





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

Assessment Period: August 2015 - July 2016

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
- · 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)
- Tax
- Water supply
- Water treatment

Quality Assurance Assessor

- Kevin Houston kevin@carbonmasters.co.uk
- Som Narayan som@carbonmasters.co.uk

Table of Contents

Introduction	4
Data Quality and Availability	
Assessment Summary for The University of Edinburgh	,
Detailed Results	10
Detailed Summary by WBCSD/WRI Scope	10
Location-Based methodology	10
Market-Based methodology	1:
Summary by Company Unit	1;
Location-Based methodology	1;
Market-Based methodology	1;
Annual Activity Data	14
References	17
Assessment Summary for Academic estate	18
Assessment Summary for Accommodation	2.

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.

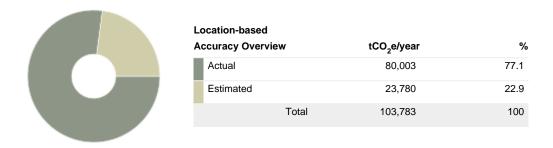
A GHG assessment is an essential tool in the process of monitoring and reducing an organisation's climate change impact as it allows reduction targets to be set and action plans formulated. GHG assessment results can also allow organisations to be transparent about their climate change impacts through 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



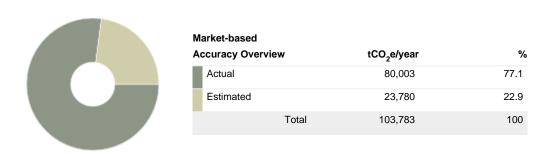


Table 2. Data Quality and Availability

Source of emissions	Data quality
Premises	
Electricity	Actual
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	Estimated
Rail (train, tram, light rail, underground)	Estimated
Taxi	Estimated

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

Assessment Summary for The University of Edinburgh Gross Overall Emissions (location-based): 103,783 tCO₂e

Gross Overall Emissions (market-based): 103,783 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
37,510 Number of students	2.77 tCO ₂ e per Student (Location-Based)
846,547 Floor area (square metres)	0.123 tCO ₂ e per square metre (Location-Based)
908,568 Thousand GBP Revenue (£)	0.114 tCO $_2$ e per Thousand GBP Revenue (£) (Location-Based)
9,331 Full Time Equivalent Employees	11.1 tCO ₂ e per Full Time Equivalent Employee (Location-Based)
37,510 Number of students	2.77 tCO ₂ e per Student (Market-Based)
846,547 Floor area (square metres)	0.123 tCO ₂ e per square metre (Market-Based)
908,568 Thousand GBP Revenue (£)	0.114 tCO ₂ e per Thousand GBP Revenue (£) (Market-Based)
9,331 Full Time Equivalent Employees	11.1 tCO ₂ e per Full Time Equivalent Employee (Market-Based)

Summary by Activity (Location-Based, tCO₂e)





Summary by Activity (Market-Based, tCO_2e)

By Activity	tCO ₂ e/year	%
Premises	77,495	74.7
Company owned vehicles	436	0.42
Business Travel	12,293	11.8
Waste	275	0.265
Staff Commuting	8,157	7.86
Student Commuting	5,126	4.94
-	Total 103,783	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	88,985	88,985	88,985	88,985
CH ₄	25	3.63	90.8	3.63	90.8
N_2O	298	1.18	350	1.18	350
HFC-143a	4470	0.044	197	0.044	197
HFC-407c	1773.85	0.017	30.2	0.017	30.2
CO ₂ e	1	14,130	14,130	14,130	14,130
		Total	103,783		103,783

