Greenhouse Gas Protocol (Dual Reporting) Report for The University of Edinburgh

Assessment Period: August 2018 - July 2019

Produced on Nov. 13, 2019 by *Our Impacts* on behalf of Ecometrica

Assessment Details

Consolidation Approach

Operational control

Organisational Boundaries

Operations of The University of Edinburgh

Included

- The University of Edinburgh
- Academic estate
- Accommodation

Operational Boundary

- Air travel
- Bicycle
- Bus and coach
- Cars
- Composted waste
- Electricity
- Fuel oil
- Hazardous waste
- Hotel night stays
- Incinerated waste
- Landfilled waste
- Motorcycle
- Natural gas
- On foot
- Other fuel(s)
- Other fuels, UK (gross CV)
- Rail
- Rail (train, tram, light rail, underground)
- Recycled plastic
- Recycled waste
- Refrigerant gas loss and other fugitive emissions
- Residential waste mass anaerobic digestion (ERWMADI)
- Residential waste mass used to create energy (ERWMENE)
- Taxi
- Water supply
- Water treatment

Quality Assurance Assessor

- Bertil Abbing - bertil.abbing@ecometrica.com
- Georgina Paxman - georgina.paxman@ecometrica.com

Table of Contents

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_2e[1]. The seven Kyoto gases are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), nitrogen trifluoride (NF_3), sulphur hexafluoride (SF_6) and perfluorocarbons (PFCs). The global warming potential (GWP) of each gas is illustrated in the Table 1.

Table 1. GWP of Kyoto Gases (IPCC 2007)

Greenhouse Gas	GWP
Carbon dioxide (CO_2)	1
Methane (CH_4)	25
Nitrous oxide (N_2O)	298
Hydrofluorocarbons (HFCs)	124 - 14,800
Perfluorocarbons (PFCs)	7,390 - 12,200
Nitrogen trifluoride (NF_3)	17,200
Sulphur hexafluoride (SF_6)	22,800

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 CO_2e is a term for describing different greenhouse gases in a common unit. For any quantity and type of greenhouse gas, CO_2e signifies the amount of CO_2 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_2e/year	%
Actual	79,729	86.3
Estimated	12,626	13.7
Total	92,355	100

Market-based

Accuracy Overview	tCO_2e/year	%
Actual	90,528	87.8
Estimated	12,626	12.2
Total	103,154	100

Table 2. Data Quality and Availability

Source of emissions	Data quality
Premises	
Electricity	Actual
Fuel oil	Actual
Natural gas	Actual
Other fuel(s)	N/A
Other fuels, UK (gross CV)	Estimated
Refrigerant gas loss and other fugitive emissions	Mixed
Water supply	Actual
Water treatment	Actual
Company owned vehicles	
Other fuel(s)	Actual
Business Travel	
Air travel	Actual
Bus and coach	Actual
Cars	Actual
Hotel night stays	Actual
Rail (train, tram, light rail, underground)	Actual

Taxi	Actual
Staff Commuting	
Bicycle	Estimated
Bus and coach	Estimated
Cars	Estimated
Estimated emissions	N/A
Motorcycle	Estimated
On foot	Estimated
Rail	Estimated
Taxi	Estimated
Student Commuting	
Bicycle	Estimated
Bus and coach	Estimated
Cars	Estimated
Estimated emissions	N/A
Motorcycle	Estimated
On foot	Estimated
Rail	Estimated
Taxi	Estimated
Contractor Vehicles	
Other fuel(s)	Actual
Waste	
Composted waste	Mixed
Hazardous waste	Actual
Incinerated waste	Actual
Landfilled waste	Actual
Recycled glass	N/A
Recycled metal	N/A
Recycled paper & board	N/A
Recycled plastic	Actual
Recycled waste	Mixed
Residential waste mass anaerobic digestion (ERWMADI)	Mixed
Residential waste mass used to create energy (ERWMENE)	Estimated

Assessment Summary for The University of Edinburgh

Gross Overall Emissions (location-based): 92,355 tCO_2e

Gross Overall Emissions (market-based): 103,154 tCO_2e

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_2e per full time equivalent. This has been calculated, along with other relevant metrics, in the table below:

