Jun-14	331,606	kWh	31
Jul-14	349,625	kWh	33
Aug-14	341,908	kWh	32
Sep-14	317,584	kWh	30
Oct-14	288,444	kWh	27
Nov-14	267,590	kWh	25
Dec-14	283,558	kWh	26
Total Electricity	3,730,090	kWh	347
TOTAL BUILDING EMISSIONS			707
CARBON INTENSITY			3.3 kgCO₂e /sq. ft. 0.4 tCO₂e/occupant

Table A1.2 – Summary by Emission Type Greenhouse Gas Inventory
Base Year (January 1 to December 31, 2014)

Source	Quantity of Activity	Activity Unit	Emissions (tCO ₂ e)	Emissions (tCO ₂)	Emissions (tCH ₄)	Emissions (tN ₂ O)
DIRECT GHG EMISSIONS						
Natural Gas						
Total Natural Gas	181,954	m³	344	342	<1	2
Diesel						
Total Diesel	5,682	L	16	16	<1	<1
ENERGY INDIRECT EMISSIONS						
Electricity - Mixed Fossil Fuels						
Total Electricity	3,730,090	kWh	347	343	2	2
TOTAL Emissions			707	701	2	4

APPENDIX B – ACTIVITY DATA AND EMISSION FACTORS

B.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	HH Angus and Manulife submitted 180 Wellington’s Enbridge monthly natural gas bills to Loop Initiatives.
Refrigerant	Manulife provided the number of chillers as well as a statement indicating no PFC’s or SF ₆ on the premises. Note the type of refrigerants used by the chillers have not been identified as having a GWP in <i>CAN/CSA-ISO Standard 14064-1-06</i> or the <i>WRI/WBCSD Greenhouse Gas Protocol Corporate Standard</i> .
Diesel	Manulife submitted 2014 diesel usage data to Loop Initiatives.
Electricity	HH Angus and Manulife submitted 180 Wellington’s Toronto Hydro monthly electricity bill to Loop Initiatives.

B.2 EMISSION FACTORS

Table B2 summarizes the emission factors and sources used in the calculations completed for 180 Wellington’s GHG inventory.

Table B2.1 – 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, 2014, Part 2, Annex 8, Table A8-1
Natural gas (Methane) (National)	0.000037 kg/m ³	Canada’s National Inventory Report, 2014, Part 2, Annex 8, Table A8-2
Natural gas (Nitrous Oxide) (National)	0.000035 kg/m ³	Canada’s National Inventory Report, 2014, Part 2, Annex 8, Table A8-2
Electricity (Carbon Dioxide) (Ontario): 2011	92 g CO ₂ /kWh	Canada’s National Inventory Report, 2014, Part 3, Annex 13, Table A13-7 (most recent year: 2012)
Electricity (Methane) (Ontario): 2011	0.02 g CH ₄ /kWh	Canada’s National Inventory Report, 2014, Part 3, Annex 13, Table A13-7 (most recent year: 2012)
Electricity (Nitrous Oxide) (Ontario): 2011	0.002 g N ₂ O/kWh	Canada’s National Inventory Report, 2014, Part 3, Annex 13, Table A13-7 (most recent year: 2012)
Diesel (Carbon Dioxide)	2725 g CO ₂ /L	Canada’s National Inventory Report, 2014, Part 2, Annex 8, Table A8-4
Diesel (Methane)	0.026 g CH ₄ /L	Canada’s National Inventory Report, 2014, Part 2, Annex 8, Table A8-4
Diesel (Nitrous Oxide)	0.031 g N ₂ O/L	Canada’s National Inventory Report, 2014, Part 2, Annex 8, Table A8-4

Table B2.2 provides the Global Warming Potentials (GWPs) used in this report:

Table B2.2 – Global Warming Potentials (GWP)

Emission Type	GWP (gCO ₂ e/g)	Source
CO ₂	1	Intergovernmental Panel on Climate Change. <i>Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories Reporting Instructions,</i> 1997.
CH ₄	21	
N ₂ O	310	

APPENDIX C – STANDARD REPORTING DECLARATION

C.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 Manulife’s assertion for 180 Wellington’s inventory.

Table C1 – Reporting Information

No.	CSA Reporting Requirement	Declaration
A	Description of the reporting organization.	Manulife is the property management company for 180 Wellington. Manulife has registered the building 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 Manulife’s initiative to green this 12 floor office building, they are reporting 180 Wellington greenhouse gas (“GHG”) emissions with the CSA Registry. 180 Wellington emits GHG’s through their use of natural gas, diesel and electricity. The total gross floor area of the building is 217,000 sq. ft., and the building occupancy is approximately 1,800 people (tenants).
B	Person responsible.	Regan Smith, Project Principal and Agent to Manulife at 180 Wellington.
C	Reporting period covered.	January 1 to December 31, 2014
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.
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: January 1 to December 31, 2014. This base year was chosen due to the performance period requirements of the Canada Green Building Council LEED-program. It is a starting point for future GHG inventories. See Appendix A for the CSA CleanStart Registry’s base year GHG emission summary.

No.	CSA Reporting Requirement	Declaration
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 natural gas and hydro bills, and diesel consumption received by Manulife. 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 provided third party verification for this GHG inventory report and provided it with a reasonable level of assurance. See the third party verification report for further details.