





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

Assessment Period: August 2016 - July 2017

Produced on June 12, 2018 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
- 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

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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_2e^1 . The seven Kyoto gases are carbon dioxide (CO_2) , methane (CH_4) , nitrous oxide (N_2O) , hydrofluorocarbons (HFCs), nitrogen trifluoride (NF_a) , sulphur hexafluoride (SF_a) 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 ₂ O)	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 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

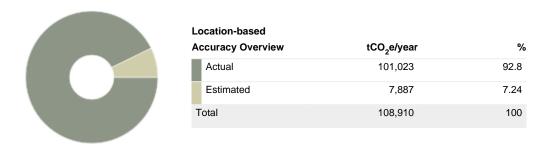




Table 2. Data Quality and Availability

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

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

Key Assumptions

none

Assessment Summary for The University of Edinburgh Gross Overall Emissions (location-based): 108,910 tCO₂e

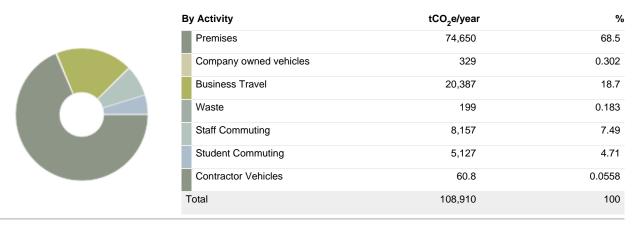
Gross Overall Emissions (market-based): 108,910 tCO₂e

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
39,576 Number of students	2.75 tCO ₂ e per Student (Location-Based)
846,547 Floor area (square metres)	0.129 tCO ₂ e per square metre (Location-Based)
928,847 Thousand GBP Revenue (£)	0.117 tCO $_2$ e per Thousand GBP Revenue (£) (Location-Based)
9,987 Full Time Equivalent Employees	10.9 tCO ₂ e per Full Time Equivalent Employee (Location-Based)
39,576 Number of students	2.75 tCO ₂ e per Student (Market-Based)
846,547 Floor area (square metres)	0.129 tCO ₂ e per square metre (Market-Based)
928,847 Thousand GBP Revenue (£)	0.117 tCO ₂ e per Thousand GBP Revenue (£) (Market-Based)
9,987 Full Time Equivalent Employees	10.9 tCO ₂ e per Full Time Equivalent Employee (Market-Based)

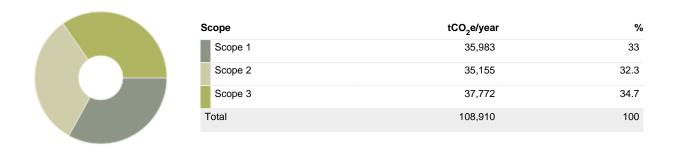
Summary by Activity (Location-Based, tCO₂e)



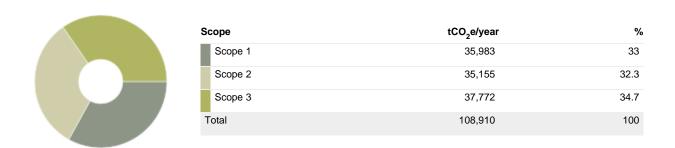
Summary by Activity (Market-Based, tCO₂e)

	By Activity	tCO ₂ e/year	%
	Premises	74,650	68.5
	Company owned vehicles	329	0.302
	Business Travel	20,387	18.7
	Waste	199	0.183
	Staff Commuting	8,157	7.49
	Student Commuting	5,127	4.71
	Contractor Vehicles	60.8	0.0558
	Total	108,910	100

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



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



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	93,645	93,645	93,645	93,645
CH ₄	25	4.87	122	4.87	122
N ₂ O	298	1.19	354	1.19	354
HFC-134a	1430	0.064	91.5	0.064	91.5
HFC-404a	3921.6	0.077	302	0.077	302
CO ₂ e	1	14,395	14,395	14,395	14,395
Total			108,910		108,910