Data	KPI
1,102,000 Thousand GBP Revenue (£)	0.0838 tCO_2e per Thousand GBP Revenue (£) (Location-Based)
43,380 Number of students	2.13 tCO_2e per Student (Location-Based)
930,000 Floor area (square metres)	0.0993 tCO_2e per square metre (Location-Based)
10,964 Full Time Equivalent Employees	8.42 tCO_2e per Full Time Equivalent Employee (Location-Based)
1,102,000 Thousand GBP Revenue (£)	0.0936 tCO_2e per Thousand GBP Revenue (£) (Market-Based)
43,380 Number of students	2.38 tCO_2e per Student (Market-Based)
930,000 Floor area (square metres)	0.111 tCO_2e per square metre (Market-Based)
10,964 Full Time Equivalent Employees	9.41 tCO_2e per Full Time Equivalent Employee (Market-Based)

Summary by Activity (Location-Based, tCO_2e)

By Activity	tCO_2e/year	%
Premises	60,557	65.6
Company owned vehicles	279	0.302
Business Travel	18,767	20.3
Staff Commuting	7,223	7.82
Student Commuting	5,265	5.7
Contractor Vehicles	38.8	0.0421
Waste	225	0.244
Total	92,355	100

Summary by Activity (Market-Based, tCO_2e)

By Activity	tCO_2e/year	%
Premises	71,356	69.2
Company owned vehicles	279	0.27
Business Travel	18,767	18.2
Staff Commuting	7,223	7
Student Commuting	5,265	5.1
Contractor Vehicles	38.8	0.0377
Waste	225	0.218
Total	103,154	100

Summary by WBCSD/WRI Scope (Location-Based, tCO_2e)

Scope	tCO_2e/year	%
Scope 1	38,265	41.4
Scope 2	22,020	23.8
Scope 3	32,070	34.7
Total	92,355	100

Summary by WBCSD/WRI Scope (Market-Based, tCO_2e)

Scope	tCO_2e/year	%
Scope 1	38,265	37.1
Scope 2	32,820	31.8
Scope 3	32,070	31.1
Total	103,154	100

Summary by Greenhouse Gas

Greenhouse Gas	GWP	tGHG/year (Location-Based)	tCO_2e/year (Location-Based)	tGHG/year (Market-Based)	tCO_2e/year (Market-Based)
CO_2	1	78,482	78,482	56,637	56,637
CH_4	25	4.38	110	2.14	53.5
N_2O	298	0.789	235	0.393	117
Biogenic CO_2	0	6.01	0	6.01	0
HFC-134a	1430	0.063	90.1	0.063	90.1
HFC-404a	3921.6	0.009	35.3	0.009	35.3
HFC-407c	1773.85	0.00737	13.1	0.00737	13.1
HFC-407f	1824.5	3e-5	0.0547	3e-5	0.0547
HFC-410a	2087.5	0.0265	55.3	0.0265	55.3

CO_2e	1	13,334	13,334	46,153	46,153
		Total	92,355		103,154

Summary of Scope 2 Market-Based Method for The University of Edinburgh

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_2e	%
Client-supplied market-based instrument	0	0	0	0
Residual mix factors	86,150	100	32,820	100
Default location-based factors	0	0	0	0
Total	86,150	100	32,820	100

Detailed Results

Detailed Summary by WBCSD/WRI Scope

Location-Based methodology

Source of Emissions	tCO_2/yr	tCH_4/yr	tN_2O/yr	Total Emissions (tCO_2e/yr)	%
Scope 1 Total	**37,927**	**1.97**	**0.0816**	**38,265**	**41.4%**
Company owned vehicles Total	275	0.00626	0.0113	279	0.302%
Other fuel(s)	275	0.00626	0.0113	279	0.302%
Premises Total	37,652	1.97	0.0703	37,986	41.1%
Fuel oil	40.5	0.00174	0.00155	41	0.0444%
Natural gas	37,579	1.97	0.0687	37,649	40.8%
Other fuels, UK (gross CV)	32.1	8.4e-4	7.05e-5	32.2	0.0348%
Refrigerant gas loss and other fugitive emissions	0	0	0	264	0.285%
Scope 2 Total	**21,846**	**2.24**	**0.396**	**22,020**	**23.8%**
Premises Total	21,846	2.24	0.396	22,020	23.8%
Electricity	21,846	2.24	0.396	22,020	23.8%
Scope 3 Total	**18,709**	**0.166**	**0.312**	**32,070**	**34.7%**
Business Travel Total	18,671	0.164	0.31	18,767	20.3%
Air travel	16,851	0.0692	0.281	16,936	18.3%
Bus and coach	76.6	7.9e-4	0.00216	77.2	0.0836%
Cars	281	0.0102	0.00596	283	0.307%
Hotel night stays	960	0.0568	0.00806	964	1.04%
Rail (train, tram, light rail, underground)	396	0.0272	0.0101	400	0.433%
Taxi	106	8.8e-5	0.00314	107	0.116%
Contractor Vehicles Total	38.4	0.00165	0.00147	38.8	0.0421%
Other fuel(s)	38.4	0.00165	0.00147	38.8	0.0421%
Premises Total	0	0	0	551	0.597%
Water supply	0	0	0	197	0.213%
Water treatment	0	0	0	354	0.383%
Staff Commuting Total	0	0	0	7,223	7.82%
Bicycle	0	0	0	0	0%
Bus and coach	0	0	0	1,610	1.74%
Cars	0	0	0	4,767	5.16%
Motorcycle	0	0	0	85	0.092%
On foot	0	0	0	0	0%
Rail	0	0	0	750	0.812%
Taxi	0	0	0	11.3	0.0122%
Student Commuting Total	0	0	0	5,265	5.7%
Bicycle	0	0	0	0	0%
Bus and coach	0	0	0	2,748	2.98%

