



Greenhouse Gas Protocol (Dual Reporting) Report for SBAB

Assessment Period: 2016

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Assessment Details

Consolidation Approach

Operational Control

Organisational Boundaries

Operations of SBAB

Included

- SBAB
- Göteborg
- Karlstad
- Malmö
- Stockholm

Operational Boundary

- Air travel
- Cars
- District cooling
- District heating
- Electricity
- Employee owned cars (unknown fuel)
- Incinerated waste
- Rail (train, tram, light rail, underground)
- Recycled waste
- Taxi

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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 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 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."

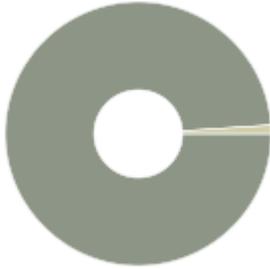
A GHG assessment is an essential tool in the process of monitoring and reducing an organisation's climate change impact as it allows reduction targets to be set and action plans formulated. GHG assessment results can also allow organisations to be transparent about their climate change impacts through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

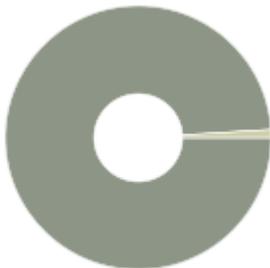
Data Quality and Availability

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	186	98.9
Estimated	1.99	1.05
Total	188	100



Market-based Accuracy Overview		
	tCO ₂ e/year	%
Actual	184	99
Estimated	1.85	0.998
Total	186	100

Table 2. Data Quality and Availability

Source of emissions	Data quality
Premises	
District cooling	Actual
District heating	Mixed
Electricity	Mixed
Incinerated waste	Actual
Recycled waste	Actual
Company owned vehicles	
Cars	Actual
Business Travel	
Air travel	Actual
Employee owned cars (unknown fuel)	Actual
Rail (train, tram, light rail, underground)	Actual
Taxi	Actual

Assessment Summary for SBAB

Gross Overall Emissions (location-based): 188 tCO₂e

Gross Overall Emissions (market-based): 186 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
10,856 Office floor area (square metres)	0.0173 tCO ₂ e per Office floor area (square metre) (Location-Based)
485 Full Time Equivalent Employees	0.388 tCO ₂ e per Full Time Equivalent Employee (Location-Based)
10,856 Office floor area (square metres)	0.0171 tCO ₂ e per Office floor area (square metre) (Market-Based)
485 Full Time Equivalent Employees	0.383 tCO ₂ e per Full Time Equivalent Employee (Market-Based)

Summary by Activity (Location-Based, tCO₂e)



By Activity	tCO ₂ e/year	%
Premises	44.3	23.6
Company owned vehicles	20.4	10.9
Business Travel	123	65.6
Total	188	100

Summary by Activity (Market-Based, tCO₂e)



By Activity	tCO ₂ e/year	%
Premises	41.7	22.5
Company owned vehicles	20.4	11
Business Travel	123	66.5
Total	186	100

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



Scope	tCO ₂ e/year	%
Scope 1	17	9.04
Scope 2	35.1	18.6
Scope 3	136	72.3
Total	188	100

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



Scope	tCO ₂ e/year	%
Scope 1	17	9.16
Scope 2	26.1	14.1
Scope 3	143	76.8
Total	186	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	144	144	134	134
CH ₄	25	0.00465	0.116	0.00149	0.0373
N ₂ O	298	0.00276	0.822	0.00222	0.663
CO ₂ e	1	43.2	43.2	51.1	51.1
Total			188		186