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





Fundadan Fastar Tama	Ene	rgy	Market-Base	d Emissions
Emission Factor Type	MWh	%	tCO ₂ e	%
Client-supplied market-based instrument	0	0	0	0
Residual mix factors	0	0	0	0
Default location-based factors	99,996	100	35,155	100
Total	99,996	100	35,155	100

Detailed Results

Detailed Summary by WBCSD/WRI Scope

Location-Based methodology

Source of Emissions	tCO ₂ /yr	tCH₄/yr	tN ₂ O/yr	Total Emissions (tCO ₂ e/yr)	%
Scope 1 Total	35,514	2	0.0889	35,983	33%
Company owned vehicles Total	321	0.00806	0.0266	329	0.302%
Other fuel(s)	321	0.00806	0.0266	329	0.302%
Premises Total	35,193	1.99	0.0623	35,655	32.7%
Natural gas	35,127	1.98	0.0619	35,195	32.3%
Other fuels, UK (gross CV)	65.8	0.00449	3.79e-4	66	0.0606%
Refrigerant gas loss and other fugitive emissions	0	0	0	393	0.361%
Scope 2 Total	34,884	2.48	0.701	35,155	32.3%
Premises Total	34,884	2.48	0.701	35,155	32.3%
Electricity	34,884	2.48	0.701	35,155	32.3%
Scope 3 Total	23,248	0.396	0.398	37,772	34.7%
Business Travel Total	19,931	0.153	0.314	20,387	18.7%
Air travel	16,406	0.0488	0.275	16,489	15.1%
Bus and coach	25.5	6.04e-4	8.44e-4	25.8	0.0237%
Cars	0	0	0	358	0.328%
Hotel night stays	2,987	0.0844	0.0262	2,996	2.75%
Rail (train, tram, light rail, underground)	373	0.0193	0.00972	376	0.345%
Тахі	140	1.76e-4	0.00275	141	0.13%
Contractor Vehicles Total	55.9	0.00249	0.0163	60.8	0.0558%
Other fuel(s)	55.9	0.00249	0.0163	60.8	0.0558%
Premises Total	3,261	0.24	0.0671	3,841	3.53%
Electricity: Electricity - transmission & distribution losses	3,261	0.24	0.0671	3,287	3.02%
Water supply	0	0	0	200	0.184%
Water treatment	0	0	0	354	0.325%
Staff Commuting Total	0	0	0	8,157	7.49%
Bus and coach	0	0	0	1,744	1.6%
Cars	0	0	0	5,325	4.89%
Motorcycle	0	0	0	95.9	0.0881%
On foot	0	0	0	0	0%
Rail	0	0	0	971	0.892%
Тахі	0	0	0	21.2	0.0195%
Student Commuting Total	0	0	0	5,127	4.71%
Bus and coach	0	0	0	2,278	2.09%
Cars	0	0	0	1,706	1.57%

Total		93,645	4.87	1.19	108,910	100%
	Residential waste mass used to create energy (ERWMENE)	0	0	0	5.58	0.00512%
	Residential waste mass anaerobic digestion (ERWMADI)	0	0	0	1.66	0.00152%
	Recycled waste	0	0	0	38.9	0.0357%
	Recycled plastic	0	0	0	0.0701	6.43e-5%
	Landfilled waste	0	0	0	113	0.104%
	Incinerated waste	0	0	0	21.9	0.0201%
	Hazardous waste	0	0	0	12.5	0.0114%
	Composted waste	0	0	0	5.33	0.00489%
Wast	te Total	0	0	0	199	0.183%
	Taxi	0	0	0	28.9	0.0265%
	Rail	0	0	0	1,064	0.977%
	Motorcycle	0	0	0	50.3	0.0462%

