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GHG Inventory Report 2019 – Final _{v1}

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SUMMARY

This report details the greenhouse gas (GHG) emissions inventory of BGIS for the calendar year 2019 (January 1, 2019 to December 31, 2019). This GHG emission inventory lists the sources of GHG emissions and the quantity of emissions released from each source during the reporting period.

This report has been written in accordance with ISO Standard 14064-1:2018(E) 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 and ISO Standard 14064-3:2019(E) Greenhouse gases - Part 3: Specification with guidance for the validation and verification of greenhouse gas statements have been used as additional resources.

BGIS GHG corporate emissions were **16,077** tonnes of CO₂e for the reporting year spanning January 1, 2019 to December 31, 2019. The emissions were calculated from data and other documentation collected from various BGIS suppliers. Please refer to Section 5 and Appendix A for the detailed GHG inventory.

1 ORGANIZATION PROFILE

BGIS Canada is the first Canadian organization to offer fully-integrated, national Real Estate Management Services. With over 320 million sq. ft. of space under management in Canada, US and the Asia-Pacific regions. BGIS offers its clients innovative outsourcing and on demand solutions that address their unique requirements. As of March 2019, our sole owner is CCMP Capital Advisors. We have over 40 years of experience and our team of over 6,000 skilled professionals leads the industry.

For the second year in a row, our GHG Inventory includes our growing operations in the United States (US) and Asia-Pacific (APAC) regions. Prior to 2017, data for these regions was non-existent as we did not operate in these regions.

BGIS has made a commitment to reducing GHG emissions from its operations. This inventory report supports the broader “greening” initiatives of the corporation and help measure progress.

CANADA

BGIS occupied a total of 37 office and warehouse locations across Canada:

- 1 main office location in Markham, ON – utility data is submetered at this location
- 1 satellite office location in Markham, ON – data is part of rent payments
- 1 support centre in Kamloops, BC – utility bills are paid for at this location
- 1 office locations in Sudbury, ON – utility bills are paid for at this location
- 8 office/warehouse locations across Canada that were acquired in 2018 as part of the purchasing of a company that maintains gasoline stations
- 25 other locations across Canada – utilities are part of the rent payments

Data for the last group was collected from:

- Utility data for some client buildings where BGIS pays the utility bills and occupies a small portion of the floor area
- Utility data supplied by contacting landlords and asked to provide energy consumption for the whole building, from which the BGIS’ share was prorated using the occupied floor area ratio.
- Energy consumption for the remainder of the buildings was estimated

BGIS leases a service vehicle fleet of approximately 970 vehicles and our employees do extensive travelling to visit client sites and attend industry events.

US

BGIS occupied a total of 5 office and warehouse locations across the United States:

- 1 main office location in Seattle, WA – data was collected from the landlord
- 1 other office location in Amesbury, MA – data was collected from the landlord
- 2 warehouse locations in eastern US – utility bills are paid for these locations

BGIS leases a service vehicle fleet of approximately 50 vehicles in the US.

APAC

BGIS occupied a total of 9 office locations across the Asia-Pacific Region:

- 6 office locations in Australia – utility data was taken from utility bills for most locations
- 4 other office locations, one in each of the following cities
 - o Auckland, New Zealand
 - o Hong Kong
 - o Seoul, South Korea
 - o Singapore and Singapore

Utility bills are paid for the majority of these locations

BGIS does not lease or own any service vehicles for the APAC region.

2 PERSON RESPONSIBLE

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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:

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.

BGIS has chosen an operational control approach as this is the most logical choice and the data systems are designed to capture activity data in this manner.

3.2 Reporting Boundaries

Reporting boundaries are defined to prevent double counting of reported emissions. These boundaries have been separated into the following three emission categories:

Direct GHG emissions:

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

Indirect GHG emissions from imported energy

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

Indirect GHG emissions from transportation

These emissions include business travel.

3.2.1 Direct GHG Emissions

Direct GHG emissions released from sources at the facility level include the emissions from the combustion of fossil fuels and fugitive refrigerant emissions. Direct energy consumption is taken from three sources:

- Where BGIS occupies the whole building, utility measured consumption is used (or applicable sub-metered data)
- BGIS' portion of the utility consumption provided by landlords in the various buildings
- Estimated consumption using energy intensity average from a databases of office energy consumption that BGIS maintains, based on measured consumption
- For non-office buildings (i.e. the EFS warehouses), the consumption was estimated using the energy intensity of EFS warehouses in the same geographic area. This was felt to be more accurate than using office building energy intensity because warehouses have different energy profiles than office buildings

These emissions would include natural gas and fuel oil supplied for space heating purposes to most of the building offices space that are occupied by BGIS.

Emissions from fossil fuel (gasoline, ethanol, biodiesel and diesel oil) combustion in BGIS' fleet is the largest source of Direct GHG Emissions. The activity data has been supplied by BGIS' fleet management service companies in the Canada and US regions.

Emissions were estimated from refrigerant leakage at the head office only.

3.2.2 Indirect GHG Emissions from imported energy

This report includes Energy Indirect GHG emissions from electricity and two buildings heated by a district steam system. Purchased chilled water was used at one office location in Ottawa.

Energy Indirect consumption is taken from four sources:

- Where BGIS occupies the whole building, utility measured consumption, or applicable sub-metered data is used
- BGIS' portion of the utility consumption where BGIS occupies space in a client's building and pays the utility bills
- BGIS' portion of the utility consumption provided by landlords
- Estimated consumption using energy intensity average from a databases of office energy consumption that BGIS maintains based on measured consumption
- For non-office buildings (i.e. the EFS warehouses), the consumption was estimated using the energy intensity of EFS warehouses in the same geographic area. This was felt to be more accurate than using office building energy intensity because warehouses have different energy profiles than office buildings

BGIS has an agreement with Brookfield Renewables to purchase electricity from renewable sources for the head office building. However, this purchase agreement was not used to offset any emissions for this year, as per the ISO 14064-1 standard.

3.2.3 Indirect GHG Emissions from transportation

BGIS employees do an extensive amount of travel on commercial airlines, some trains and rental cars, as well as overnight stays at hotels. The activity data for this information has been supplied by BGIS' centralized travel booking companies, one for each region. However, only complete data for air travel was provided. The completeness and accuracy of the train, rental car and hotel stay data lead us to exclude these emission sources at this time.

3.2.4 Anthropogenic CO2 emissions and removals

There are no anthropogenic CO2 emissions or removals at any BGIS locations.

3.2.5 Sources Excluded from this Inventory

As mentioned above, the emissions from refrigerant leakage has been excluded from this inventory, with the exception of the head office. BGIS is confident that the total amount of emissions from this source is negligible (less than 2 tCO₂e or 0.02%).

The indirect GHG emissions from transportation exclude the train, rental car and hotel stay emissions.

3.2.6 Global Warming Potential (GWP)

This inventory uses the latest GWP, as required under section 6.3 of the ISO 14064-1:2018 standard. As such, the GWPs from the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report have been used.

BGIS has not gone back to previous reports to use the updated GWP values. We estimate that this would change the total emissions by less than about 10 tCO₂e, or 0.2%. Given the effort involved in restating past GHG emissions, the benefit is minimal.

3.3. Base Year

With a previous change in ownership of the company, BGIS re-aligned our fiscal reporting to be based on calendar year.

The base year still remains the period from October 1, 2012 to September 1, 2013. A comparison of the current year emissions and the base year is provided in section 7.

3.4. Base Year Recalculation Policy

BGIS has established a base year recalculation policy, as follows:

The base year will not be recalculated due to organic growth, or shrinkage, of the business activities.

Any major change in the business that impact the total emissions by $\pm 10\%$ will trigger a recalculation of the base year emissions, provided that activity data is available for the GHG emission calculations.

A number of energy and emission intensity values will be calculated to assist in reporting the reductions in emissions.

With the acquisition of the SNC-Lavalin's facility management business in 2017, there has been a substantial increase in energy consumption and GHG emissions. However, the base year information from SNC-Lavalin was not available. Because of this, we have not restated the base year.

With the expansion into the US and APAC regions in 2017, the energy consumption and emissions have grown substantially from a corporate standpoint. However, since no data is available for the base year period because the operations were due to organic growth of the business activities, the base year has not been restated.

Late in 2018, BGIS acquired a company that specializes in the maintenance of equipment at gasoline stations. The company was renamed to BGIS Energy and Facility Services (BGIS EFS) and 8 locations were added to the list of BGIS leased locations at that time. No data was

available for these buildings, for the baseline period of October 2012 to September 2013, so they were not included in a base year recalculation.

There have been no changes in the calculation methodology since the base year.

4 QUANTIFICATION

Since it is neither practical, nor in many cases physically possible, to directly measure greenhouse gas emissions, the quantification methodology chosen for each emission component uses an emission factor calculation. This methodology yields a considerable level of certainty because both the activity data and emission factors are readily available from reliable sources. This methodology requires three general types of data: the appropriate “activity data”, the “emission factor” and the “global warming potential” for each gas and are combined into the following equation:

$$\text{GHG emissions (t CO}_2\text{e)} = [\text{activity data}] * [\text{emission factor}] * [\text{global warming potential}]$$

Activity data was collected from site utility bills, energy consumption estimates, vehicle fleet fuel consumption and business travel trip length and mode of transportation. Emission factors and GWPs (global warming potentials) were taken from various national and international sources. The activity data and emission factors used in the calculations are described in more detail below. A complete set of emission factors is located in Appendix B.