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	16.9	6.06e-4	3.84e-4	17	9.04%
Company owned vehicles Total	16.9	6.06e-4	3.84e-4	17	9.04%
Cars	16.9	6.06e-4	3.84e-4	17	9.04%
Scope 2 Total	12.3	0.00293	4.95e-4	35.1	18.6%
Premises Total	12.3	0.00293	4.95e-4	35.1	18.6%
District cooling	0	0	0	0.0496	0.0264%
District heating	0	0	0	22.1	11.7%
District heating: District Heating EON Malmo (Sweden), upstream emissions	0	0	0	0.362	0.192%
Electricity	12.3	0.00293	4.95e-4	12.5	6.66%
Scope 3 Total	115	0.00111	0.00188	136	72.3%
Business Travel Total	111	8.83e-4	0.00184	123	65.6%
Air travel	97.8	5.56e-4	0.00155	98.3	52.2%
Air travel: Flights, long-haul, average, upstream emissions	0	0	0	3.03	1.61%
Air travel: Flights, medium-haul, economy, upstream emissions	0	0	0	2.17	1.15%
Air travel: Flights, short-haul, upstream emissions	0	0	0	4.74	2.52%
Employee owned cars (unknown fuel)	11.2	2.24e-4	2.34e-4	11.3	6.01%
Rail (train, tram, light rail, underground)	0	0	0	1.5	0.797%
Taxi	1.76	1.02e-4	5.23e-5	1.78	0.945%
Taxi: Regular taxi, upstream emissions	0	0	0	0.633	0.336%
Company owned vehicles Total	0	0	0	3.42	1.82%
Cars: Average diesel car, upstream emissions	0	0	0	1.85	0.981%
Cars: Average petrol car, upstream emissions	0	0	0	1.57	0.836%
Premises Total	4.09	2.29e-4	3.87e-5	9.29	4.93%
District heating: District Heating, Karlstads Energi AB, upstream emissions	0	0	0	2.46	1.31%
District heating: District heating (Göteborg Energi), upstream emissions	0	0	0	0.106	0.0561%
Electricity: Electricity - transmission & distribution losses (MCR)	1.62	2.29e-4	3.87e-5	1.64	0.87%
Electricity: Electricity grid, T&D losses, upstream emissions	0	0	0	0.189	0.101%
Electricity: Electricity grid, generated, upstream emissions	0	0	0	2.37	1.26%
Incinerated waste	2.47	0	0	2.52	1.34%
Recycled waste	0	0	0	0	0%

Total	144	0.00465	0.00276	188	100%
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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	16.9	6.06e-4	3.84e-4	17	9.16%
Company owned vehicles Total	16.9	6.06e-4	3.84e-4	17	9.16%
Cars	16.9	6.06e-4	3.84e-4	17	9.16%
Scope 2 Total	3.6	0	0	26.1	14.1%
Premises Total	3.6	0	0	26.1	14.1%
District cooling	0	0	0	0.0496	0.0267%
District heating	0	0	0	22.1	11.9%
District heating: District Heating EON Malmo (Sweden), upstream emissions	0	0	0	0.362	0.195%
Electricity	3.6	0	0	3.6	1.94%
Scope 3 Total	113	8.86e-4	0.00184	143	76.8%
Business Travel Total	111	8.83e-4	0.00184	123	66.5%
Air travel	97.8	5.56e-4	0.00155	98.3	53%
Air travel: Flights, long-haul, average, upstream emissions	0	0	0	3.03	1.63%
Air travel: Flights, medium-haul, economy, upstream emissions	0	0	0	2.17	1.17%
Air travel: Flights, short-haul, upstream emissions	0	0	0	4.74	2.55%
Employee owned cars (unknown fuel)	11.2	2.24e-4	2.34e-4	11.3	6.1%
Rail (train, tram, light rail, underground)	0	0	0	1.5	0.808%
Taxi	1.76	1.02e-4	5.23e-5	1.78	0.958%
Taxi: Regular taxi, upstream emissions	0	0	0	0.633	0.341%
Company owned vehicles Total	0	0	0	3.42	1.84%
Cars: Average diesel car, upstream emissions	0	0	0	1.85	0.995%
Cars: Average petrol car, upstream emissions	0	0	0	1.57	0.848%
Premises Total	2.48	2.6e-6	4.38e-7	15.6	8.42%
District heating: District Heating, Karlstads Energi AB, upstream emissions	0	0	0	2.46	1.33%
District heating: District heating (Göteborg Energi), upstream emissions	0	0	0	0.106	0.0569%
Electricity: Electricity - transmission & distribution losses (MCR)	0.0184	2.6e-6	4.38e-7	0.0185	0.00999%
Electricity: Electricity grid, T&D losses, upstream emissions	0	0	0	0.00214	0.00115%
Electricity: Electricity grid, generated, upstream emissions	0	0	0	0.0268	0.0144%
Electricity: MBI Upstream Emissions	0	0	0	10.5	5.65%
Incinerated waste	2.47	0	0	2.52	1.36%

Recycled waste	0	0	0	0	0%
Total	134	0.00149	0.00222	186	100%

Summary by Company Unit

Location-Based methodology

Assessment	2015		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)
SBAB	159	0.358	188	0.388
Göteborg	0.709	-	1.15	-
Karlstad	31.6	-	29.5	-
Malmö	2.99	-	3.78	-
Stockholm	25.4	-	9.95	-