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





Facilities Facilities Tame	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	88,614	100	36,513	100
Total	88,614	100	36,513	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	37,231	2.06	0.117	37,544	36.2%
Company owned vehicles Total	421	0.0122	0.0505	436	0.42%
Other fuel(s)	421	0.0122	0.0505	436	0.42%
Premises Total	36,810	2.04	0.0664	37,107	35.8%
Natural gas	36,540	2.03	0.0645	36,610	35.3%
Other fuels, UK (gross CV)	270	0.0136	0.00191	271	0.261%
Refrigerant gas loss and other fugitive emissions	0	0	0	227	0.219%
Scope 2 Total	36,294	1.38	0.621	36,513	35.2%
Premises Total	36,294	1.38	0.621	36,513	35.2%
Electricity	36,294	1.38	0.621	36,513	35.2%
Scope 3 Total	15,460	0.195	0.437	29,726	28.6%
Business Travel Total	12,177	0.0882	0.381	12,293	11.8%
Air travel	11,504	0.066	0.366	11,614	11.2%
Bus and coach	11.9	3.83e-4	3.37e-4	12	0.0116%
Cars	235	0.00962	0.00492	237	0.228%
Rail (train, tram, light rail, underground)	292	0.012	0.00706	294	0.283%
Taxi	135	1.66e-4	0.00265	136	0.131%
Premises Total	3,283	0.106	0.0565	3,874	3.73%
Electricity: Electricity - transmission & distribution losses	3,283	0.106	0.0565	3,303	3.18%
Water supply	0	0	0	193	0.186%
Water treatment	0	0	0	378	0.365%
Staff Commuting Total	0	0	0	8,157	7.86%
Bus and coach	0	0	0	1,744	1.68%
Cars	0	0	0	5,325	5.13%
Motorcycle	0	0	0	95.9	0.0924%
On foot	0	0	0	0	0%
Rail	0	0	0	971	0.936%
Taxi	0	0	0	21.2	0.0204%
Student Commuting Total	0	0	0	5,126	4.94%
Bus and coach	0	0	0	2,278	2.19%
Cars	0	0	0	1,706	1.64%
Motorcycle	0	0	0	50.3	0.0485%
Rail	0	0	0	1,064	1.02%
Taxi	0	0	0	28.9	0.0278%

	Total	88,985	3.63	1.18	103,783	100%
Residential waste mass used to create energy (ERWMENE)		0	0	0	4.95	0.00477%
Residential waste mass anaerobic digestion (ERWMADI)		0	0	0	1.16	0.00111%
Recycled waste		0	0	0	35.1	0.0338%
Recycled plastic		0	0	0	0.0916	8.82e-5%
Landfilled waste		0	0	0	204	0.197%
Incinerated waste		0	0	0	23.9	0.023%
Composted waste		0	0	0	5.41	0.00522%
Waste Total		0	0	0	275	0.265%

Market-Based methodology

Source of Emissions	tCO ₂ /yr	tCH₄/yr	tN ₂ O/yr	Total Emissions (tCO ₂ e/yr)	%
Scope 1 Total	37,231	2.06	0.117	37,544	36.2%
Company owned vehicles Total	421	0.0122	0.0505	436	0.42%
Other fuel(s)	421	0.0122	0.0505	436	0.42%
Premises Total	36,810	2.04	0.0664	37,107	35.8%
Natural gas	36,540	2.03	0.0645	36,610	35.3%
Other fuels, UK (gross CV)	270	0.0136	0.00191	271	0.261%
Refrigerant gas loss and other fugitive emissions	0	0	0	227	0.219%
Scope 2 Total	36,294	1.38	0.621	36,513	35.2%
Premises Total	36,294	1.38	0.621	36,513	35.2%
Electricity	36,294	1.38	0.621	36,513	35.2%
Scope 3 Total	15,460	0.195	0.437	29,726	28.6%
Business Travel Total	12,177	0.0882	0.381	12,293	11.8%
Air travel	11,504	0.066	0.366	11,614	11.2%
Bus and coach	11.9	3.83e-4	3.37e-4	12	0.0116%
Cars	235	0.00962	0.00492	237	0.228%
Rail (train, tram, light rail, underground)	292	0.012	0.00706	294	0.283%
Taxi	135	1.66e-4	0.00265	136	0.131%
Premises Total	3,283	0.106	0.0565	3,874	3.73%
Electricity: Electricity - transmission & distribution losses	3,283	0.106	0.0565	3,303	3.18%
Water supply	0	0	0	193	0.186%
Water treatment	0	0	0	378	0.365%
Staff Commuting Total	0	0	0	8,157	7.86%
Bus and coach	0	0	0	1,744	1.68%
Cars	0	0	0	5,325	5.13%
Motorcycle	0	0	0	95.9	0.0924%
On foot	0	0	0	0	0%