4.1 Natural Gas – Buildings

4.1.1 Activity Data - Measured

Activity data for natural gas is based on monthly natural gas utility bills from the local utility company.

CANADA

- For the new head office, called the Innovation Centre, in Markham, ON, all of the consumption was used for the whole reporting period because the company has occupied parts of the building since October 2014. Natural gas was measured in cubic meters and was measured by submeters maintained by the landlord.
- For the Kamloops, BC location, the utility provides natural gas in GJ. A conversion factor of 0.03903 GJ/m³ was used to convert the GJ measured units to m³. This factor was taken from Statistics Canada Catalogue no. 57-003-X Report on Energy Supply and Demand in Canada 2017 Preliminary - Energy Conversion Factors Table. This was required to match the units of the emission factor.
- For the Sudbury, ON location, the utility provides natural gas measured in m³.
- For the four BGIS EFS locations, all in Ontario, the utility companies provide natural gas

measured in m3.

- For the four locations where BGIS has space in a client's building, all in Ontario, the utility companies provided natural gas measured in m3.

US

- Measured consumption was provided for 2 of the 3 warehouse locations in the US. Natural gas was measured in therms.

APAC

- There was no natural gas, or other fuels, measured in any of the APAC buildings.

4.1.2 Activity Data – Landlord Collected

For the leased locations where fuel consumption is part of the lease payments, the landlords were contacted for these locations and asked to provide energy consumption for the whole building, from which BGIS's share was prorated using the occupied floor area.

CANADA

Landlords provided data for 10 of the 19 buildings that were not heated with electricity.

US

Landlords provided data for one office locations, the other office was electrically heated.

4.1.3 Activity Data – Estimated

For the remaining buildings where the landlord did not respond, the consumption was estimated. This was estimated by taking the energy intensity from databases for office buildings in that province or state and applying it to the buildings using the leased floor area, with one exception, below.

US

The data for one warehouse was estimated from the energy intensity of the two buildings with measured data. This was felt to be reasonable given that:

- all three buildings are located on the eastern seaboard of the US
- warehouse heating consumption is typically higher than office locations
- reliable industry wide data for warehouses is difficult to find

4.1.4 Emission Factor

CANADA

The National Inventory Report (1990-2018) natural gas emission factors were used to calculate

the GHG emissions. Provincial-specific CO₂ emission factors from Canada's National Inventory Report 1990-2018, Part 2, Annex 6, Table A6-1 were used. National commercial CH₄ and N₂O data from Part 2, Annex 6, Table A6-2 were used.

The natural gas emission factor was provided in units of kg of GHG per m³ of natural gas.

US

The EPA Centre for Corporate Climate Leadership, GHG Emission Factors Hub website provide the emission factors for natural gas (<https://www.epa.gov/climateleadership/center-corporate-climate-leadership-ghg-emission-factors-hub>)

The natural gas emission factor was provided units are of kg and g of GHG per therm of natural gas.

4.3 Refrigerant HFC-R22 – Innovation Centre

4.3.1 Activity Data

Although not considered a greenhouse gas under the Kyoto Protocol, HFC-R22 has been included for completeness of the GHG inventory. Activity data for refrigerant HFC-R22 is based on the estimated leakage from the chiller's refrigerant loop. A leakage rate of 0.5% of the total refrigerant charge is assumed based on defaults derived from LEED EB credit EAc5: Enhanced Refrigerant Management. The total charge of refrigerant HFC-R22 is 54.5 lbs for the two buildings. Refrigerant charge is converted from pounds (lb) of charge to metric tonnes of charge using a conversion factor of 0.00045359237 tonnes/lb.

4.3.2 Emission Factor

BGIS used the refrigerant global warming potential (GWP) factors as published in the from the Linde Group AG, which sells gases worldwide.

4.4 Refrigerant HFC-R123 – Innovation Centre

4.4.1 Activity Data

Although not considered a greenhouse gas under the Kyoto Protocol, HFC-R123 has been included for completeness of the GHG inventory. Activity data for refrigerant HFC-R123 is based on the estimated leakage from the chiller's refrigerant loop. A leakage rate of 0.5% of the total refrigerant charge is assumed based on defaults derived from LEED EB credit EAc5: Enhanced Refrigerant Management. The total charge of refrigerant HFC-R123 is 1200 lbs. Refrigerant charge is converted from pounds (lb) of charge to metric tonnes of charge using a conversion factor of 0.00045359237 tonnes/lb.

4.4.2 Emission Factor

BGIS used the refrigerant global warming potential (GWP) factors from the Linde IPCC Fifth Assessment Report.

4.5 Electricity - Buildings

4.5.1 Activity Data - Measured

Activity data for electricity is based on monthly utility bills from the local utility company or from sub-meters managed by the landlord. To ensure that the data reported is consistent for all buildings and for all previous reports, unadjusted kWhs were used for this GHG inventory. That is, transmission and distribution losses were excluded.

4.5.2 Activity Data – Landlord Collected

For the leased locations where electricity consumption is part of the lease payments, the landlords were contacted for these locations and asked to provide energy consumption for the whole building, from which BGIS's share was prorated using the occupied floor area.

CANADA

Landlords provided data for 15 of the 21 buildings that were not measured.

There were two exceptions to this:

- For 9 buildings, the landlords did not respond in 2019, but did provide data in 2018. The 2017 data was used as it was more accurate than using an estimate.
- Three other landlords did not respond in 2019, but did provide data in 2017. Data from 2017 was used as it was more accurate than using an estimate.
- One other landlord did not respond in 2019, but did provide data in 2016. Data from 2016 was used as it was more accurate than using an estimate.

US

Landlords provided data for the two office locations.

4.5.3 Activity Data - Estimated

For the remaining buildings where the landlord did not respond, the electricity consumption was estimated. This was developed by taking the energy intensity from databases for office buildings in that province or state and applying it to the buildings using the leased floor area.

4.5.4 Emission Factor

CANADA

The National Inventory Report (1990-2018) electricity emission factors were used to calculate the GHG emissions. Published electricity grid emission sometimes account for transmission and distribution losses. However, as explained in section 4.5.1, the transmission and distribution losses are not included in any calculations.

The calculations used provincial CO₂, CH₄ and N₂O emission factors from the National Inventory Report's Part 3, Annex 13, Tables A13-2 to A13-12. The 2018 emission factors reported in the National Inventory Report were preliminary values at the time of quantification but were used as they were the most current factors available at the time of quantification.

The electricity emission factor was provided in kg of GHG per kWh.

US

The eGRID database emission factors were used to calculate the GHG emissions. This database is maintained by the Environmental Protection Agency and was available at the following website - <https://www.epa.gov/energy/emissions-generation-resource-integrated-database-eGRID>. The latest version has emission factor for 2018.

The electricity emission factor was provided in lbs of GHG per kWh and were converted to kg of GHG per kWh using a conversion factor of 0.453592 kg/lb.

APAC

Since the APAC locations were spread amongst five different countries, the emission factors came from a variety of sources. These sources include government reports, utility companies and international emission factors. The sources are all detailed in the Appendix B.

4.6 Steam - Buildings

4.5.1 Activity Data

CANADA

Four office locations, two in Vancouver, BC, one in Ottawa, ON and one in Montreal, QC used steam from a district heating system to heat the building:

- One Vancouver, BC building estimated the steam consumption, similar to natural gas, by taking an energy intensity for office buildings. This was then converted to lbs of steam using a conversion factor of 0.001252 GJ/lb steam.
- The other buildings had steam data was provided by the landlord, also in lbs of steam.

4.6.2 Emission Factor

CANADA

The steam emission factors were taken from two sources:

- The Vancouver, BC building steam emission factor was taken from a personal communication with the district energy company. The steam emission factor is measured in kg CO₂e per lb of steam.
- The Ottawa, ON and Montreal QC building steam emission factor was taken from a federal government document "FEDERAL GREENHOUSE GAS TRACKING PROTOCOL, A common standard for federal operations, Version 3.1, November 2010" which is used for reporting greenhouse gas emissions. The steam emission factor is measured in kg CO₂e per GJ of steam. A conversion factor of 0.00125 GJ/lb of steam was used to

convert the landlord data, taken from the same protocol document.

4.7 Chilled Water - Buildings

4.7.1 Activity Data

CANADA

One building in Ottawa, ON is connected to a chilled water cooling system in downtown Ottawa. The landlord provided chilled water consumption for the whole building, from which BGIS's share was prorated using the occupied floor area. This consumption was provided in ton-hrs of cooling.