Cars	0	0	0	1,375	1.49%
Motorcycle	0	0	0	4.2	0.00455%
On foot	0	0	0	0	0%
Rail	0	0	0	1,106	1.2%
Taxi	0	0	0	31.7	0.0343%
Waste Total	0	0	0	225	0.244%
Composted waste	0	0	0	5.74	0.00621%
Hazardous waste	0	0	0	4.46	0.00483%
Incinerated waste	0	0	0	24.3	0.0263%
Landfilled waste	0	0	0	133	0.144%
Recycled plastic	0	0	0	0.0615	6.66e-5%
Recycled waste	0	0	0	44	0.0476%
Residential waste mass anaerobic digestion (ERWMADI)	0	0	0	2.81	0.00304%
Residential waste mass used to create energy (ERWMENE)	0	0	0	10.5	0.0114%
Total	**78,482**	**4.38**	**0.789**	**92,355**	**100%**

Market-Based methodology

Source of Emissions	tCO_2/yr	tCH_4/yr	tN_2O/yr	Total Emissions (tCO_2e/yr)	%
Scope 1 Total	**37,927**	**1.97**	**0.0816**	**38,265**	**37.1%**
Company owned vehicles Total	275	0.00626	0.0113	279	0.27%
Other fuel(s)	275	0.00626	0.0113	279	0.27%
Premises Total	37,652	1.97	0.0703	37,986	36.8%
Fuel oil	40.5	0.00174	0.00155	41	0.0397%
Natural gas	37,579	1.97	0.0687	37,649	36.5%
Other fuels, UK (gross CV)	32.1	8.4e-4	7.05e-5	32.2	0.0312%
Refrigerant gas loss and other fugitive emissions	0	0	0	264	0.256%
Scope 2 Total	**0**	**0**	**0**	**32,820**	**31.8%**
Premises Total	0	0	0	32,820	31.8%
Electricity	0	0	0	32,820	31.8%
Scope 3 Total	**18,709**	**0.166**	**0.312**	**32,070**	**31.1%**
Business Travel Total	18,671	0.164	0.31	18,767	18.2%
Air travel	16,851	0.0692	0.281	16,936	16.4%
Bus and coach	76.6	7.9e-4	0.00216	77.2	0.0749%
Cars	281	0.0102	0.00596	283	0.275%
Hotel night stays	960	0.0568	0.00806	964	0.934%
Rail (train, tram, light rail, underground)	396	0.0272	0.0101	400	0.387%
Taxi	106	8.8e-5	0.00314	107	0.104%
Contractor Vehicles Total	38.4	0.00165	0.00147	38.8	0.0377%