	Total	88,985	3.63	1.18	103,783	100%
Residential waste mass used to create (ERWMENE)	energy	0	0	0	4.95	0.00477%
Residential waste mass anaerobic dige: (ERWMADI)	stion	0	0	0	1.16	0.00111%
Recycled waste		0	0	0	35.1	0.0338%
Recycled plastic		0	0	0	0.0916	8.82e-5%
Landfilled waste		0	0	0	204	0.197%
Incinerated waste		0	0	0	23.9	0.023%
Composted waste		0	0	0	5.41	0.00522%
Waste Total		0	0	0	275	0.265%
Taxi		0	0	0	28.9	0.0278%
Rail		0	0	0	1,064	1.02%
Motorcycle		0	0	0	50.3	0.0485%
Cars		0	0	0	1,706	1.64%
Bus and coach		0	0	0	2,278	2.19%
Student Commuting Total		0	0	0	5,126	4.94%
Taxi		0	0	0	21.2	0.02049
Rail		0	0	0	971	0.936%

Summary by Company Unit

Location-Based methodology

Assessment	August 2014	August 2014 - July 2015		i - July 2016
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	107,233	11.7	103,783	11.1
Academic estate	87,336	9.5	82,081	8.8
Accommodation	10,450	-	8,417	-

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 Emissions	Value	Unit
Business Travel		
Air travel		
Long-haul, average class (RFI 1.9)	13,095,160	pass.km
Long-haul, business (RFI 1.9)	3,205,719	pass.km
Long-haul, economy (RFI 1.9)	27,500,619	pass.km
Long-haul, first class (RFI 1.9)	82,406	pass.km
Long-haul, premium economy (RFI 1.9)	2,238,413	pass.km
Medium-haul, average class (RFI 1.9)	3,648,505	pass.km
Medium-haul, business (RFI 1.9)	128,294	pass.km
Medium-haul, economy (RFI 1.9)	7,676,777	pass.km
Short-haul (RFI 1.9)	4,175,626	pass.km
Bus and coach		
Coach	144,882	pass.km
Local bus	65,433	pass.km
Cars		
Average car (unknown fuel)	1,265,136	km
Rail (train, tram, light rail, underground)		
Light rail	37,389	pass.km
Train, national	5,978,561	pass.km
Taxi		
Black cab taxi	414,158	km
Company owned vehicles		
Other fuel(s)		
Diesel, retail station biofuel blend	95,789	I
Gas Oil	53,907	I
Petrol, retail station biofuel blend	11,970	I
Premises		
Electricity		
Electricity consumption	88,614,038	kWh
Natural gas		
Natural gas consumption (gross CV)	198,969,614	kWh
Other fuels, UK (gross CV)		
LPG (gross CV)	151,096	kWh
Residual fuel oil (gross CV)	889,675	kWh
Refrigerant gas loss and other fugitive emissions		
HFC-143a emissions	44	kg
R407c emissions	17	kg
Water supply		
Water supply	562,447	m3

Wate	er treatment		
	Water treatment	534,325	m3
Staff Commi	uting		
Bicyc	cle		
	Bicycle	3	mi
Bus a	and coach		
	Total CO2e emissions	1,744	tonne
Cars			
	Total CO2e emissions	5,325	tonne
Moto	orcycle		
	Total CO2e emissions	95.9	tonne
On fo	pot		
	On foot	1	mi
Rail			
	Total CO2e emissions	971	tonne
Taxi			
	Total CO2e emissions	21.2	tonne
Student Con	nmuting		
Bus a	and coach		
	Total CO2e emissions	2,278	tonne
Cars			
	Total CO2e emissions	1,706	tonne
Moto	rcycle		
	Total CO2e emissions	50.3	tonne
Rail			
	Total CO2e emissions	1,064	tonne
Taxi			
	Total CO2e emissions	28.9	tonne
Waste			
Com	posted waste		
	Composted waste, food & drink	413	tonne
	Composted waste, garden waste	490	tonne
Incine	erated waste		
	Incinerated waste, mixed commercial & industrial, with heat recovery	1,136	tonne
Land	Ifilled waste		
	Mixed commercial and industrial waste, landfilled	1,013	tonne
	Scrap metal, landfilled	3.8	tonne
	Wood, landfilled	3.8	tonne
Recy	voted plastic	4.00	4
	Average plastics, open loop recycled	4.36	tonne
Recy	voled waste	00.5	
	Recycled waste, WEEE, open loop	86.6	tonne

