



Greenhouse Gas Protocol (Dual Reporting) Report for Dawson College

Assessment Period: July 2017 - June 2018

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Assessment Details

Consolidation Approach

Operational Control

Organisational Boundaries

Operations of Dawson College

Included

- Dawson College
- Dawson College

Operational Boundary

- Air travel
- Bicycle
- Bus and coach
- Buses, whole vehicle
- Cars
- Composted waste
- Electricity
- Hired cars
- Landfilled waste
- Leased trucks
- Leased vans
- Motorcycle
- Natural gas
- Off-road vehicles and equipment
- On foot
- Rail (train, tram, light rail, underground)
- Recycled waste
- Refrigerant gas loss and other fugitive emissions

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Introduction

A greenhouse gas (GHG) emissions assessment quantifies the total greenhouse gases produced directly and indirectly from a business or organisation's activities. Also known as a carbon footprint, it is an essential tool, providing your business with a basis for understanding and managing its climate change impacts.

A GHG assessment quantifies all seven Kyoto greenhouse gases where applicable and is measured in units of carbon dioxide equivalence, or CO₂e¹. The seven Kyoto gases are carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), nitrogen trifluoride (NF₃), sulphur hexafluoride (SF₆) and perfluorocarbons (PFCs). The global warming potential (GWP) of each gas is illustrated in the Table 1.

Table 1. GWP of Kyoto Gases (IPCC 2013, without climate-carbon feedback)

Greenhouse Gas	GWP
Carbon dioxide (CO ₂)	1
Methane (CH ₄)	28
Nitrous oxide (N ₂ O)	265
Hydrofluorocarbons (HFCs)	1 - 12,400
Perfluorocarbons (PFCs)	1 - 11,100
Nitrogen trifluoride (NF ₃)	16,100
Sulphur hexafluoride (SF ₆)	23,500

This assessment has been carried out in accordance with the World Business Council for Sustainable Development and World Resources Institute's (WBCSD/WRI) Greenhouse Gas Protocol; a Corporate Accounting and Reporting Standard, including the GHG Protocol Scope 2 Guidance. This protocol is considered current best practice for corporate or organisational greenhouse gas emissions reporting. GHG emissions have been reported by the three WBCSD/WRI Scopes.

Scope 1 includes direct GHG emissions from sources that are owned or controlled by the company such as natural gas combustion and company owned vehicles.

Scope 2 accounts for GHG emissions from the generation of purchased electricity, heat and steam generated off-site. As the subject of this assessment operates in markets which offer contractual instruments with product or supplier-specific data, scope 2 emissions are reported using both the location-based method and the market-based method. The location-based method applies average emission factors that correspond to the grid where consumption occurs, whereas the market-based method applies emission factors that correspond to energy purchased (or not purchased) through contractual instruments. Contractual instruments include energy attribute certificates, direct energy contracts, and supplier specific emission rates. The subject of this assessment has ensured that any contractual instruments used in the market-based method have met the Scope 2 Quality Criteria, as defined in the Guidance. Where contractual instruments do not meet the Quality Criteria, or where contractual instruments were not purchased, market-based scope 2 emissions have been calculated using residual mix emission factors. Where residual mix emission factors are not available, market-based scope 2 emissions have been calculated using default location grid-average emission factors, per the Protocol hierarchy. This may result in double counting between electricity consumers, as an adjusted emission factor taking into account voluntary purchases of electricity with specific attributes was not available.

Scope 3 includes all other indirect emissions such as waste disposal, business travel and staff commuting. Reporting of these activities is optional under the WBCSD/WRI GHG Protocol, but as they can contribute a significant portion of overall emissions Ecometrica recommends they are reported where applicable.

A GHG assessment is an essential tool in the process of monitoring and reducing an organisation's climate change impact as it allows reduction targets to be set and action plans formulated. GHG assessment results can also allow organisations to be transparent about their climate change impacts through reporting of GHG emissions to customers, shareholders, employees and other stakeholders. Regular assessments allow clients to track their progress in achieving reductions over time and provide evidence to support green claims in external marketing initiatives such as product labelling or CSR reporting. Ecometrica GHG assessments are designed to be transparent, consistent and repeatable over time.

¹ Carbon dioxide equivalent or CO₂e is a term for describing different greenhouse gases in a common unit. For any quantity and type of greenhouse gas, CO₂e signifies the amount of CO₂ which would have the equivalent global warming impact.