Other fuel(s)	38.4	0.00165	0.00147	38.8	0.0377%
Premises Total	0	0	0	551	0.534%
Water supply	0	0	0	197	0.191%
Water treatment	0	0	0	354	0.343%
Staff Commuting Total	0	0	0	7,223	7%
Bicycle	0	0	0	0	0%
Bus and coach	0	0	0	1,610	1.56%
Cars	0	0	0	4,767	4.62%
Motorcycle	0	0	0	85	0.0824%
On foot	0	0	0	0	0%
Rail	0	0	0	750	0.727%
Taxi	0	0	0	11.3	0.011%
Student Commuting Total	0	0	0	5,265	5.1%
Bicycle	0	0	0	0	0%
Bus and coach	0	0	0	2,748	2.66%
Cars	0	0	0	1,375	1.33%
Motorcycle	0	0	0	4.2	0.00407%
On foot	0	0	0	0	0%
Rail	0	0	0	1,106	1.07%
Taxi	0	0	0	31.7	0.0307%
Waste Total	0	0	0	225	0.218%
Composted waste	0	0	0	5.74	0.00556%
Hazardous waste	0	0	0	4.46	0.00433%
Incinerated waste	0	0	0	24.3	0.0236%
Landfilled waste	0	0	0	133	0.129%
Recycled plastic	0	0	0	0.0615	5.96e-5%
Recycled waste	0	0	0	44	0.0426%
Residential waste mass anaerobic digestion (ERWMADI)	0	0	0	2.81	0.00272%
Residential waste mass used to create energy (ERWMENE)	0	0	0	10.5	0.0102%
Total	**56,637**	**2.14**	**0.393**	**103,154**	**100%**

Summary by Company Unit

Location-Based methodology

Assessment	August 2017 - July 2018		August 2018 - July 2019	
Company Unit	**Total Emissions (tCO_2e)**	**Emissions per FTE (tCO_2e/FTE)**	**Total Emissions (tCO_2e)**	**Emissions per FTE (tCO_2e/FTE)**
The University of Edinburgh	98,653	9.44	92,355	8.42
Academic estate	79,453	-	72,899	-
Accommodation	6,712	-	6,968	-

Market-Based methodology

Assessment	August 2017 - July 2018		August 2018 - July 2019	
Company Unit	**Total Emissions (tCO_2e)**	**Emissions per FTE (tCO_2e/FTE)**	**Total Emissions (tCO_2e)**	**Emissions per FTE (tCO_2e/FTE)**
The University of Edinburgh	67,707	6.48	103,154	9.41
Academic estate	51,472	-	82,531	-
Accommodation	3,747	-	8,136	-

Annual Activity Data

Source of Emissions	Value	Unit
Business Travel		
Air travel		
Long-haul, average class (RFI 1.9)	443,752	pass.km
Long-haul, business (RFI 1.9)	5,173,839	pass.km
Long-haul, economy (RFI 1.9)	62,410,978	pass.km
Long-haul, first class (RFI 1.9)	162,377	pass.km
Long-haul, premium economy (RFI 1.9)	3,561,792	pass.km
Medium-haul, average class (RFI 1.9)	1,468,848	pass.km
Medium-haul, business (RFI 1.9)	367,395	pass.km
Medium-haul, economy (RFI 1.9)	14,739,665	pass.km
Short-haul (RFI 1.9)	6,617,372	pass.km
Bus and coach		
Coach	42,604	pass.km
Local bus	629,813	pass.km
Cars		
Average car (unknown fuel)	1,600,768	km
Hotel night stays		
Hotel night stays	35,891	night
Rail (train, tram, light rail, underground)		
Eurostar	17,621	pass.km
Train, national	9,711,246	pass.km
Taxi		
Average taxi	509,294	km
Company owned vehicles		
Other fuel(s)		
Diesel, retail station biofuel blend	68,915	l
Gas Oil	30,659	l
Petrol	6,698	l
Contractor Vehicles		
Other fuel(s)		
Gas Oil	14,084	l
Premises		
Electricity		
Electricity consumption	86,149,598	kWh
Fuel oil		
Gas Oil	150,000	kWh
Natural gas		
Natural gas (average UK network) (gross)	204,781,696	kWh
Other fuels, UK (gross CV)		

	LPG (gross CV)	150,000	kWh
Refrigerant gas loss and other fugitive emissions			
	HFC-134a emissions	63	kg
	R404a emissions	9	kg
	R407c emissions	7.37	kg
	R407f emissions	0.03	kg
	R410a emissions	26.5	kg
	Total CO2e emissions	69.8	tonne
Water supply			
	Water supply	573,025	m3
Water treatment			
	Water treatment	499,685	m3
Staff Commuting			
Bicycle			
	Bicycle	2,788,364	km
Bus and coach			
	Total CO2e emissions	1,610	tonne
Cars			
	Total CO2e emissions	4,767	tonne
Motorcycle			
	Total CO2e emissions	85	tonne
On foot			
	On foot	1,688,456	km
Rail			
	Total CO2e emissions	750	tonne
Taxi			
	Total CO2e emissions	11.3	tonne
Student Commuting			
Bicycle			
	Bicycle	4,714,538	km
Bus and coach			
	Total CO2e emissions	2,748	tonne
Cars			
	Total CO2e emissions	1,375	tonne
Motorcycle			
	Total CO2e emissions	4.2	tonne
On foot			
	On foot	8,970,984	km
Rail			
	Total CO2e emissions	1,106	tonne
Taxi			
	Total CO2e emissions	31.7	tonne