4.7.2 Emission Factor

CANADA

The chilled water emission factor was taken from a federal government document "FEDERAL GREENHOUSE GAS TRACKING PROTOCOL, A common standard for federal operations, Version 3.1, November 2010" which is used for reporting greenhouse gas emissions. The chilled water emission factor is measured in kg CO₂e per GJ of chilled water. A conversion factor of 0.007898 GJ/ton-hrs of chilled water was used to convert the landlord data, taken from standard energy conversions.

4.8 Gasoline, Ethanol, Biodiesel and Diesel Oil – Vehicle Fleet

4.8.1 Activity Data

Activity data for vehicle fleet related emissions is based on consumption data provided to us from the BGIS fleet management companies, one for Canada and one for the US region. There were no service vehicles in the APAC region for 2018. The companies provided annual total fuel consumption for each vehicle based on use of a company supplied gasoline/diesel credit card. Odometer readings and/or distances travelled were also included.

4.8.2 Emission Factor

CANADA

Canada's National Inventory Report (1990-2018) provided the gasoline, ethanol, biodiesel and diesel emission factors. Since the detail of the type of vehicle engine was not collected, a conservative average was used for the methane and nitrous oxide emission factors.

The vehicle fuel factors are measured in kg of emission per liter of fuel.

US

The US EPA provided the the gasoline, ethanol and diesel emission factors from the following website "FEDERAL from EPA Centre for Corporate Climate Leadership, GHG Emission Factors Hub <https://www.epa.gov/climateleadership/center-corporate-climate-leadership-ghg-emission-factors-hub>".

The vehicle fuel factors are measured in kg of emission per USgal of fuel. This was converted to an emission factor in liters of fuel using a conversion factor of 0.264172 USgal per liter.

4.9 Business Travel

4.9.1 Activity Data

Activity data for business travel is provided by BGIS' centralized travel booking service companies, one for each region. They provided the date of travel, the start and end cities and the mode of travel. However, many of the entries were duplicates due to flight changes (change in day or time of flight, seat preference changes and charges, baggage charges, etc.). A concerted effort was made to remove these duplicates from the database as far as possible.

For each city pair, the great circle distances were calculated using an online tool (Great Circle Mapper, www.gcmap.com).

Each flight was categorized as short, medium or long, using guidelines published by UK DEFRA (Department of Energy, Farms and Rural Agriculture). However, their categorization of flights changed in the most recent update of the guideline. A review of the methodology led us to use the same categorization used previously.

Table 1: Air Travel Categories

Category	Flight Distance Range [km]
Short	<500
Medium	500-1600
Long	>1600

4.9.2 Emission Factor

Emission factors for flights were taken from work done by the UK DEFRA (Department of Energy, Farms and Rural Agriculture) and include an updated radiative forcing factor of 1.891 and an uplift factor of 1.08 as suggested in their guidance document.

Please refer to Appendix A for summary of activity data and GHG emissions.

Please refer to Appendix B for emission factors, conversion values and global warming potentials.

5 GHG INVENTORY COMPONENTS

5.1 Emissions

The total emissions from direct and indirect GHG emissions sources during the reporting year are **16,077** tonnes of CO₂e. The breakdown is as follows:

Table 2: Emission Summary by Source

Source	Emissions [t CO ₂ e]	% of total
DIRECT GHG EMISSIONS		
Natural Gas	519.9	3.23%
Refrigerant	0.4	0.00%
Gasoline	11,269.2	70.09%
Ethanol	2.9	0.02%
Diesel + Biodiesel	62.3	0.39%
INDIRECT GHG EMISSIONS FROM ENERGY		
Electricity	466.4	2.90%
Steam	163.3	1.02%
Chilled Water	12.2	0.08%
INDIRECT GHG EMISSIONS FROM TRAVEL		
Business Travel	3,580.3	22.27%
TOTAL emissions	16,077.1	

CO₂ emissions account for 95.57% of the total GHG emissions, while CH₄ and N₂O emissions make up 0.19% and 4.24%, respectively, with refrigerant emissions taking up the remainder.

Figure 1: Greenhouse Gas Breakdown by Region

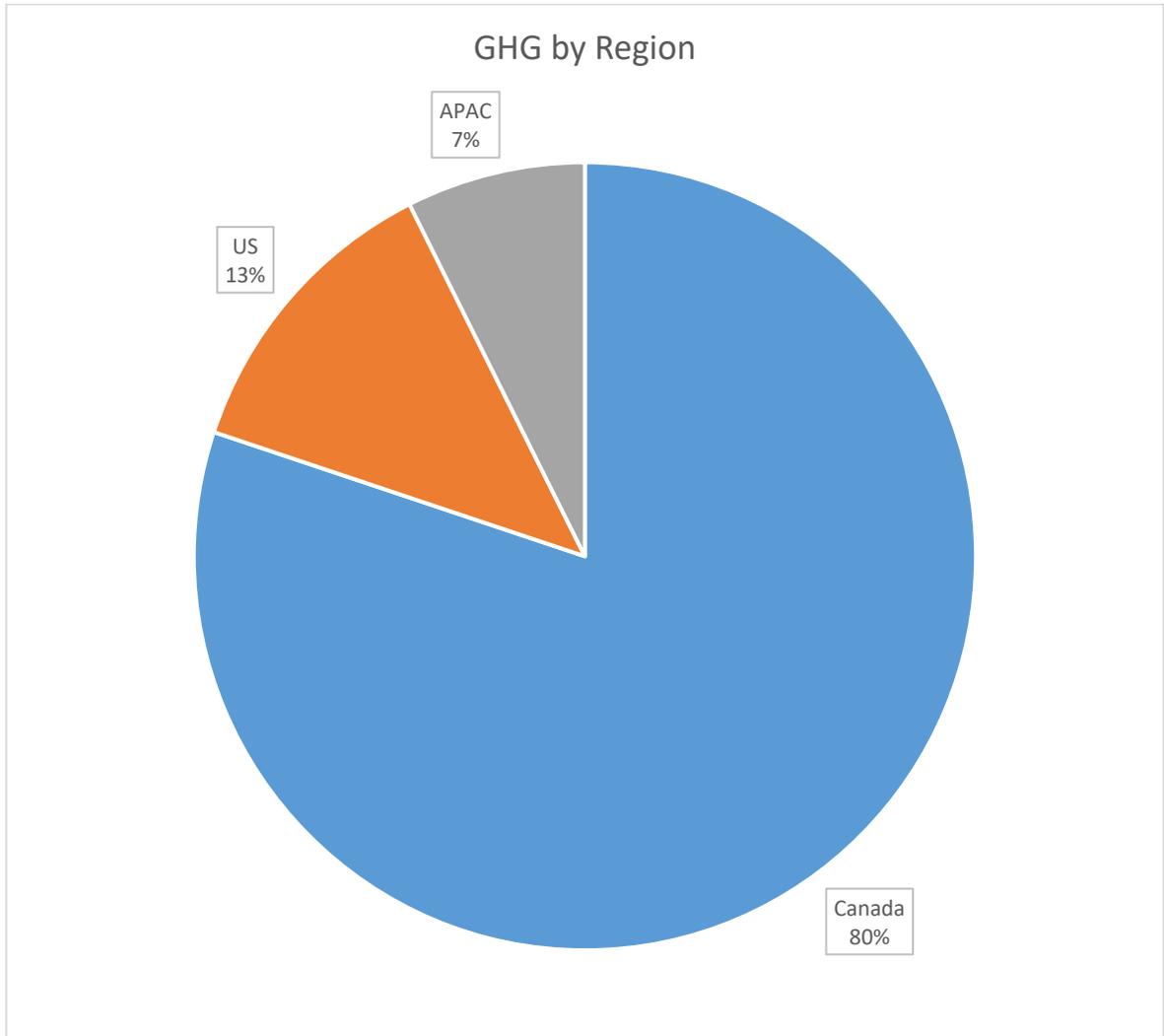
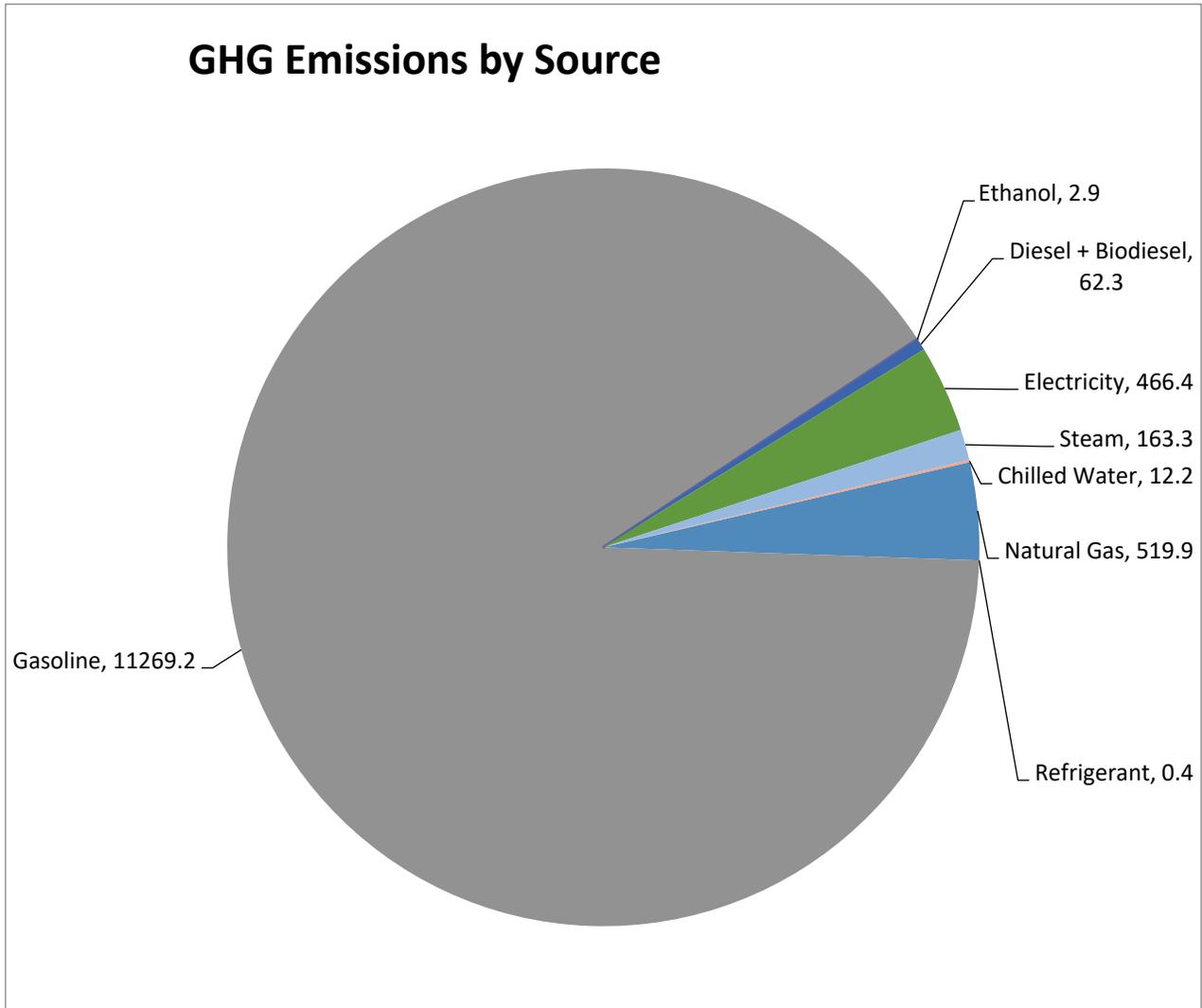