Data Quality and Availability

In order to provide the most accurate estimate of an organisation's GHG emissions, primary (actual) data should be used where it is available, up to date and geographically relevant. Secondary data in the form of estimates, extrapolations and industry averages may be used when primary data is not available. Table 2 details the quality of data submitted for this assessment with the key assumptions used stated below.

Data Quality Overview



Location-based Accuracy Overview		
	tCO ₂ e/year	%
Actual	393	14.6
Estimated	2,294	85.4
Total	2,687	100



Market-based Accuracy Overview		
	tCO ₂ e/year	%
Actual	393	14.6
Estimated	2,294	85.4
Total	2,687	100

Table 2. Data Quality and Availability

Source of emissions	Data quality
Premises	
Composted waste	Estimated
Electricity	Estimated
Landfilled waste	Actual
Natural gas	Estimated
Off-road vehicles and equipment	Estimated
Other fuel(s)	N/A
Recycled waste	Actual
Refrigerant gas loss and other fugitive emissions	Actual
Business Travel	
Air travel	Actual
Bus and coach	Unknown
Buses, whole vehicle	Actual
Employee owned cars	Unknown
Hired cars	Actual
Hotel night stays	Unknown
Rail (train, tram, light rail, underground)	Unknown

Taxi	Unknown
Commuting	
Bicycle	Estimated
Bus and coach	Estimated
Cars	Mixed
Motorcycle	Actual
On foot	Estimated
Rail (train, tram, light rail, underground)	Estimated
Third Party Vehicle Use	
Leased trucks	Actual
Leased vans	Actual

Key Assumptions

Operational Scope

The operational scope of this assessment was selected by Dawson College, and included all Scope 1 and Scope 2 emission sources as well as Scope 3 waste data, commuting and business travel.

Market-Based Instruments

- It was confirmed by Dawson College that they did not purchase any market-based instruments for Scope 2 energy consumption in 2017-2018. Per the Scope 2 Protocol, residual mix factors are applied in the market-based method where available (i.e. European countries), and location-based factors are defaulted to in the market-based method where residual mix factors are not available.

Premises

- Due to billing periods, electricity consumption data covered the period didn't match the assessment period. For this reason, the electricity consumption at the beginning and the end of the assessment period had to be prorated for the number of days covered by the assessment period based on the actual data of the respective months. Actual data was available for the remaining of the assessment period.
- Due to billing periods, natural gas consumption data covered the period didn't match the assessment period. For this reason, natural gas consumption at the beginning and the end of the assessment period had to be prorated for the number of days covered by the assessment period based on the actual data of the respective months. Actual data was available for the remaining of the assessment period.
- Data for off-roads vehicles and equipment could not be reviewed due to lack of evidence.
- The refrigerant gas loss emissions are calculated based on actual data from invoices.
- Actual amount of waste, landfilled, recycled and composted, was available throughout the entire reporting period. The composted weight is estimated because the data was available in units of volume which Dawson College converted to weight based on data from Compost Montreal.

Commuting

- A survey of students and staff members was done by Dawson College to determine the percentage of use between each mode (bus, metro, car, carpooling, active transport and motorcycle) for both students and staff.
- The average distance was established through a survey done by the STM.
- Commuting data for car, carpooling, active transport and motorcycle was estimated based on the average distance (multiplied by 2 for return distance), the percentage of use and the respective number of students and staff members surveyed and was then extrapolated to take into account the actual number of students and staff members.
- The average number of student days (130.35) was confirmed by email by Dawson.
- The number of days work by staff was assumed to be 260.
- Commuting data for bus and metro was derived based on actual data from the STM where the total [passenger.km](#) for 2017 was available as well as the emission factor per [passenger.km](#) for both bus and metro.
- For the staff members survey, the sum of all modes being 99.9%, the remaining 0.1% was redistributed among all modes.
- For the students survey, the percentage for motorcycle was assumed 0% as the sum of all other modes was 100%.
- For carpooling, it was assumed that two students were traveling per car.

- It was assumed that active transport was equally divided between bicycle and on foot.

Business Travel

- Dawson College decided to include for 2017-2018 part of their scope 3 business travel emissions. Due to lack of actual data, the answers for rail, taxi, bus and coach and employee own cars were unavailable. Dawson College intend to improve data collection in future assessments.
- Hotel night stays have not been included in this assessment.
- Actual data for air travel and whole bus was available.

Third-Party Vehicle Use

- Data was available from actual invoices.