Market-Based methodology

					Total	
Source of Emis	sions	tCO ₂ /yr	tCH ₄ /yr	tN ₂ O/yr	Emissions (tCO ₂ e/yr)	%
Scope 1 Total		35,514	2	0.0889	35,983	33%
Compai	ny owned vehicles Total	321	0.00806	0.0266	329	0.302%
	Other fuel(s)	321	0.00806	0.0266	329	0.302%
Premise	es Total	35,193	1.99	0.0623	35,655	32.7%
	Natural gas	35,127	1.98	0.0619	35,195	32.3%
	Other fuels, UK (gross CV)	65.8	0.00449	3.79e-4	66	0.0606%
	Refrigerant gas loss and other fugitive emissions	0	0	0	393	0.361%
Scope 2 Total		34,884	2.48	0.701	35,155	32.3%
Premise	es Total	34,884	2.48	0.701	35,155	32.3%
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Busines	ss Travel Total	19,931	0.153	0.314	20,387	18.7%
	Air travel	16,406	0.0488	0.275	16,489	15.1%
	Bus and coach	25.5	6.04e-4	8.44e-4	25.8	0.0237%
	Cars	0	0	0	358	0.328%
	Hotel night stays	2,987	0.0844	0.0262	2,996	2.75%
	Rail (train, tram, light rail, underground)	373	0.0193	0.00972	376	0.345%
	Taxi	140	1.76e-4	0.00275	141	0.13%
Contrac	ctor Vehicles Total	55.9	0.00249	0.0163	60.8	0.0558%
	Other fuel(s)	55.9	0.00249	0.0163	60.8	0.0558%
Premise	es Total	3,261	0.24	0.0671	3,841	3.53%
	Electricity: Electricity - transmission & distribution losses	3,261	0.24	0.0671	3,287	3.02%

Total		93,645	4.87	1.19	108,910	100%
Residential waste m (ERWMENE)	ass used to create energy	0	0	0	5.58	0.00512%
Residential waste m (ERWMADI)	ass anaerobic digestion	0	0	0	1.66	0.00152%
Recycled waste		0	0	0	38.9	0.0357%
Recycled plastic		0	0	0	0.0701	6.43e-5%
Landfilled waste		0	0	0	113	0.104%
Incinerated waste		0	0	0	21.9	0.0201%
Hazardous waste		0	0	0	12.5	0.0114%
Composted waste		0	0	0	5.33	0.00489%
Waste Total		0	0	0	199	0.183%
Taxi		0	0	0	28.9	0.0265%
Rail		0	0	0	1,064	0.977%
Motorcycle		0	0	0	50.3	0.0462%
Cars		0	0	0	1,706	1.57%
Bus and coach		0	0	0	2,278	2.09%
Student Commuting Total		0	0	0	5,127	4.71%
Taxi		0	0	0	21.2	0.0195%
Rail		0	0	0	971	0.892%
On foot		0	0	0	0	0.000170
Motorcycle		0	0	0	95.9	0.0881%
Cars		0	0	0	5,325	4.89%
Staff Commuting Total Bus and coach		0	0	0	8,157 1,744	7.49% 1.6%
Water treatment		0	0	0	354	0.325%
Water supply		0	0	0	200	0.184%

Summary by Company Unit

Location-Based methodology

Assessment	August 2015 - July 2016		August 2016 - July 2017		
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)	
The University of Edinburgh	103,783	11.1	108,910	10.9	
Academic estate	82,081	8.8	88,125	-	
Accommodation	8,417	-	7,501	-	

Market-Based methodology

Scope 2 Market Based Emissions were only computed starting in 2016. No previous year is available for comparison.