Figure 2: Greenhouse Gas Breakdown by Source



5.2 Emissions by GHG

Below is the breakdown of GHG emissions by source and type of GHG.

Table 3: Emission Summary by gas type

Source and Fuel	Quantity of Activity	Activity Unit	Carbon Dioxide Emissions (CO ₂) [t CO ₂ e]	Methane Emissions (CH ₄) [t CO ₂ e]	Nitrous Oxide Emissions (N ₂ O) [t CO ₂ e]	Refrigerant Emissions (HFC-R134a, HFC-R22) [t CO ₂ e]	Total Emissions [t CO ₂ e]
DIRECT GHG EMISSIONS							
Natural Gas	244,192	m ³	517.5	0.2604	2.1518		519.9
Refrigerant	2.85	kg				0.43	0.4
Gasoline	4,636,004	L	10,595.3	28.9911	644.8960		11,269.2
Ethanol	1,637	L	2.9	0.0013	0.0013		2.9
Diesel + Biodiesel	22,754	L	61.0	0.0434	1.2625		62.3
INDIRECT GHG EMISSIONS FROM ENERGY							
Electricity	4,526,359	kWh	466.4				466.4
Steam	1,482,143	lb	163.27				163.3
Chilled Water	32,428	ton-hrs	12.24				12.2
INDIRECT GHG EMISSIONS FROM TRAVEL							
Business Travel	16,369,937	p.km	3,546.1	0.6199	33.6022		3,580.3
TOTAL emissions			15,364.8	29.9	681.9	0.4	16,077.1

5.3 Directed Actions to Reduce GHG Emissions

GHG reduction strategies for BGIS facility have focused on the vehicle fleet management practices and energy conservation measures in the head office building. These have not been detailed at this time.

5.4 Estimation of Uncertainty

Table 4 presents an opinion of the level of uncertainty related to this GHG inventory. These opinions of uncertainty are 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 4 – Uncertainty Ranking

Activity Data	Uncertainty Assessment
Natural Gas Consumption	<p>Moderate Uncertainty</p> <p>The measured consumption is taken from meters that are calibrated by the utility company on a regular basis.</p> <p>The landlord supplied consumption data was compare against similar buildings to determine its reasonableness.</p> <p>The estimated consumption was taken from energy databases that are periodically updated. Only a small portion of the overall emissions were taken from estimates, which reduces the uncertainty.</p> <p>Natural gas emission factors are standard and accurate and taken from a reliable sources.</p>
Refrigerant Amount	<p>High Uncertainty – Refrigerant leakage is assumed to be 0.5% of total refrigerant charge, based on LEED EAc5 guidelines.</p>
Electricity Consumption	<p>Moderate Uncertainty</p> <p>The measured consumption is taken from meters that are calibrated by the utility company on a regular basis.</p> <p>The landlord supplied consumption data was compare against similar buildings to determine its reasonableness.</p> <p>The estimated consumption was taken from energy databases that are periodically updated. Only a small portion of the overall emissions were taken from estimates, which reduces the uncertainty.</p> <p>The electricity emission factors published by Environment Canada show quite a bit of variation from one year’s report (estimated value) to the subsequent reports actual value.</p>
Steam Consumption	<p>Moderate Uncertainty</p> <p>The steam consumption supplied by the landlord was checked for reasonableness.</p> <p>The steam emission factor was taken from a public source and is comparable with emission factors from other steam district heating systems in Canada.</p>
Chilled Water Consumption	<p>Moderate Uncertainty</p> <p>The chilled water consumption supplied by the landlord was checked for reasonableness.</p> <p>The chilled water emission factor was taken from a federal government source.</p>
Gasoline, Ethanol and Diesel Oil – Vehicle Fleet	<p>Moderate Uncertainty</p> <p>The fuel consumption is taken from measured data gathered by the fleet management company and is felt to be complete and accurate for the time period involved.</p> <p>There is some uncertainty in the use of the emission factors because it is unknown what exact type of gasoline vehicle (Tier 0, 1 or 2) was being used in each case.</p>
Business Travel	<p>Moderate Uncertainty</p> <p>The activity data is based on data from BGIS’ travel service booking company. It is unknown how many employee trips were taken that were not booked through the travel agency. In addition, there are a number of duplicate entries that had to be manually excluded. There is still quite a bit of uncertainty in the air travel emission factors being used, as noted in the reference.</p>

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 ISO Standard 14064-1:2018(E).

Name	Role	Company
Evan Jones	Lead Quantifier	BGIS

Responsibilities:

To develop quantification methodologies and spreadsheets

To review calculations and emission factors

Name	Role	Company
CANADA		
Lou Buxton	FSSC Accounting Manager	BGIS
Jason Francisco	Controller	BGIS EFS
Estelle Ramoso	Senior Lease Administrator	BGIS
Lou Meadows	Fleet Administrator	BGIS
US		
Julie Cook	Executive Assistant	BGIS-US
Anne Hanrahan	Business Operations Specialist, CSG	BGIS-US
APAC		
Sherrie Jones	Workplace Director	BGIS-APAC

Responsibilities:

To provide energy consumption data (via utility bills)

To provide BGIS leased office space information and landlord contacts

To provide fleet vehicle fuel consumption data

6.2 Document Retention and Record Keeping

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

BGIS scans each utility bill for the locations for which the bills are paid for by the Accounts Payable staff and maintains electronic copies on a secure server.

BGIS maintains the data for the vehicle fleet on a secure server.

BGIS maintains the data for the employee business travel on a secure server.

7 GHG INVENTORY CHANGES SINCE BASE YEAR

Since only the Canada region has an established base year, this analysis only applies to that region.

7.1 Buildings

Overall electricity consumption in the buildings was 134.3% greater than in the base year. This was due primarily to the increased floor area of our office locations. The natural gas consumption increased 263.6% due to the same reason.

Overall energy intensity increased by 32.8%. This is partly due to increasing the occupancy density in the Innovation Centre and other locations. It is also driven because we are now occupying an electrically heated office building in Markham.

The GHG emissions from buildings increased overall by 223.1% compared to the base year.

7.2 Vehicle Fleet

Overall energy consumption in the vehicle fleet was approximately 153.0% greater than the base year. This was due primarily to an increase in the number of vehicles, especially the vehicles that were acquired from the acquisition of SNC-Lavalin. The emissions per vehicle has decreased by about 1.6% compared to the base year, mostly due to the type and age of the vehicles that were acquired.

The GHG emissions from the vehicle fleet increased approximately 139.5% compared to the base year.

7.3 Air Travel

Overall air travel distance travelled increased 105.4% compared to the base year. The expansion of the company's business meant more flights were taken and about 3.7 million kilometers more were flown by employees, compared to the base year. The amount of travel decreased slightly compared to 2018 as more use of video conferencing is used throughout the organization.