Assessment Summary for Dawson College

Gross Overall Emissions (location-based): 2,687 tCO₂e

Gross Overall Emissions (market-based): 2,687 tCO₂e

Key Performance Indicators

Absolute GHG emissions will vary over time and often correspond to the expansion or contraction of an organisation. It is useful therefore to use reporting metrics that take these effects into account and monitor relative GHG emissions intensity. A common emissions intensity metric is tonnes of CO₂e per full time equivalent. This has been calculated, along with other relevant metrics, in the table below:

Data	KPI
10,222 Number of students	0.263 tCO ₂ e per student (Location-Based)
78,949 Floor area (square metres)	0.034 tCO ₂ e per square metre (Location-Based)
795 Full Time Equivalent Employees	3.38 tCO ₂ e per Full Time Equivalent Employee (Location-Based)
10,222 Number of students	0.263 tCO ₂ e per student (Market-Based)
78,949 Floor area (square metres)	0.034 tCO ₂ e per square metre (Market-Based)
795 Full Time Equivalent Employees	3.38 tCO ₂ e per Full Time Equivalent Employee (Market-Based)

Summary by Activity (Location-Based, tCO₂e)



By Activity	tCO ₂ e/year	%
Premises	619	23
Business Travel	84.1	3.13
Commuting	1,984	73.8
Third Party Vehicle Use	0.571	0.0212
Total	2,687	100

Summary by Activity (Market-Based, tCO₂e)



By Activity	tCO ₂ e/year	%
Premises	619	23
Business Travel	84.1	3.13
Commuting	1,984	73.8
Third Party Vehicle Use	0.571	0.0212
Total	2,687	100

Summary by WBCSD/WRI Scope (Location-Based, tCO₂e)



Scope	tCO ₂ e/year	%
Scope 1	339	12.6
Scope 2	15.5	0.576
Scope 3	2,333	86.8
Total	2,687	100

Summary by WBCSD/WRI Scope (Market-Based, tCO₂e)



Scope	tCO ₂ e/year	%
Scope 1	339	12.6
Scope 2	15.5	0.576
Scope 3	2,333	86.8
Total	2,687	100

Summary by Greenhouse Gas

Greenhouse Gas	GWP	tGHG/year (Location-Based)	tCO ₂ e/year (Location-Based)	tGHG/year (Market-Based)	tCO ₂ e/year (Market-Based)
CO ₂	1	1,038	1,038	1,038	1,038
CH ₄	28	9.39	263	9.39	263
N ₂ O	265	0.0213	5.63	0.0213	5.63
Biogenic CH ₄	27	0.0531	1.43	0.0531	1.43
HFC-134a	1300	0.00113	1.47	0.00113	1.47
HFC-404a	3942.8	0.00318	12.5	0.00318	12.5
CO ₂ e	1	1,366	1,366	1,366	1,366
		Total	2,687		2,687

Summary of Scope 2 Market-Based Method for Dawson College

Energy Consumed and Emissions By Factor Type In Scope 2 Market-Based Method

Scope 2 Market-Based Energy



Scope 2 Market-Based Emissions



Emission Factor Type	Energy		Market-Based Emissions	
	MWh	%	tCO ₂ e	%
Client-supplied market-based instrument	0	0	0	0
Residual mix factors	0	0	0	0
Default location-based factors	13,734	100	15.5	100
Total	13,734	100	15.5	100

Detailed Results

Detailed Summary by WBCSD/WRI Scope

Location-Based methodology

Source of Emissions	tCO ₂ /yr	tCH ₄ /yr	tN ₂ O/yr	Total Emissions (tCO ₂ e/yr)	%
Scope 1 Total	323	0.00634	0.006	339	12.6%
Premises Total	323	0.00634	0.006	339	12.6%
Natural gas	323	0.00634	0.00599	325	12.1%
Off-road vehicles and equipment	0.067	1.82e-6	3.11e-6	0.0679	0.00253%
Refrigerant gas loss and other fugitive emissions	0	0	0	14	0.521%
Scope 2 Total	15.1	0	0.00137	15.5	0.576%
Premises Total	15.1	0	0.00137	15.5	0.576%
Electricity	15.1	0	0.00137	15.5	0.576%
Scope 3 Total	699	9.38	0.0139	2,333	86.8%
Business Travel Total	82.9	0.00247	0.00399	84.1	3.13%
Air travel	26.2	1.23e-4	8.37e-4	26.5	0.985%
Buses, whole vehicle	55.7	0.00229	0.00314	56.6	2.11%
Hired cars	0.973	5.9e-5	9.28e-6	0.977	0.0364%
Commuting Total	616	0.0376	0.00588	1,984	73.8%
Bicycle	0	0	0	0	0%
Bus and coach	0	0	0	1,365	50.8%
Cars	615	0.0373	0.00586	618	23%
Motorcycle	0.915	3.05e-4	1.63e-5	0.928	0.0345%
On foot	0	0	0	0	0%
Rail (train, tram, light rail, underground)	0	0	0	0.962	0.0358%
Premises Total	0	9.34	0.00398	264	9.83%
Composted waste	0	0	0.00398	2.49	0.0926%
Landfilled waste	0	9.34	0	262	9.74%
Recycled waste	0	0	0	0	0%
Third Party Vehicle Use Total	0.56	2.04e-5	3.89e-5	0.571	0.0212%
Leased trucks	0.435	1.28e-5	3.77e-5	0.446	0.0166%
Leased vans	0.125	7.58e-6	1.19e-6	0.125	0.00467%
Total	1,038	9.39	0.0213	2,687	100%

