



# Greenhouse Gas Protocol (Dual Reporting) Report for Dawson College

Assessment Period: July 2016 - June 2017

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# Assessment Details

## Consolidation Approach

Operational Control

## Organisational Boundaries

Operations of Dawson College

### Included

- Dawson College
- Dawson College

## Operational Boundary

- Composted waste
- Electricity
- Landfilled waste
- Natural gas
- Off-road vehicles and equipment
- Other fuel(s)
- 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 CO<sub>2</sub>e<sup>1</sup>. The seven Kyoto gases are carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), hydrofluorocarbons (HFCs), nitrogen trifluoride (NF<sub>3</sub>), sulphur hexafluoride (SF<sub>6</sub>) 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 <sub>2</sub> )	1
Methane (CH <sub>4</sub> )	28
Nitrous oxide (N <sub>2</sub> O)	265
Hydrofluorocarbons (HFCs)	1 - 12,400
Perfluorocarbons (PFCs)	1 - 11,100
Nitrogen trifluoride (NF <sub>3</sub> )	16,100
Sulphur hexafluoride (SF <sub>6</sub> )	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.

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<sup>1</sup> Carbon dioxide equivalent or CO<sub>2</sub>e is a term for describing different greenhouse gases in a common unit. For any quantity and type of greenhouse gas, CO<sub>2</sub>e signifies the amount of CO<sub>2</sub> 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 <sub>2</sub> e/year	%
Actual	592	98.7
Estimated	8.06	1.34
<b>Total</b>	<b>600</b>	<b>100</b>



Market-based Accuracy Overview		
	tCO <sub>2</sub> e/year	%
Actual	592	98.7
Estimated	8.06	1.34
<b>Total</b>	<b>600</b>	<b>100</b>

**Table 2. Data Quality and Availability**

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

Taxi	N/A
<b>Commuting</b>	
Bicycle	N/A
Bus and coach	N/A
Cars	N/A
Motorcycle	N/A
On foot	N/A
Rail (train, tram, light rail, underground)	N/A

## 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.

### 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. 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 from June 10, 2016 to June 15, 2017. 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 from June 15, 2016 to June 14, 2017. 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 diesel for the generator is recharged on demand. The latest invoice covered the period from August 2014 to December 2016 (856 days). A daily average of diesel consumption was derived based on the total amount. That daily average was applied to the full reporting period.
- The refrigerant gas loss corresponded to R-408a which was determined to be R-22 (47%), R-143a (46%) and R-125 (7%) for a total GWP (AR5) of 2429.9. Ecometrica used this calculated GWP to calculate emissions of R-408a, data confirmed by Dawson College. Another refrigerant gas loss was attributed to leaks from CO2 incubator and weight was estimated by Dawson College.
- Actual amount of waste, landfilled, recycled and composted, was available throughout the entire reporting period.

# Assessment Summary for Dawson College

**Gross Overall Emissions (location-based): 600 tCO<sub>2</sub>e**

**Gross Overall Emissions (market-based): 600 tCO<sub>2</sub>e**

## 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 CO<sub>2</sub>e per full time equivalent. This has been calculated, along with other relevant metrics, in the table below:

Data	KPI
10,964 Number of students	0.0548 tCO <sub>2</sub> e per student (Location-Based)
78,949 Floor area (square metres)	0.0076 tCO <sub>2</sub> e per square metre (Location-Based)
773 Full Time Equivalent Employees	0.777 tCO <sub>2</sub> e per Full Time Equivalent Employee (Location-Based)
10,964 Number of students	0.0548 tCO <sub>2</sub> e per student (Market-Based)
78,949 Floor area (square metres)	0.0076 tCO <sub>2</sub> e per square metre (Market-Based)
773 Full Time Equivalent Employees	0.777 tCO <sub>2</sub> e per Full Time Equivalent Employee (Market-Based)

## Summary by Activity (Location-Based, tCO<sub>2</sub>e)



By Activity	tCO <sub>2</sub> e/year	%
Premises	600	100
<b>Total</b>	<b>600</b>	<b>100</b>

## Summary by Activity (Market-Based, tCO<sub>2</sub>e)



By Activity	tCO <sub>2</sub> e/year	%
Premises	600	100
<b>Total</b>	<b>600</b>	<b>100</b>

## Summary by WBCSD/WRI Scope (Location-Based, tCO<sub>2</sub>e)



Scope	tCO <sub>2</sub> e/year	%
Scope 1	334	55.7
Scope 2	15.2	2.53
Scope 3	251	41.8
<b>Total</b>	<b>600</b>	<b>100</b>

**Summary by WBCSD/WRI Scope (Market-Based, tCO<sub>2</sub>e)**



Scope	tCO <sub>2</sub> e/year	%
Scope 1	334	55.7
Scope 2	15.2	2.53
Scope 3	251	41.8
<b>Total</b>	<b>600</b>	<b>100</b>

**Summary by Greenhouse Gas**

Greenhouse Gas	GWP	tGHG/year (Location-Based)	tCO <sub>2</sub> e/year (Location-Based)	tGHG/year (Market-Based)	tCO <sub>2</sub> e/year (Market-Based)
CO <sub>2</sub>	1	339	339	339	339
CH <sub>4</sub>	28	8.95	250	8.95	250
N <sub>2</sub> O	265	0.00868	2.3	0.00868	2.3
Biogenic CH <sub>4</sub>	27	0.0137	0.37	0.0137	0.37
CO <sub>2</sub> e	1	7.78	7.78	7.78	7.78
<b>Total</b>			<b>600</b>		<b>600</b>