The GHG emissions from air travel increased by 138.7 % compared to the base year.

7.4 Overall GHG Emissions

For the Canada region only, the overall the GHG emissions increased compared to the base year by 10,846.8 CO₂e, or 207%. The breakdown of the contributions to the increase are shown below.

Table 5 – GHG Emission Increases

Source	Emissions Increase from Base Year [t CO ₂ e]	% of total
Buildings	890.0	8.21%
Vehicle Fleet	7,049.9	65.00%
Business Travel	2,906.9	26.80%
TOTAL increase	10,846.8	100.0%

8 VERIFICATION ACTIVITIES

BGIS has undertaken third party verification of this inventory. This report will be made available on BGIS' public website and will also be posted in the CSA CleanStart Registry.

AET Group has been engaged to provide a reasonable level of assurance for this GHG inventory. The verification statement will be posted in the CleanStart Registry.

APPENDIX A – GREENHOUSE GAS INVENTORY

Table A1 – Corporate Summary of Activity Data and GHG Emissions

BGIS CORPORATE Annual Energy and GHG Emissions Report - 2019

	2019					
	Measured	Estimated	Total	Unit	Total	Unit
Buildings						
Energy use from purchased electricity (indirect)	4,266,879	259,480	4,526,359	kWh	16,295	GJ
Energy use from purchased steam (indirect)	1,435,165	46,978	1,482,143	Lb	1,856	GJ
Energy use from purchased chilled water (indirect)	32,428	0	32,428	Ton-hrs	256	GJ
Energy use from natural gas use (direct)	211,738	32,454	244,192	m ³	9,852	GJ
Energy use from fuel oil use (direct)	6,091	0	6,091	liters	236	GJ
Total energy use	26,236	2,260			28,495	GJ
Water Consumption						
Total Water consumption	2,619		2,619	m ³		
Floor Area						
Total Floor Area	23,658	2,622	26,280	m ²		
Employees						
Total FTE			7,890	FTE		
Total FTE (head office only)			1,106	FTE		
Intensities						
Total energy intensity all properties	1,109	862	1,084.3	MJ/m ²		
Total energy intensity by FTE	3.325	0.286	3.612	GJ/FTE		
Total GHG intensity by FTE	0.122	0.025	0.147	t CO ₂ e/FTE		
Water intensity - head office	0.227		0.227	m ³ /m ²		
Water intensity - head office by FTE	1.535		1.535	m ³ /FTE		
GHG emissions						
t CO ₂ e emissions from direct energy use - CO ₂	454.8	62.7	517.5	t CO ₂ e		
t CO ₂ e emissions from direct energy use - CH ₄	0.22	0.04	0.26	t CO ₂ e		
t CO ₂ e emissions from direct energy use - N ₂ O	1.87	0.29	2.15	t CO ₂ e		
t CO ₂ e emissions from electricity use	332.3	134.1	466.4	t CO ₂ e		
t CO ₂ e emissions from steam use	159.49	3.78	163.27	t CO ₂ e		
t CO ₂ e emissions from chilled water use	12.24	0.00	12.24	t CO ₂ e		
t CO ₂ e emissions from building energy use - total	961.0	200.9	1,161.9	t CO ₂ e		
Refrigerant R-22, R-122, R-134a						
Leakage amount	0.00	2.85	2.85	kg		
t CO ₂ e direct emissions	0.000	0.4	0.4	t CO ₂ e		
Vehicle Fleet - Gasoline						
Total number of vehicles			47			

Fleet Energy Consumption

Energy use from purchased gasoline (direct)

4,636,004	0	4,636,004	liters	160,684	GJ
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Mileage

Total mileage

21,113,500	0	21,113,500	km		
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Fuel Efficiency

Fuel efficiency of fleet

22.0	0.0	22.0	l/100 km		
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GHG intensity of fleet

0.000534	0.000000	0.000534	t CO2e/km		
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GHG per vehicle

239.77	0.00	239.77	t CO2e/vehicle		
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GHG emissions

t CO2e emissions from direct energy use - CO2

10,595.3	0.0	10,595.3	t CO2e		
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t CO2e emissions from direct energy use - CH4

29.0	0.0	29.0	t CO2e		
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t CO2e emissions from direct energy use - N2O

644.9	0.0	644.9	t CO2e		
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t CO2e emissions from Vehicle Fleet - total

11,269.2	0.0	11,269.2	t CO2e		
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Vehicle Fleet - Ethanol

Fleet Energy Consumption

Energy use from purchased ethanol (direct)

1,637	0	1,637	liters	57	GJ
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GHG emissions

t CO2e emissions from direct energy use - CO2

2.9	0.0	2.9	t CO2e		
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t CO2e emissions from direct energy use - CH4

0.0	0.0	0.0	t CO2e		
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t CO2e emissions from direct energy use - N2O

0.0	0.0	0.0	t CO2e		
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t CO2e emissions from Vehicle Fleet - total

2.9	0.0	2.9	t CO2e		
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Vehicle Fleet - Diesel

Fleet Energy Consumption

Energy use from purchased diesel (direct)

22,754	0	22,754	liters	880	GJ
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GHG emissions

t CO2e emissions from direct energy use - CO2

61.0	0.0	61.0	t CO2e		
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t CO2e emissions from direct energy use - CH4

0.0	0.0	0.0	t CO2e		
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t CO2e emissions from direct energy use - N2O

1.3	0.0	1.3	t CO2e		
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t CO2e emissions from Vehicle Fleet - total

62.3	0.0	62.3	t CO2e		
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Air Travel

Number of kms travelled

16,369,937		16,369,937	km		
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GHG emissions

t CO2e emissions from other indirect - CO2

3,546.1		3,546.1	t CO2e		
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t CO2e emissions from other indirect - CH4

0.6		0.6	t CO2e		
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t CO2e emissions from other indirect - N2O

33.6		33.6	t CO2e		
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t CO2e emissions from Air Travel - total

3,580.3		3,580.3	t CO2e		
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Total Energy

				190,116	GJ
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Total GHG emissions

GHG emissions - by category

t CO2e emissions direct

11,791.4	63.4	11,854.8	t CO2e		
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t CO2e emissions from indirect energy use

504.0	137.9	641.9	t CO2e		
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t CO2e emissions from other indirect

3,580.3	0.0	3,580.3	t CO2e		
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t CO2e emissions total

15,875.7	201.3	16,077.1	t CO2e		
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GHG emissions - by gas

t CO2e emissions - CO2
t CO2e emissions - CH4
t CO2e emissions - N2O
t CO2e emissions - refrigerant
t CO2e emissions - total
 Total GHG intensity by FTE

15,164.2	200.6	15,364.8	t CO2e		
29.9	0.0	29.9	t CO2e		
681.6	0.3	681.9	t CO2e		
0.0	0.4	0.4	t CO2e		
15,875.7	201.3	16,077.1	t CO2e		
2.012	0.026	2.038	t CO2e		

Table A2 – Canada Region Summary of Activity Data and GHG Emissions

CANADA	2019					
	Measured	Estimated	Total	Unit	Total	Unit
Buildings						
Energy use from purchased electricity (indirect)	3,975,725	99,265	4,074,989	kWh	14,670	GJ
Energy use from purchased steam (indirect)	1,435,165	46,978	1,482,143	Lb	1,856	GJ
Energy use from purchased chilled water (indirect)	32,428	0	32,428	Ton-hrs	256	GJ
Energy use from natural gas use (direct)	207,167	30,624	237,792	m3	9,281	GJ
Energy use from fuel oil use (direct)	6,091	0	6,091	liters	236	GJ
Total energy use	24,688	1,611			26,299	GJ
Water Consumption						
Total Water consumption	1,620		1,620	m3		
Floor Area						
Total Floor Area	19,599	1,388	20,987	m2		
Employees						
Total FTE			5,928	FTE		
Total FTE (head office only)			1,106	FTE		
Intensities						
Total energy intensity all properties	1,259.7	1,160.8	1,253.1	MJ/m2		
Total energy intensity by FTE	4.165	0.272	4.436	GJ/FTE		
Total GHG intensity by FTE	0.133	0.016	0.149	t CO2e/FTE		
Water intensity - head office	0.227		0.227	m3/m2		
Water intensity - head office by FTE	1.535		1.535	m3/FTE		
GHG emissions						
t CO2e emissions from direct energy use - CO2	429.7	58.7	488.4	t CO2e		
t CO2e emissions from direct energy use - CH4	0.21	0.03	0.24	t CO2e		
t CO2e emissions from direct energy use - N2O	1.85	0.28	2.13	t CO2e		
t CO2e emissions from electricity use	183.6	31.5	215.2	t CO2e		
t CO2e emissions from steam use	159.49	3.78	163.27	t CO2e		
t CO2e emissions from chilled water use	12.24	0.00	12.24	t CO2e		
t CO2e emissions from building energy use - total	787.1	94.3	881.4	t CO2e		
Refrigerant R-22, R-122, R-134a						
Leakage amount	0.00	2.85	2.85	kg		
t CO2e direct emissions	0.000	0.4	0.4	t CO2e		
Vehicle Fleet - Gasoline						
Total number of vehicles			966			
Fleet Energy Consumption						
Energy use from purchased gasoline (direct)	4,185,557		4,185,557	liters	145,071	GJ
Mileage						
Total mileage	19,731,812	0	19,731,812	km		
Fuel Efficiency						
Fuel efficiency of fleet	21.2	0.0	21.2	l/100 km		