Market-Based methodology

Source of Emissions	tCO ₂ /yr	tCH ₄ /yr	tN ₂ O/yr	Total Emissions (tCO ₂ e/yr)	%
Scope 1 Total	323	0.00634	0.006	339	12.6%
Premises Total	323	0.00634	0.006	339	12.6%

Natural gas	323	0.00634	0.00599	325	12.1%
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Electricity	15.1	0	0.00137	15.5	0.576%
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Commuting Total	616	0.0376	0.00588	1,984	73.8%
Bicycle	0	0	0	0	0%
Bus and coach	0	0	0	1,365	50.8%
Cars	615	0.0373	0.00586	618	23%
Motorcycle	0.915	3.05e-4	1.63e-5	0.928	0.0345%
On foot	0	0	0	0	0%
Rail (train, tram, light rail, underground)	0	0	0	0.962	0.0358%
Premises Total	0	9.34	0.00398	264	9.83%
Composted waste	0	0	0.00398	2.49	0.0926%
Landfilled waste	0	9.34	0	262	9.74%
Recycled waste	0	0	0	0	0%
Third Party Vehicle Use Total	0.56	2.04e-5	3.89e-5	0.571	0.0212%
Leased trucks	0.435	1.28e-5	3.77e-5	0.446	0.0166%
Leased vans	0.125	7.58e-6	1.19e-6	0.125	0.00467%
Total	1,038	9.39	0.0213	2,687	100%

Summary by Company Unit

Location-Based methodology

Assessment	July 2016 - June 2017		July 2017 - June 2018	
Company Unit	Total Emissions (tCO ₂ e)	Emissions per FTE (tCO ₂ e/FTE)	Total Emissions (tCO ₂ e)	Emissions per FTE (tCO ₂ e/FTE)
Dawson College	600	0.777	2,687	3.38
Dawson College	600	-	2,687	-

Market-Based methodology

Assessment	July 2016 - June 2017		July 2017 - June 2018	
Company Unit	Total Emissions (tCO₂e)	Emissions per FTE (tCO₂e/FTE)	Total Emissions (tCO₂e)	Emissions per FTE (tCO₂e/FTE)
Dawson College	600	0.777	2,687	3.38
Dawson College	600	-	2,687	-

Annual Activity Data

Source of Emissions	Value	Unit
Business Travel		
Air travel		
Long-haul, economy	307,753	pass.km
Buses, whole vehicle		
Diesel Bus	64,926	km
Hired cars		
Average gasoline cars	5,050	km
Commuting		
Bicycle		
Bicycle	1,526,147	km
Bus and coach		
Total CO2e emissions	1,365	tonne
Cars		
Average gasoline cars	3,192,384	km
Motorcycle		
Motorbike	7,346	km
On foot		
On foot	1,526,147	km
Rail (train, tram, light rail, underground)		
Transit rail	962	kg
Premises		
Composted waste		
Composted waste (wet weight basis)	13,268	kg
Electricity		
Electricity consumption	13,733,682	kWh
Landfilled waste		
Waste, landfilled, MSW	173	tonne
Natural gas		
Natural gas consumption (gross CV)	171,235	m3
Off-road vehicles and equipment		
Mobile equipment and off-road vehicles, diesel	25	l
Recycled waste		
Waste, recycled	64.1	tonne
Refrigerant gas loss and other fugitive emissions		
HFC-134a emissions	2.5	lb
R404a emissions	7	lb
Third Party Vehicle Use		
Leased trucks		
Gasoline medium and heavy duty truck	854	km

Leased vans

Gasoline light duty truck, passenger transportation

480

km

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none - direct emissions entry