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 2)	148,715	pass.km
Medium-haul, economy (RFI 2)	123,389	pass.km
Short-haul (RFI 2)	159,865	pass.km
Employee owned cars (unknown fuel)		
Large car (unknown fuel)	46,760	km
Rail (train, tram, light rail, underground)		
Swedish rail	1,239,702	pass.km
Taxi		
Hybrid taxi	13,446	km
Company owned vehicles		
Cars		
Average diesel car	48,989	km
Average petrol car	41,915	km
Premises		
District cooling		
District cooling (Solna/Sundbyberg, Norrenergi)	49,634	kWh
District heating		
District Heating Karlstads Energi AB	492,986	kWh
District heating (Göteborg Energi)	17,600	kWh
District heating EON Malmo	28,365	kWh
District heating, Solna/Sundbyberg (Norrenergi)	98,900	kWh
Electricity		
Electricity consumption (Nordic Market)	946,170	kWh
Incinerated waste		
Combusted waste, energy recovery, WEEE, mixed	60	kg
Combusted waste, energy recovery, WEEE, small	45	kg
Combusted waste, energy recovery, aluminum cans and foil	70	kg
Combusted waste, energy recovery, average plastics	250	kg
Combusted waste, energy recovery, glass	530	kg
Combusted waste, energy recovery, mixed paper and board	1,705	kg
Combusted waste, energy recovery, wood	50	kg
Waste, incinerated (no heat recovery), MSW	10,890	kg
Recycled waste		
Waste, recycled	16,020	kg

References

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Assessment Summary for Göteborg

Gross Overall Emissions (location-based): 1.15 tCO₂e

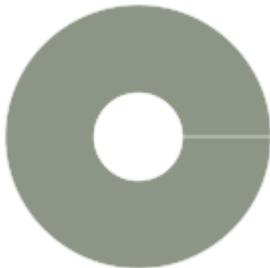
Gross Overall Emissions (market-based): 1.07 tCO₂e

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:

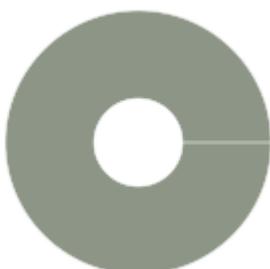
Data	KPI
350 Office floor area (square metres)	0.00329 tCO ₂ e per Office floor area (square metre) (Location-Based)
350 Office floor area (square metres)	0.00306 tCO ₂ e per Office floor area (square metre) (Market-Based)

Summary by Activity (Location-Based, tCO₂e)



By Activity	tCO ₂ e/year	%
Premises	1.15	100
Total	1.15	100

Summary by Activity (Market-Based, tCO₂e)



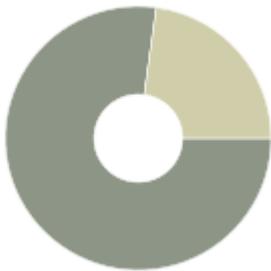
By Activity	tCO ₂ e/year	%
Premises	1.07	100
Total	1.07	100

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



Scope	tCO ₂ e/year	%
Scope 2	0.991	86.1
Scope 3	0.161	13.9
Total	1.15	100

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



Scope	tCO ₂ e/year	%
Scope 2	0.827	77.2
Scope 3	0.245	22.8
Total	1.07	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	0.183	0.183		
CH ₄	25	4.14e-5	0.00104		
N ₂ O	298	6.98e-6	0.00208		
CO ₂ e	1	0.966	0.966	1.07	1.07
Total			1.15		1.07

Assessment Summary for Karlstad

Gross Overall Emissions (location-based): 29.5 tCO₂e

Gross Overall Emissions (market-based): 26.6 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:

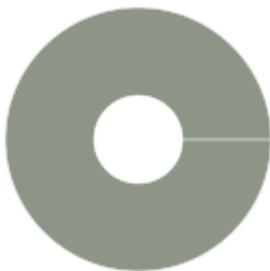
Data	KPI
5,958 Office floor area (square metres)	0.00494 tCO ₂ e per Office floor area (square metre) (Location-Based)
5,958 Office floor area (square metres)	0.00446 tCO ₂ e per Office floor area (square metre) (Market-Based)

Summary by Activity (Location-Based, tCO₂e)



By Activity	tCO ₂ e/year	%
Premises	29.5	100
Total	29.5	100

Summary by Activity (Market-Based, tCO₂e)



By Activity	tCO ₂ e/year	%
Premises	26.6	100
Total	26.6	100

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



Scope	tCO ₂ e/year	%
Scope 2	24.7	83.8
Scope 3	4.78	16.2
Total	29.5	100

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



Scope	tCO ₂ e/year	%
Scope 2	17.7	66.8
Scope 3	8.81	33.2
Total	26.6	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	7.7	7.7		
CH ₄	25	0.00175	0.0437		
N ₂ O	298	2.95e-4	0.0878		
CO ₂ e	1	21.6	21.6	26.6	26.6
Total			29.5		26.6