Recycled waste, books, closed loop	3.75	tonne
Recycled waste, glass, closed loop	148	tonne
Recycled waste, mixed commercial & industrial, closed loop	1,312	tonne
Recycled waste, paper & board, closed loop	120	tonne
Residential waste mass anaerobic digestion (ERWMADI)		
Municipal waste, average, anaerobic digestion	55.1	tonne
Residential waste mass used to create energy (ERWMENE)		
Combusted waste, energy recovery, municipal waste, average	236	tonne

References

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.

Defra/DECC (2016). UK Government conversion factors for greenhouse gas reporting. Department of Environment Food and Rural Affairs/Department for Energy and Climate Change, London.

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

Assessment Summary for Academic estate Gross Overall Emissions (location-based): 82,081 tCO₂e

Gross Overall Emissions (market-based): 82,081 tCO₂e

Key Performance Indicators

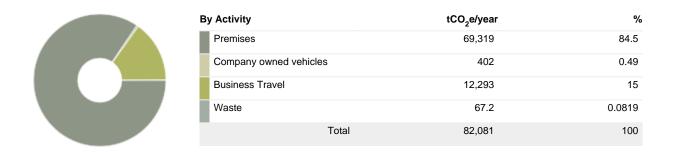
Absolute GHG emissions will vary over time and often correspond to the expansion or contraction of an organisation. It is useful therefore to use reporting metrics that take these effects into account and monitor relative GHG emissions intensity. A common emissions intensity metric is tonnes of CO₂e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

Data	KPI
772,837 Floor area (square metres)	0.106 tCO ₂ e per square metre (Location-Based)
9,331 Full Time Equivalent Employees	8.8 tCO ₂ e per Full Time Equivalent Employee (Location-Based)
772,837 Floor area (square metres)	0.106 tCO ₂ e per square metre (Market-Based)
9,331 Full Time Equivalent Employees	8.8 tCO ₂ e per Full Time Equivalent Employee (Market-Based)

Summary by Activity (Location-Based, tCO2e)



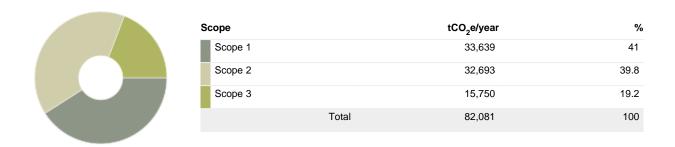
Summary by Activity (Market-Based, tCO₂e)



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



Summary by WBCSD/WRI Scope (Market-Based, tCO_2 e)



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	80,947	80,947	80,947	80,947
CH ₄	25	3.26	81.5	3.26	81.5
N ₂ O	298	1.1	327	1.1	327
HFC-143a	4470	0.044	197	0.044	197
HFC-407c	1773.85	0.017	30.2	0.017	30.2
CO ₂ e	1	500	500	500	500
		Total	82,081		82,081

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	79,341	100	32,693	100	
Total	79,341	100	32,693	100	

Assessment Summary for Accommodation Gross Overall Emissions (location-based): 8,417 tCO₂e Gross Overall Emissions (market-based): 8,417 tCO₂e

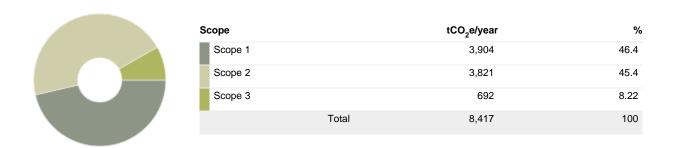
Summary by Activity (Location-Based, tCO₂e)



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	8,038	8,038	8,038	8,038
CH ₄	25	0.371	9.29	0.371	9.29
N_2O	298	0.0791	23.6	0.0791	23.6
CO ₂ e	1	347	347	347	347
		Total	8,417		8,417

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





Fusing in Factor Torre	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	9,273	100	3,821	100	
Total	9,273	100	3,821	100	