GHG intensity of fleet	0.000523	0.000000	0.000523	t CO2e/km		
GHG per vehicle	10.69	0.00	10.69	t CO2e/vehicle		

GHG emissions

<i>t CO2e emissions from direct energy use - CO2</i>	9,656.1		9,656.1	t CO2e		
<i>t CO2e emissions from direct energy use - CH4</i>	28.1		28.1	t CO2e		
<i>t CO2e emissions from direct energy use - N2O</i>	643.3		643.3	t CO2e		
<i>t CO2e emissions from Vehicle Fleet - total</i>	10,327.5	0.0	10,327.5	t CO2e		

Vehicle Fleet - Ethanol

Fleet Energy Consumption

Energy use from purchased ethanol (direct)	0		0	liters	0	GJ
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GHG emissions

<i>t CO2e emissions from direct energy use - CO2</i>	0.0		0.0	t CO2e		
<i>t CO2e emissions from direct energy use - CH4</i>	0.0		0.0	t CO2e		
<i>t CO2e emissions from direct energy use - N2O</i>	0.0		0.0	t CO2e		
<i>t CO2e emissions from Vehicle Fleet - total</i>	0.0	0.0	0.0	t CO2e		

Vehicle Fleet - Diesel

Fleet Energy Consumption

Energy use from purchased diesel (direct)	22,687		22,687	liters	878	GJ
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GHG emissions

<i>t CO2e emissions from direct energy use - CO2</i>	60.8		60.8	t CO2e		
<i>t CO2e emissions from direct energy use - CH4</i>	0.0		0.0	t CO2e		
<i>t CO2e emissions from direct energy use - N2O</i>	1.3		1.3	t CO2e		
<i>t CO2e emissions from Vehicle Fleet - total</i>	62.1	0.0	62.1	t CO2e		

Air Travel

Number of kms travelled	7,314,054		7,314,054	km		
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GHG emissions

<i>t CO2e emissions from other indirect - CO2</i>	1,592.1		1,592.1	t CO2e		
<i>t CO2e emissions from other indirect - CH4</i>	0.3		0.3	t CO2e		
<i>t CO2e emissions from other indirect - N2O</i>	15.1		15.1	t CO2e		
<i>t CO2e emissions from Air Travel - total</i>	1,607.5		1,607.5	t CO2e		

Total Energy

					172,248	GJ
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Total GHG emissions

GHG emissions - by category

<i>t CO2e emissions direct</i>	10,821.4	59.4	10,880.8	t CO2e		
<i>t CO2e emissions from indirect energy use</i>	355.4	35.3	390.7	t CO2e		
<i>t CO2e emissions from other indirect</i>	1,607.5	0.0	1,607.5	t CO2e		
<i>t CO2e emissions total</i>	12,784.3	94.7	12,879.0	t CO2e		

GHG emissions - by gas

<i>t CO2e emissions - CO2</i>	12,094.1	94.0	12,188.0	t CO2e		
<i>t CO2e emissions - CH4</i>	28.7	0.0	28.7	t CO2e		
<i>t CO2e emissions - N2O</i>	661.5	0.3	661.8	t CO2e		
<i>t CO2e emissions - refrigerant</i>	0.0	0.4	0.4	t CO2e		
<i>t CO2e emissions - total</i>	12,784.3	94.7	12,879.0	t CO2e		
Total GHG intensity by FTE	2.157	0.016	2.173	t CO2e		

Table A3 – US Region Summary of Activity Data and GHG Emissions

US	2019					
	Measured	Estimated	Total	Unit	Total	Unit
Buildings						
Energy use from purchased electricity (indirect)	108,345	0	108,345	kWh	390	GJ
Energy use from purchased steam (indirect)	0	0	0	Lb	0	GJ
Energy use from purchased chilled water (indirect)	0	0	0	Ton-hrs	0	GJ
Energy use from natural gas use (direct)	4,740	0	4,740	therms	500	GJ
Energy use from fuel oil use (direct)	0	0	0	USgal	0	GJ
Total energy use	890	0			890	GJ
Water Consumption						
Total Water consumption	998		998	m3		
Floor Area						
Total Floor Area	1,607	0	1,607	m2		
Employees						
Total FTE			650	FTE		
Total FTE (head office only)			650	FTE		
Intensities						
Total energy intensity all properties	553.7	0.0	553.7	MJ/m2		
Total energy intensity by FTE	1.369	0.000	1.369	GJ/FTE		
Total GHG intensity by FTE	0.076	0.000	0.076	t CO2e/FTE		
Water intensity - head office			0.000	m3/m2		
Water intensity - head office by FTE			0.000	m3/FTE		
GHG emissions						
<i>t CO2e emissions from direct energy use - CO2</i>	25.1	0.0	25.1	t CO2e		
<i>t CO2e emissions from direct energy use - CH4</i>	0.01	0.00	0.01	t CO2e		
<i>t CO2e emissions from direct energy use - N2O</i>	0.02	0.00	0.02	t CO2e		
<i>t CO2e emissions from electricity use</i>	24.5	0.0	24.5	t CO2e		
<i>t CO2e emissions from steam use</i>	0.00	0.00	0.00	t CO2e		
<i>t CO2e emissions from chilled water use</i>	0.00	0.00	0.00	t CO2e		
<i>t CO2e emissions from building energy use - total</i>	49.6	0.0	49.6	t CO2e		
Refrigerant R-22, R-122, R-134a						
Leakage amount	0.00	0.00	0.00	kg		
<i>t CO2e direct emissions</i>	0.000	0.0	0.0	t CO2e		
Vehicle Fleet - Gasoline + Gasoline E10						
Total number of vehicles			47			
Fleet Energy Consumption						
Energy use from purchased gasoline (direct)	450,447		450,447	liters	15,612	GJ
Mileage						
Total mileage	1,381,688	0	1,381,688	km		
Fuel Efficiency						
Fuel efficiency of fleet	32.6	0.0	32.6	l/100 km		

GHG intensity of fleet	0.000682	0.000000	0.000682	t CO2e/km		
GHG per vehicle	20.04	0.00	20.04	t CO2e/vehicle		

GHG emissions

<i>t CO2e emissions from direct energy use - CO2</i>	939.2		939.2	t CO2e		
<i>t CO2e emissions from direct energy use - CH4</i>	0.9		0.9	t CO2e		
<i>t CO2e emissions from direct energy use - N2O</i>	1.6		1.6	t CO2e		
<i>t CO2e emissions from Vehicle Fleet - total</i>	941.7	0.0	941.7	t CO2e		

Vehicle Fleet - Ethanol E85

Fleet Energy Consumption

Energy use from purchased ethanol (direct)	1,637		1,637	liters	57	GJ
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GHG emissions

<i>t CO2e emissions from direct energy use - CO2</i>	2.9		2.9	t CO2e		
<i>t CO2e emissions from direct energy use - CH4</i>	0.0		0.0	t CO2e		
<i>t CO2e emissions from direct energy use - N2O</i>	0.0		0.0	t CO2e		
<i>t CO2e emissions from Vehicle Fleet - total</i>	2.9	0.0	2.9	t CO2e		

Vehicle Fleet - Diesel

Fleet Energy Consumption

Energy use from purchased diesel (direct)	66		66	liters	3	GJ
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GHG emissions

<i>t CO2e emissions from direct energy use - CO2</i>	0.2		0.2	t CO2e		
<i>t CO2e emissions from direct energy use - CH4</i>	0.0		0.0	t CO2e		
<i>t CO2e emissions from direct energy use - N2O</i>	0.0		0.0	t CO2e		
<i>t CO2e emissions from Vehicle Fleet - total</i>	0.2	0.0	0.2	t CO2e		

Air Travel

Number of kms travelled	4,683,603		4,683,603	km		
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GHG emissions

<i>t CO2e emissions from other indirect - CO2</i>	1,003.3		1,003.3	t CO2e		
<i>t CO2e emissions from other indirect - CH4</i>	0.2		0.2	t CO2e		
<i>t CO2e emissions from other indirect - N2O</i>	9.5		9.5	t CO2e		
<i>t CO2e emissions from Air Travel - total</i>	1,013.0		1,013.0	t CO2e		

Total Energy

					16,562	GJ
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Total GHG emissions

GHG emissions - by category

<i>t CO2e emissions direct</i>	970.0	0.0	970.0	t CO2e		
<i>t CO2e emissions from indirect energy use</i>	24.5	0.0	24.5	t CO2e		
<i>t CO2e emissions from other indirect</i>	1,013.0	0.0	1,013.0	t CO2e		
<i>t CO2e emissions total</i>	2,007.4	0.0	2,007.4	t CO2e		