Assessment Summary for Malmö

Gross Overall Emissions (location-based): 3.78 tCO₂e

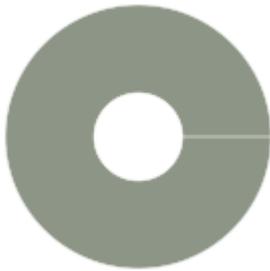
Gross Overall Emissions (market-based): 7.24 tCO₂e

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:

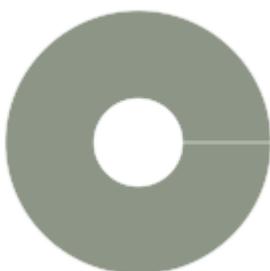
Data	KPI
248 Office floor area (square metres)	0.0152 tCO ₂ e per Office floor area (square metre) (Location-Based)
248 Office floor area (square metres)	0.0292 tCO ₂ e per Office floor area (square metre) (Market-Based)

Summary by Activity (Location-Based, tCO₂e)



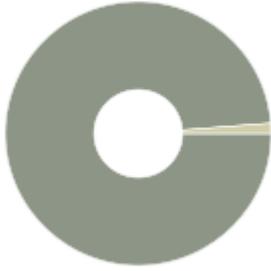
By Activity	tCO ₂ e/year	%
Premises	3.78	100
Total	3.78	100

Summary by Activity (Market-Based, tCO₂e)



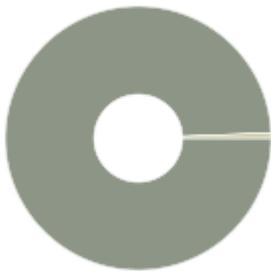
By Activity	tCO ₂ e/year	%
Premises	7.24	100
Total	7.24	100

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



Scope	tCO ₂ e/year	%
Scope 2	3.73	98.7
Scope 3	0.0475	1.26
Total	3.78	100

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



Scope	tCO ₂ e/year	%
Scope 2	7.2	99.3
Scope 3	0.0475	0.655
Total	7.24	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	0.158	0.158	3.62	3.62
CH ₄	25	3.58e-5	8.95e-4	2.6e-6	6.49e-5
N ₂ O	298	6.04e-6	0.0018	4.38e-7	1.31e-4
CO ₂ e	1	3.62	3.62	3.62	3.62
Total			3.78		7.24

Assessment Summary for Stockholm

Gross Overall Emissions (location-based): 9.95 tCO₂e

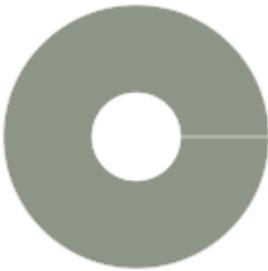
Gross Overall Emissions (market-based): 6.87 tCO₂e

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:

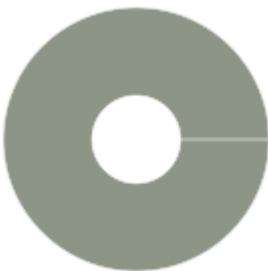
Data	KPI
4,300 Office floor area (square metres)	0.00231 tCO ₂ e per Office floor area (square metre) (Location-Based)
4,300 Office floor area (square metres)	0.0016 tCO ₂ e per Office floor area (square metre) (Market-Based)

Summary by Activity (Location-Based, tCO₂e)



By Activity	tCO ₂ e/year	%
Premises	9.95	100
Total	9.95	100

Summary by Activity (Market-Based, tCO₂e)



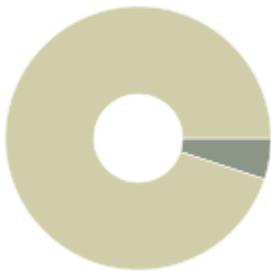
By Activity	tCO ₂ e/year	%
Premises	6.87	100
Total	6.87	100

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



Scope	tCO ₂ e/year	%
Scope 2	5.65	56.8
Scope 3	4.3	43.2
Total	9.95	100

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



Scope	tCO ₂ e/year	%
Scope 2	0.346	5.04
Scope 3	6.52	95
Total	6.87	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	8.36	8.36	2.47	2.47
CH ₄	25	0.00134	0.0334		
N ₂ O	298	2.26e-4	0.0672		
CO ₂ e	1	1.48	1.48	4.41	4.41
Total			9.95		6.87