Annual Activity Data

Source of	of Emiss	sions	Value	Unit			
Busines	Business Travel						
	Air travel						
		Long-haul, average class (RFI 1.9)	18,174,111	pass.km			
		Long-haul, business (RFI 1.9)	2,206,981	pass.km			
		Long-haul, economy (RFI 1.9)	27,500,619	pass.km			
		Long-haul, first class (RFI 1.9)	603,459	pass.km			
		Long-haul, premium economy (RFI 1.9)	2,133,993	pass.km			
		Medium-haul, average class (RFI 1.9)	4,446,753	pass.km			
		Medium-haul, business (RFI 1.9)	425,865	pass.km			
		Medium-haul, economy (RFI 1.9)	28,410,168	pass.km			
		Short-haul (RFI 1.9)	5,891,000	pass.km			
	Bus and	l coach					
		Coach	389,360	pass.km			
		Local bus	121,959	pass.km			
	Cars						
		Total CO2e emissions	358	tonne			
	Hotel ni	ght stays					
		Hotel night stays	105,023	night			
	Rail (tra	in, tram, light rail, underground)					
		Train, national	8,042,650	pass.km			
	Taxi						
		Black cab taxi	440,737	km			
Compa	ny owne	ed vehicles					
	Other fu	el(s)					
		Diesel, retail station biofuel blend	88,022	I			
		Gas Oil	25,563	I			
		Petrol, retail station biofuel blend	11,160	I			
Contrac	ctor Veh	icles					
	Other fu	el(s)					
		Gas Oil	20,583	I			
Premise	es						
	Electrici	ty					
		Electricity consumption	99,996,087	kWh			
	Natural	gas					
		Natural gas consumption (gross CV)	191,107,122	kWh			
	Other fu	els, UK (gross CV)					
		Burning Oil (gross CV)	147,712	kWh			
		LPG (gross CV)	137,939	kWh			
	Refriger	ant gas loss and other fugitive emissions					

		HFC-134a emissions	64	kg
		R404a emissions	77	kg
	Water s	upply		
		Water supply	581,275	m3
	Water to	reatment		
		Water treatment	500,686	m3
Staff (Commuti	ng		
	Bicycle			
	·	Bicycle	3	mi
	Bus and			
	Dus and	Total CO2e emissions	1,744	tonne
	Ca**	Total COZE EITISSIONS	1,744	torine
	Cars			
		Total CO2e emissions	5,325	tonne
	Motorcy			
		Total CO2e emissions	95.9	tonne
	On foot			
		On foot	1	mi
	Rail			
		Total CO2e emissions	971	tonne
	Taxi			
		Total CO2e emissions	21.2	tonne
Stude	nt Comm	uting		
	Bus and	d coach		
		Total CO2e emissions	2,278	tonne
	Cars			
		Total CO2e emissions	1,706	tonne
	Motorcy			
		Total CO2e emissions	50.3	tonne
	Rail		00.0	
	Tall	Total CO2e emissions	1,064	tonne
	Tovi	Total COZO GITIGOIOTO	1,007	MINE
	Taxi	Tatal CO2a aminaiana	20.0	4000
101		Total CO2e emissions	28.9	tonne
Waste				
	Compo	sted waste		
		Composted waste, food & drink	370	tonne
		Composted waste, garden waste	518	tonne
	Hazard	ous waste		
		Closed loop recycling - mixed commercial and industrial waste	11.5	tonne
		Combusted waste, energy recovery, mixed commercial and industrial	40.5	tonne
		Mixed commercial and industrial waste, landfilled	113	tonne
	Incinera	ated waste		
		Incinerated waste, mixed commercial & industrial, with heat recovery	1,045	tonne

Landfilled waste		
Metal, landfilled	3.82	tonne
Mixed commercial and industrial waste, landfilled	1,101	tonne
Wood, landfilled	3.82	tonne
Recycled plastic		
Open loop recycling - average plastics	3.22	tonne
Recycled waste		
Recycled waste, WEEE, open loop	76.8	tonne
Recycled waste, books, closed loop	3.57	tonne
Recycled waste, glass, closed loop	163	tonne
Recycled waste, mixed commercial & industrial, closed loop	1,492	tonne
Recycled waste, paper & board, closed loop	118	tonne
Residential waste mass anaerobic digestion (ERWMADI)		
Municipal waste, average, anaerobic digestion	76.2	tonne
Residential waste mass used to create energy (ERWMENE)		
Combusted waste, energy recovery, municipal waste, average	256	tonne