GHG emissions - by gas

<i>t CO2e emissions - CO2</i>	1,995.3	0.0	1,995.3	t CO2e		
<i>t CO2e emissions - CH4</i>	1.0	0.0	1.0	t CO2e		
<i>t CO2e emissions - N2O</i>	11.1	0.0	11.1	t CO2e		
<i>t CO2e emissions - refrigerant</i>	0.0	0.0	0.0	t CO2e		
<i>t CO2e emissions - total</i>	2,007.4	0.0	2,007.4	t CO2e		
Total GHG intensity by FTE	3.088	0.000	3.088	t CO2e		

Table A4 – APAC Region Summary of Activity Data and GHG Emissions

APAC	2019					
	Measured	Estimated	Total	Unit	Total	Unit
Buildings						
Energy use from purchased electricity (indirect)	182,809	160,216	343,025	kWh	1,235	GJ
Energy use from natural gas use (direct)	0	1,830	1,830	m3	71	GJ
Energy use from fuel oil use (direct)	0	0	0	liters	0	GJ
Total energy use	658	648			1,306	GJ
Water Consumption						
Total Water consumption	0		0	m3		
Floor Area						
Total Floor Area	2,452	1,234	3,686	m2		
Employees						
Total FTE			1,312	FTE		
Total FTE (head office only)			0	FTE		
Intensities						
Total energy intensity all properties	268.4	525.3	995.7	MJ/m2		
Total energy intensity by FTE	0.502	0.494	0.996	GJ//FTE		
Total GHG intensity by FTE	0.095	0.081	0.176	t CO2e/FTE		
Water intensity - head office	0.000		0.000	m3/m2		
Water intensity - head office by FTE				m3/FTE		
GHG emissions						
t CO2e emissions from direct energy use - CO2	0.0	4.0	4.0	t CO2e		
t CO2e emissions from direct energy use - CH4	0.00	0.01	0.01	t CO2e		
t CO2e emissions from direct energy use - N2O	0.00	0.00	0.00	t CO2e		
t CO2e emissions from electricity use	124.2	102.6	226.8	t CO2e		
t CO2e emissions from steam use	0.00	0.00	0.00	t CO2e		
t CO2e emissions from chilled water use	0.00	0.00	0.00	t CO2e		
t CO2e emissions from building energy use - total	124.2	106.6	230.8	t CO2e		
Air Travel						
Number of kms travelled	4,372,280		4,372,280	km		
GHG emissions						
t CO2e emissions from other indirect - CO2	950.6		950.6	t CO2e		
t CO2e emissions from other indirect - CH4	0.2		0.2	t CO2e		
t CO2e emissions from other indirect - N2O	9.0		9.0	t CO2e		
t CO2e emissions from Air Travel - total	959.8		959.8	t CO2e		
Total Energy					1,306	GJ
Total GHG emissions						
GHG emissions - by category						

t CO2e emissions direct
t CO2e emissions from indirect energy use
t CO2e emissions from other indirect
t CO2e emissions total

0.0	4.0	4.0	t CO2e		
124.2	102.6	226.8	t CO2e		
959.8	0.0	959.8	t CO2e		
1,084.0	106.6	1,190.6	t CO2e		

GHG emissions - by gas

t CO2e emissions - CO2
t CO2e emissions - CH4
t CO2e emissions - N2O
t CO2e emissions - refrigerant
t CO2e emissions - total
 Total GHG intensity by FTE

1,074.9	106.6	1,181.5	t CO2e		
0.2	0.0	0.2	t CO2e		
9.0	0.0	9.0	t CO2e		
0.0	0.0	0.0	t CO2e		
1,084.0	106.6	1,190.6	t CO2e		
0.826	0.081	0.907	t CO2e//FTE		

APPENDIX B – EMISSION FACTORS and GLOBAL WARMING POTENTIALS

EMISSION FACTORS and ENERGY CONVERSION FACTORS

Tables B1 to B4 summarize the emission factors and energy conversion factors used for each region and for air travel calculations.

Table B1 – Emission Factors and Energy Conversion Factors – Canada

CANADA

Emission Source	Emission Factor	Source of Emissions Factor
Natural gas (Carbon Dioxide) (Alberta)	1.928 kg CO ₂ /m ³	Canada's National Inventory Report 1990-2018, Part 2, Annex 6, Table A6-1
Natural gas (Carbon Dioxide) (BC)	1.926 kg CO ₂ /m ³	
Natural gas (Carbon Dioxide) (Manitoba)	1.886 kg CO ₂ /m ³	
Natural gas (Carbon Dioxide) (Ontario)	1.888 kg CO ₂ /m ³	
Natural gas (Carbon Dioxide) (Quebec)	1.887 kg CO ₂ /m ³	
Natural gas (Methane) (Canada)	0.000037 kg CH ₄ /m ³	Canada's National Inventory Report 1990-2018, Part 2, Annex 6, Table A6-2
Natural gas (Nitrous Oxide) (Canada)	0.000035 kg N ₂ O/m ³	
Fuel Oil (Carbon Dioxide) (Canada)	2.753 kg CO ₂ /l	Canada's National Inventory Report 1990-2018, Annex 6, Table A6-4
Fuel Oil (Methane) (Canada)	0.000026 kg CH ₄ /l	
Fuel Oil (Nitrous Oxide) (Canada)	0.000031 kg N ₂ O/l	
Electricity (Carbon Dioxide) (Alberta): 2017	0.62 kg CO ₂ /kWh	Canada's National Inventory Report 1990-2018, Part 3, Annex 13, Table A13-2 to A13-12
Electricity (Carbon Dioxide) (BC): 2017	0.012 kg CO ₂ /kWh	
Electricity (Carbon Dioxide) (Manitoba): 2017	0.0013 kg CO ₂ /kWh	
Electricity (Carbon Dioxide) (NB): 2017	0.28 kg CO ₂ /kWh	
Electricity (Carbon Dioxide) (NL island): 2017	0.19 kg CO ₂ /kWh	
Electricity (Carbon Dioxide) (NS): 2017	0.72 kg CO ₂ /kWh	
Electricity (Carbon Dioxide) (Ontario): 2017	0.029 kg CO ₂ /kWh	
Electricity (Carbon Dioxide) (Quebec): 2017	0.0013 kg CO ₂ /kWh	
Electricity (Methane) (Alberta): 2017	0.00005 kg CH ₄ /kWh	
Electricity (Methane) (BC): 2017	0.000003 kg CH ₄ /kWh	
Electricity (Methane) (Manitoba): 2017	0.0000001 kg CH ₄ /kWh	
Electricity (Methane) (NB): 2017	0.00002 kg CH ₄ /kWh	
Electricity (Methane) (NL island): 2017	0.00002 kg CH ₄ /kWh	
Electricity (Methane) (NS): 2017	0.00003 kg CH ₄ /kWh	
Electricity (Methane) (Ontario): 2017	0.00001 kg CH ₄ /kWh	
Electricity (Methane) (Quebec): 2017	0 kg CH ₄ /kWh	
Electricity (Nitrous Oxide) (Alberta): 2017	0.00001 kg N ₂ O/kWh	
Electricity (Nitrous Oxide) (BC): 2017	0.0000007 kg N ₂ O/kWh	
Electricity (Nitrous Oxide) (Manitoba): 2017	0 kg N ₂ O/kWh	
Electricity (Nitrous Oxide) (NB): 2017	0.000005 kg N ₂ O/kWh	
Electricity (Nitrous Oxide) (NL island): 2017	0.000004 kg N ₂ O/kWh	
Electricity (Nitrous Oxide) (NS): 2017	0.00001 kg N ₂ O/kWh	
Electricity (Nitrous Oxide) (Ontario): 2017	0.000001 kg N ₂ O/kWh	
Electricity (Nitrous Oxide) (Quebec): 2017	0 kg N ₂ O/kWh	

Gasoline (Carbon Dioxide)	2.307 kg CO ₂ /l	Canada's National Inventory Report 1990-2018, Annex 6, Table A6-13, Tier 1 Light Duty Gasoline Trucks
Gasoline ((Methane)	0.00024 kg CH ₄ /l	
Gasoline (Nitrous Oxide)	0.00058 kg N ₂ O/l	
Ethanol (Carbon Dioxide)	1.508	Canada's National Inventory Report 1990-2018, Annex 6, Table A6-13 + Tier 1 Light Duty Gasoline Trucks
Ethanol ((Methane)	0.00024 kg CH ₄ /l	
Ethanol (Nitrous Oxide)	0.00058 kg N ₂ O/l	
Diesel Oil (Carbon Dioxide)	2.681 kg CO ₂ /l	Canada's National Inventory Report 1990-2018, Annex 6, Table A6-13, Light Duty Diesel Vehicles Moderate Control
Diesel Oil ((Methane)	0.000068 kg CH ₄ /l	
Diesel Oil (Nitrous Oxide)	0.00021 kg N ₂ O/l	
Propane (Carbon Dioxide)	1.515 kg CO ₂ /l	Canada's National Inventory Report 1990-2018, Annex 6, Table A6-13
Propane ((Methane)	0.00064 kg CH ₄ /l	
Propane (Nitrous Oxide)	0.000028 kg N ₂ O/l	
Steam (BC) (Carbon Dioxide equivalent)	80.5 g CO ₂ e/lb	Personal communication with Central Heat Distribution, Vancouver
Steam (ON) (Carbon Dioxide equivalent)	0.0892 g CO ₂ e/GJ	FEDERAL GREENHOUSE GAS TRACKING PROTOCOL, A common standard for federal operations, Version 3.1, November 2010
Chilled Water (ON) (Carbon Dioxide equivalent)	0.0478 g CO ₂ e/GJ	
Energy Type	Conversion Factor	Source of Conversion Factor
GJ of Natural gas to cubic meters	0.03903	Statistics Canada Catalogue no. 57-003-X Report on Energy Supply and Demand in Canada 2017 Preliminary - Energy Conversion Factors Table