Waste			
	Composted waste		
		Composted waste, food & drink	451	tonne
		Composted waste, garden waste	506	tonne
	Hazardous waste		
		Closed loop recycling - mixed commercial and industrial waste	4.1	tonne
		Combusted waste, energy recovery, mixed commercial and industrial	205	tonne
	Incinerated waste		
		Combusted waste, energy recovery, mixed commercial and industrial	1,139	tonne
	Landfilled waste		
		Mixed commercial and industrial waste, landfilled	1,334	tonne
	Recycled plastic		
		Closed loop recycling - average plastics	2.88	tonne
	Recycled waste		
		Closed loop recycling - books	6.85	tonne
		Closed loop recycling - cardboard	1.3	tonne
		Closed loop recycling - glass	135	tonne
		Closed loop recycling - mixed commercial and industrial waste	1,728	tonne
		Closed loop recycling - mixed paper & board	62.1	tonne
		Closed loop recycling - scrap metal	7.36	tonne
		Open loop recycling - WEEE - mixed	84	tonne
		Open loop recycling - WEEE - small	1.32	tonne
		Open loop recycling - average construction material	133	tonne
		Open loop recycling - average plastics	3.24	tonne
		Open loop recycling - wood	22.8	tonne
	Residential waste mass anaerobic digestion (ERWMADI)		
		Municipal waste, average, anaerobic digestion	275	tonne
	Residential waste mass used to create energy (ERWMENE)		
		Combusted waste, energy recovery, municipal waste, average	492	tonne

References

IEA (2017). Statistics. http://www.iea.org/stats/index.asp

AIB (2019). European Residual Mixes 2018. Version 1.1, 28th May 2019. Association of Issuing Bodies.

BOC (2010). R407F Safety Data Sheet, available online:https://www.boconline.co.uk/internet.lg.lg.gbr/en/images/r407f410_55997.pdf

CIBSE (2012). Energy Efficiency in Buildings, Guide F. The Chartered Institution of Building Services Engineers.

Defra/DECC (2012). Guidelines to Defra/DECC's GHG conversion factors for company reporting. Department of Environment Food and Rural Affairs/Department for Energy and Climate Change, London.

Department for Business, Energy and Industrial Strategy (2017). 2017 Government GHG Conversion Factors for Company Reporting.

Department for Business, Energy and Industrial Strategy (2019). 2019 Government GHG Conversion Factors for Company Reporting.

EC (2009). National Inventory Report. Greenhouse Gas Sources and Sinks in Canada: 1990 - 2007. Environment Canada.

EC (2018). National Inventory Report. Greenhouse Gas Sources and Sinks in Canada: 1990 - 2016. Environment Canada.

EC (2018). National Inventory Report. Greenhouse Gas Sources and Sinks in Canada: 1990 - 2016.Environment Canada.

EPA (2018). GHG Emission Factors Hub. Center for Corporate Climate Leadership. March 2018. https://www.epa.gov/sites/production/files/2018-03/documents/emission-factors_mar_2018_0.pdf.

EPA (2018). Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2016. United States Environmental Protection Agency.

EPA (2018). eGrid2016. Release : 2/15/2018. Online: https://www.epa.gov/energy/emissions-generation-resource-integrated-database-egrid. Accessed March 12, 2018.

Governo do Brasil (2018). MCTIC. Arquivos dos fatores médios de emissão de CO2 grid mês/ano. Ministério da Ciência, Tecnologia, Inovações e Comunicações. Online: http://www.mctic.gov.br/mctic/opencms/ciencia/SEPED/clima/textogeral/emissao_corporativos.html. Accessed March 2018.

IPCC (2006). Revised IPCC Guidelines for National Greenhouse Gas Inventories: Reference Manual. Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge.

IPCC (2007). IPCC Fourth Assessment Report: Climate Change 2007. Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge.

IPCC (2007). IPCC Fourth Assessment Report: Climate Change 2007. Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge.