Key Observations

none

Reduction Actions

none

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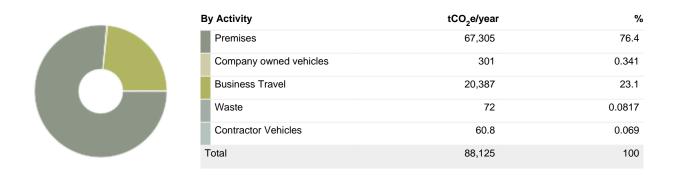
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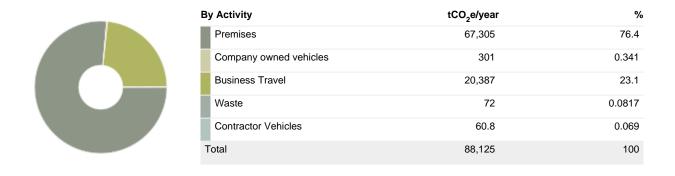
Assessment Summary for Academic estate Gross Overall Emissions (location-based): 88,125 tCO₂e

Gross Overall Emissions (market-based): 88,125 tCO₂e

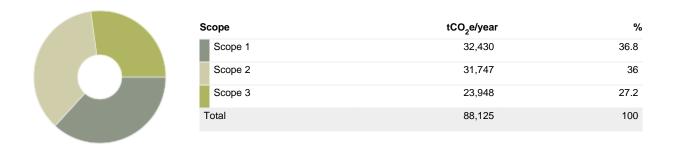
Summary by Activity (Location-Based, tCO₂e)



Summary by Activity (Market-Based, tCO2e)



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



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



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	86,401	86,401	86,401	86,401
CH ₄	25	4.41	110	4.41	110
N ₂ O	298	1.11	330	1.11	330
HFC-134a	1430	0.064	91.5	0.064	91.5
HFC-404a	3921.6	0.077	302	0.077	302
CO ₂ e	1	890	890	890	890
Total			88,125		88,125

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



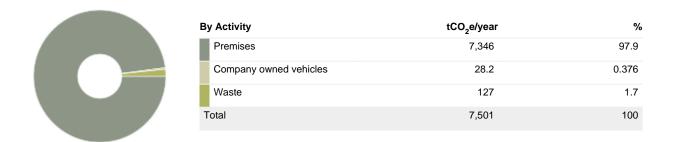


	Ene	rgy	Market-Based Emissions		
Emission Factor Type	MWh	%	tCO ₂ e	%	
Client-supplied market-based instrument	0	0	0	0	
Residual mix factors	0	0	0	0	
Default location-based factors	90,302	100	31,747	100	
Total	90,302	100	31,747	100	

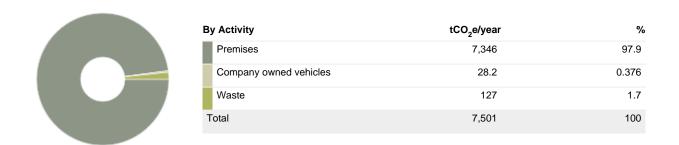
Assessment Summary for Accommodation

Gross Overall Emissions (location-based): 7,501 tCO_2e Gross Overall Emissions (market-based): 7,501 tCO_2e

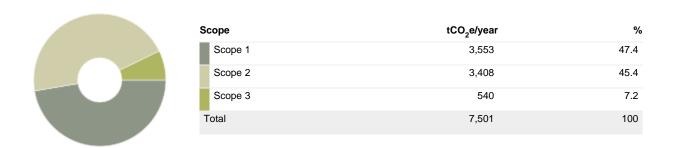
Summary by Activity (Location-Based, tCO2e)



Summary by Activity (Market-Based, tCO₂e)



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



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



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	7,244	7,244	7,244	7,244
CH ₄	25	0.464	11.6	0.464	11.6
N ₂ O	298	0.0813	24.2	0.0813	24.2
CO ₂ e	1	221	221	221	221
Total			7,501		7,501

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





	Ene	rgy	Market-Based Emissions		
Emission Factor Type	MWh	%	tCO ₂ e	%	
Client-supplied market-based instrument	0	0	0	0	
Residual mix factors	0	0	0	0	
Default location-based factors	9,694	100	3,408	100	
Total	9,694	100	3,408	100	