# 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 <sub>2</sub> e	%
Client-supplied market-based instrument	0	0	0	0
Residual mix factors	0	0	0	0
Default location-based factors	13,456	100	15.2	100
<b>Total</b>	<b>13,456</b>	<b>100</b>	<b>15.2</b>	<b>100</b>

# Detailed Results

## Detailed Summary by WBCSD/WRI Scope

### Location-Based methodology

Source of Emissions	tCO <sub>2</sub> /yr	tCH <sub>4</sub> /yr	tN <sub>2</sub> O/yr	Total Emissions (tCO <sub>2</sub> e/yr)	%
<b>Scope 1 Total</b>	<b>325</b>	<b>0.00664</b>	<b>0.00631</b>	<b>334</b>	<b>55.7%</b>
Premises Total	325	0.00664	0.00631	334	55.7%
Natural gas	322	0.00632	0.00598	324	54%
Off-road vehicles and equipment	0.185	2.16e-4	4e-6	0.192	0.032%
Other fuel(s)	2.21	1.09e-4	3.29e-4	2.3	0.384%
Refrigerant gas loss and other fugitive emissions	0	0	0	7.78	1.3%
<b>Scope 2 Total</b>	<b>14.8</b>	<b>0</b>	<b>0.00135</b>	<b>15.2</b>	<b>2.53%</b>
Premises Total	14.8	0	0.00135	15.2	2.53%
Electricity	14.8	0	0.00135	15.2	2.53%
<b>Scope 3 Total</b>	<b>0</b>	<b>8.94</b>	<b>0.00103</b>	<b>251</b>	<b>41.8%</b>
Premises Total	0	8.94	0.00103	251	41.8%
Composted waste	0	0	0.00103	0.643	0.107%
Landfilled waste	0	8.94	0	250	41.7%
Recycled waste	0	0	0	0	0%
<b>Total</b>	<b>339</b>	<b>8.95</b>	<b>0.00868</b>	<b>600</b>	<b>100%</b>

### Market-Based methodology

Source of Emissions	tCO <sub>2</sub> /yr	tCH <sub>4</sub> /yr	tN <sub>2</sub> O/yr	Total Emissions (tCO <sub>2</sub> e/yr)	%
<b>Scope 1 Total</b>	<b>325</b>	<b>0.00664</b>	<b>0.00631</b>	<b>334</b>	<b>55.7%</b>
Premises Total	325	0.00664	0.00631	334	55.7%
Natural gas	322	0.00632	0.00598	324	54%
Off-road vehicles and equipment	0.185	2.16e-4	4e-6	0.192	0.032%
Other fuel(s)	2.21	1.09e-4	3.29e-4	2.3	0.384%
Refrigerant gas loss and other fugitive emissions	0	0	0	7.78	1.3%
<b>Scope 2 Total</b>	<b>14.8</b>	<b>0</b>	<b>0.00135</b>	<b>15.2</b>	<b>2.53%</b>
Premises Total	14.8	0	0.00135	15.2	2.53%
Electricity	14.8	0	0.00135	15.2	2.53%
<b>Scope 3 Total</b>	<b>0</b>	<b>8.94</b>	<b>0.00103</b>	<b>251</b>	<b>41.8%</b>
Premises Total	0	8.94	0.00103	251	41.8%
Composted waste	0	0	0.00103	0.643	0.107%
Landfilled waste	0	8.94	0	250	41.7%
Recycled waste	0	0	0	0	0%
<b>Total</b>	<b>339</b>	<b>8.95</b>	<b>0.00868</b>	<b>600</b>	<b>100%</b>

# Summary by Company Unit

## Location-Based methodology

Assessment	July 2015 - June 2016		July 2016 - June 2017	
Company Unit	Total Emissions (tCO <sub>2</sub> e)	Emissions per FTE (tCO <sub>2</sub> e/FTE)	Total Emissions (tCO <sub>2</sub> e)	Emissions per FTE (tCO <sub>2</sub> e/FTE)
Dawson College	565	0.734	600	0.777
Dawson College	565	-	600	-

## Market-Based methodology

Assessment	July 2015 - June 2016		July 2016 - June 2017	
Company Unit	Total Emissions (tCO <sub>2</sub> e)	Emissions per FTE (tCO <sub>2</sub> e/FTE)	Total Emissions (tCO <sub>2</sub> e)	Emissions per FTE (tCO <sub>2</sub> e/FTE)
Dawson College	565	0.734	600	0.777
Dawson College	565	-	600	-

# Annual Activity Data

Source of Emissions	Value	Unit
<b>Premises</b>		
Composted waste		
Composted waste (wet weight basis)	3.43	tonne
Electricity		
Electricity consumption	13,456,466	kWh
Landfilled waste		
Waste, landfilled, MSW	166	tonne
Natural gas		
Natural gas consumption (gross CV)	170,741	m3
Off-road vehicles and equipment		
Small utility mobile equipment and off-road vehicles, gasoline	80	l
Other fuel(s)		
Diesel	823	l
Recycled waste		
Waste, recycled	1,020	lb
Waste, recycled	116	tonne
Refrigerant gas loss and other fugitive emissions		
Total CO2e emissions	7,783	kg

## References

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