Statistics Canada (2018). Report on Energy Supply and Demand in Canada (57-003-X). 2015 Revision. Online: https://www150.statcan.gc.ca/n1/pub/57-003-x/57-003-x2018001-eng.pdf

Assessment Summary for Academic estate

Gross Overall Emissions (location-based): 72,899 tCO_2e

Gross Overall Emissions (market-based): 82,531 tCO_2e

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_2e per full time equivalent. This has been calculated, along with other relevant metrics, in the table below:

Data	KPI
731,000 Floor area (square metres)	0.0997 tCO_2e per square metre (Location-Based)
731,000 Floor area (square metres)	0.113 tCO_2e per square metre (Market-Based)

Summary by Activity (Location-Based, tCO_2e)

By Activity	tCO_2e/year	%
Premises	53,802	73.8
Company owned vehicles	238	0.327
Business Travel	18,767	25.7
Contractor Vehicles	38.8	0.0533
Waste	52	0.0713
Total	72,899	100

Summary by Activity (Market-Based, tCO_2e)

By Activity	tCO_2e/year	%
Premises	63,434	76.9
Company owned vehicles	238	0.289
Business Travel	18,767	22.7
Contractor Vehicles	38.8	0.0471
Waste	52	0.063
Total	82,531	100

Summary by WBCSD/WRI Scope (Location-Based, tCO_2e)

Scope	tCO_2e/year	%
Scope 1	33,913	46.5
Scope 2	19,639	26.9
Scope 3	19,348	26.5
Total	72,899	100

Summary by WBCSD/WRI Scope (Market-Based, tCO_2e)

Scope	tCO_2e/year	%
Scope 1	33,913	41.1
Scope 2	29,271	35.5
Scope 3	19,348	23.4
Total	82,531	100

Summary by Greenhouse Gas

Greenhouse Gas	GWP	tGHG/year (Location-Based)	tCO_2e/year (Location-Based)	tGHG/year (Market-Based)	tCO_2e/year (Market-Based)
CO_2	1	71,777	71,777	52,293	52,293
CH_4	25	3.91	97.8	1.91	47.9
N_2O	298	0.737	220	0.384	114
Biogenic CO_2	0	4.92	0	4.92	0
HFC-134a	1430	0.063	90.1	0.063	90.1
HFC-404a	3921.6	0.009	35.3	0.009	35.3
HFC-407c	1773.85	0.00737	13.1	0.00737	13.1
HFC-407f	1824.5	3e-5	0.0547	3e-5	0.0547
HFC-410a	2087.5	0.0265	55.3	0.0265	55.3
CO_2e	1	611	611	29,882	29,882
		Total	72,899		82,531

Summary of Scope 2 Market-Based Method for Academic estate

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_2e	%
Client-supplied market-based instrument	0	0	0	0
Residual mix factors	76,834	100	29,271	100
Default location-based factors	0	0	0	0
Total	76,834	100	29,271	100

Assessment Summary for Accommodation

Gross Overall Emissions (location-based): 6,968 tCO_2e

Gross Overall Emissions (market-based): 8,136 tCO_2e

Summary by Activity (Location-Based, tCO_2e)

By Activity	tCO_2e/year	%
Premises	6,754	96.9
Company owned vehicles	40.7	0.584
Waste	173	2.48
Total	6,968	100

Summary by Activity (Market-Based, tCO_2e)

By Activity	tCO_2e/year	%
Premises	7,922	97.4
Company owned vehicles	40.7	0.5
Waste	173	2.13
Total	8,136	100

Summary by WBCSD/WRI Scope (Location-Based, tCO_2e)

Scope	tCO_2e/year	%
Scope 1	4,352	62.5
Scope 2	2,381	34.2
Scope 3	235	3.37
Total	6,968	100

Summary by WBCSD/WRI Scope (Market-Based, tCO_2e)

Scope	tCO_2e/year	%
Scope 1	4,352	53.5
Scope 2	3,549	43.6
Scope 3	235	2.88
Total	8,136	100

Summary by Greenhouse Gas

Greenhouse Gas	GWP	tGHG/year (Location-Based)	tCO_2e/year (Location-Based)	tGHG/year (Market-Based)	tCO_2e/year (Market-Based)
CO_2	1	6,706	6,706	4,344	4,344
CH_4	25	0.468	11.7	0.226	5.66
N_2O	298	0.0522	15.6	0.00938	2.8
Biogenic CO_2	0	1.09	0	1.09	0
CO_2e	1	235	235	3,784	3,784
		Total	6,968		8,136

Summary of Scope 2 Market-Based Method for Accommodation

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_2e	%
Client-supplied market-based instrument	0	0	0	0
Residual mix factors	9,316	100	3,549	100
Default location-based factors	0	0	0	0
Total	9,316	100	3,549	100