Table B2 – Emission Factors and Energy Conversion Factors – US

US

Emission Source	Emission Factor	Source of Emissions Factor
Natural gas (Carbon Dioxide) (US)	5.307 kg CO2/therm	EPA Centre for Corporate Climate Leadership, GHG Emission Factors Hub https://www.epa.gov/climateleadership/center-corporate-climate-leadership-ghg-emission-factors-hub
Natural gas (Methane) (US)	0.0001 kg CH4/therm	
Natural gas (Nitrous Oxide) (US)	0.00001 kg N2O/therm	
Electricity (Carbon Dioxide) (California): 2018	0.19069 kg CO2/kWh	eGRID emission factors data 2018
Electricity (Carbon Dioxide) (Massachusetts): 2018	0.33002 kg CO2/kWh	
Electricity (Carbon Dioxide) (Maryland): 2018	0.37909 kg CO2/kWh	
Electricity (Carbon Dioxide) (Virginia): 2018	0.33536 kg CO2/kWh	
Electricity (Carbon Dioxide) (Washington): 2018	0.09009 kg CO2/kWh	
Electricity (Methane) (California): 2018	0.0000122 kg CH4/kWh	
Electricity (Methane) (Massachusetts): 2018	0.0000449 kg CH4/kWh	
Electricity (Methane) (Maryland): 2018	0.0000367 kg CH4/kWh	
Electricity (Methane) (Virginia): 2018	0.000029 kg CH4/kWh	
Electricity (Methane) (Washington): 2018	0.0000095 kg CH4/kWh	
Electricity (Nitrous Oxide) (California): 2018	0.0000014 kg N2O/kWh	
Electricity (Nitrous Oxide) (Massachusetts): 2018	0.0000059 kg N2O/kWh	
Electricity (Nitrous Oxide) (Maryland): 2018	0.000005 kg N2O/kWh	
Electricity (Nitrous Oxide) (Virginia): 2018	0.0000041 kg N2O/kWh	
Electricity (Nitrous Oxide) (Washington): 2018	0.0000014 kg N2O/kWh	
Gasoline (Carbon Dioxide)	2.319 kg CO2/l	EPA Centre for Corporate Climate Leadership, GHG Emission Factors Hub https://www.epa.gov/climateleadership/center-corporate-climate-leadership-ghg-emission-factors-hub
Gasoline ((Methane)	0.000100 kg CH4/l	
Gasoline (Nitrous Oxide)	0.000021 kg N2O/l	
Ethanol (Carbon Dioxide)	2.239 kg CO2/l	
Ethanol ((Methane)	0.000093 kg CH4/l	
Ethanol (Nitrous Oxide)	0.000019 kg N2O/l	

Table B3 – Emission Factors and Energy Conversion Factors – APAC

APAC

Emission Source	Emission Factor	Source of Emissions Factor
Natural gas (Carbon Dioxide) (South Korea): 2014	1.928 kg CO ₂ /m ³	emissionfactors.com
Natural gas (Methane) (South Korea): 2014	0.000037 kg CH ₄ /m ³	
Natural gas (Nitrous Oxide) (South Korea): 2014	0.000035 kg N ₂ O/m ³	
Electricity (Carbon Dioxide equiv.) (Australian Capital): 2017	0.83 kg CO ₂ e/kWh	National Greenhouse Accounts Factors- Australian Government July 2018, Table 5
Electricity (Carbon Dioxide equiv.) (New South Wales): 2017	0.83 kg CO ₂ e/kWh	
Electricity (Carbon Dioxide equiv.) (Northern Territory): 2017	0.64 kg CO ₂ e/kWh	
Electricity (Carbon Dioxide equiv.) (Queensland): 2017	0.79 kg CO ₂ e/kWh	
Electricity (Carbon Dioxide equiv.) (South Australia): 2017	0.49 kg CO ₂ e/kWh	
Electricity (Carbon Dioxide equiv.) (Victoria): 2017	1.08 kg CO ₂ e/kWh	
Electricity (Carbon Dioxide equiv.) (Western Australia): 2017	0.7 kg CO ₂ e/kWh	
Electricity (Carbon Dioxide equiv.) (New Zealand): 2014	0.119 kg CO ₂ e/kWh	Voluntary GHG Reporting 2016 emission factors
Electricity (Carbon Dioxide equiv.) (Hong Kong): 2017	0.79 kg CO ₂ e/kWh	HK Electric Carbon Calculator
Electricity (Carbon Dioxide equiv.) (South Korea): 2014	0.0848 kg CO ₂ e/kWh	emissionfactors.com
Electricity (Carbon Dioxide equiv.) (Singapore): 2017	0.4192 kg CO ₂ e/kWh	Energy Market Authority, Electricity Grid Emissions Factors and Upstream Fugitive Methane Emission Factor

Table B4 – Emission Factors for Air Travel Calculations

Air Flight – Short <500 km		From DEFRA UK 2018 GOVERNMENT GHG CONVERSION FACTORS FOR COMPANY REPORTING accompanying emission factor spreadsheet - https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2018 . Includes Radiative Forcing Factor of 1.891 and Uplift Factor of 1.08
Air Flight – Short (Carbon Dioxide)	0.318943 kg CO ₂ e/p.km	
Air Flight – Short (Methane)	0.000245 kg CO ₂ e/p.km	
Air Flight – Short (Nitrous Oxide)	0.003023 kg CO ₂ e/p.km	
Air Flight – Medium Haul 500 km to 1600 km		
Air Flight – Medium (Carbon Dioxide)	0.227326 kg CO ₂ e/p.km	
Air Flight – Medium (Methane)	0.00002 kg CO ₂ e/p.km	
Air Flight – Medium (Nitrous Oxide)	0.002144 kg CO ₂ e/p.km	
Air Flight – Long Haul >1600 km		
Air Flight – Long (Carbon Dioxide)	0.195467 kg CO ₂ e/p.km	
Air Flight – Long (Methane)	0.00002 kg CO ₂ e/p.km	
Air Flight – Long (Nitrous Oxide)	0.001858 kg CO ₂ e/p.km	

GLOBAL WARMING POTENTIALS

Table B2 summarizes the global warming potential values.

Table B2 – Global Warming Potentials

Greenhouse Gas	Global Warming Potential	Source of Emissions Factor
Carbon Dioxide GWP (100-yr)	1	from IPCC Fifth Assessment Report https://www.ipcc.ch/report/ar5/syr/ - Box 3.2, Table 1
Methane GWP (100-yr)	28	
Nitrous Oxide GWP (100-yr)	265	
Refrigerant HFC-R22 (100-yr GWP)	1760 t CO ₂ e/ tonne of refrigerant	
Refrigerant HFC-R134a (100-yr GWP)	1300 t CO ₂ e/ tonne of refrigerant	
Refrigerant HFC-R123 (100-yr GWP)	79 t CO ₂ e/ tonne of refrigerant	

APPENDIX C – STANDARD REPORTING DECLARATION

REPORTING INFORMATION

The following table provides a summary of the reporting information required by ISO Standard 14064-1:2018(E) provided in the “declaration” column is our GHG statement for this inventory

No.	CSA Reporting Requirement	Declaration
A	Description of the reporting organization.	BGIS is a facility management company based in Canada, US and APAC. The GHG inventory consists of the following sources: <ul style="list-style-type: none"> - Building energy for leased offices - Vehicle fleet - Business air travel
B	Person responsible	Evan Jones, Professional Services Information Manager, BGIS
C	Reporting period covered	January 1, 2019 to December 31, 2019
D	Documentation of organizational boundary.	Operational Control Approach
E	Direct GHG emissions, quantified separately for each GHG, in tonnes of CO ₂ e.	See Table 2
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 direct and energy indirect GHG emissions sources and some other indirect sources. Only some refrigerant fugitive emissions have been excluded. 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 Table 2
J	The historical base year selected and the base-year GHG inventory.	October 1, 2012 to September 30, 2013

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 as this methodology has a considerable level of certainty and the most cost-effective to implement.
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 BGIS from various suppliers. Refrigerant data is based on total.
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 ISO Standard 14064-1:2018(E) Greenhouse gases - 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	This GHG inventory report has undergone third party verification to a reasonable level of assurance by AET Group. See the third party verification statement for further details.