CarbonGuru

# Greenhouse Gas Protocol Report for The University of Edinburgh

**Assessment Period: August 2008 - July 2009**

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# Assessment Details

## Consolidation Approach

Operational Control

## Organisational Boundaries

Operations of The University of Edinburgh

**Included**

- Academic estate
- Accommodation

## Operational Boundary

- Cars
- Incinerated waste
- Landfilled waste
- Natural gas
- Other fuel(s)
- Rigid HGVs
- Trucks
- Composted waste
- Electricity
- Recycled waste
- Vans
- Water supply
- Water treament

## 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 ($NF_3$), 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. 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. Scope 3 includes all other indirect emissions such as waste disposal, business travel and staff commuting. Reporting of these activities is optional under the WBCSD/WRI GHG Protocol, but as they can contribute a significant portion of overall emissions Ecometrica recommends they are reported where applicable.

A GHG assessment is an essential tool in the process of monitoring and reducing an organisation's climate change impact as it allows reduction targets to be set and action plans formulated. GHG assessment results can also allow organisations to be transparent about their climate change impacts through reporting of GHG emissions to customers, shareholders, employees and other stakeholders. Regular assessments allow clients to track their progress in achieving reductions over time and provide evidence to support green claims in external marketing initiatives such as product labelling or CSR reporting. Ecometrica GHG assessments are designed to be transparent, consistent and repeatable over time.

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[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

| Accuracy Overview | $tCO_2e$/year | % |
|---|---|---|
| Actual | 74,452 | 99.3 |
| Estimated | 544 | 0.725 |
| Total | 74,996 | 100 |

**Table 2. Data Quality and Availability**

| Source of emissions | Data quality |
|---|---|
| Company-Owned Vehicles | |
| Trucks | Complete |
| Rigid HGVs | Complete |
| Other fuel(s) | Mixed |
| Vans | Complete |
| Cars | Complete |
| Premises | |
| Natural gas | Complete |
| Water supply | Complete |
| Other fuel(s) | Complete |
| Electricity | Complete |
| Water treament | Estimated |
| Waste | |
| Recycled waste | Mixed |
| Incinerated waste | Mixed |
| Landfilled waste | Mixed |
| Composted waste | Complete |

# Assessment Summary for The University of Edinburgh
# Gross Overall Emissions: 74,996 $tCO_2e$

### 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 |
|---|---|
| 26,951 Number of students | 2.78 $tCO_2e$ per Student |
| 735,000 Floor area (square metres) | 0.102 $tCO_2e$ per Floor area (square metres) |
| 608,000 Thousand GBP Revenue (£) | 0.123 $tCO_2e$ per Thousand GBP Revenue (£) |
| 7,934 Full Time Equivalent Employees | 9.45 $tCO_2e$ per Full Time Equivalent Employee |

### Summary by Activity ($tCO_2e$)

| By Activity | $tCO_2e$/year | % |
|---|---|---|
| Premises | 74,188 | 98.9 |
| Company-Owned Vehicles | 321 | 0.428 |
| Waste | 487 | 0.649 |
| Total | 74,996 | 100 |

### Summary by WBCSD/WRI Scope ($tCO_2e$)

| Scope | $tCO_2e$/year | % |
|---|---|---|
| Scope 1 | 39,554 | 52.7 |
| Scope 2 | 31,786 | 42.4 |
| Scope 3 | 3,656 | 4.87 |
| Total | 74,996 | 100 |

### Summary by Greenhouse Gas

| Greenhouse Gas | GWP | tGHG/year | $tCO_2e$/year |
|---|---|---|---|
| $CO_2$ | 1 | 73,544 | 73,544 |
| $CH_4$ | 25 | 20.2 | 504 |
| $N_2O$ | 298 | 0.837 | 250 |
| Biogenic $CH_4$ | 24 | 0.988 | 23.7 |
| $CO_2e$ | 1 | 674 | 674 |

| | |
|---|---|
| Total | 74,996 |

# Detailed Results

## Detailed Summary by WBCSD/WRI Scope

| Source of Emissions | $tCO_2/yr$ | $tCH_4/yr$ | $tN_2O/yr$ | Total Emissions ($tCO_2e/yr$) | % |
|---|---|---|---|---|---|
| **Scope 1 Total** | **39,460** | **2.74** | **0.0844** | **39,554** | **52.7%** |
| Company-Owned Vehicles Total | 318 | 0.00717 | 0.00864 | 321 | 0.428% |
| Cars | 47.9 | 9.01e-4 | 0.00133 | 48.3 | 0.0644% |
| Other fuel(s) | 196 | 0.00472 | 0.00547 | 198 | 0.264% |
| Rigid HGVs | 6.21 | 2.34e-4 | 2.09e-4 | 6.28 | 0.00837% |
| Trucks | 11.1 | 5.42e-4 | 3.74e-4 | 11.2 | 0.015% |
| Vans | 56.9 | 7.72e-4 | 0.00126 | 57.2 | 0.0763% |
| Premises Total | 39,142 | 2.74 | 0.0758 | 39,233 | 52.3% |
| Natural gas | 39,031 | 2.73 | 0.0753 | 39,122 | 52.2% |
| Other fuel(s) | 111 | 0.00296 | 4.42e-4 | 111 | 0.148% |
| **Scope 2 Total** | **31,580** | **0.716** | **0.63** | **31,786** | **42.4%** |
| Premises Total | 31,580 | 0.716 | 0.63 | 31,786 | 42.4% |
| Electricity | 31,580 | 0.716 | 0.63 | 31,786 | 42.4% |
| **Scope 3 Total** | **2,503** | **16.7** | **0.123** | **3,656** | **4.87%** |
| Premises Total | 2,478 | 0.0622 | 0.0485 | 3,169 | 4.23% |
| Electricity: Electricity - transmission & distribution losses (carbon masters standard) | 2,478 | 0.0622 | 0.0485 | 2,494 | 3.33% |
| Water supply | 0 | 0 | 0 | 216 | 0.288% |
| Water treament | 0 | 0 | 0 | 458 | 0.611% |
| Waste Total | 24.8 | 16.7 | 0.0741 | 487 | 0.649% |
| Composted waste | 0 | 0 | 0.0741 | 45.8 | 0.0611% |
| Incinerated waste | 24.8 | 0 | 0 | 24.8 | 0.0331% |
| Landfilled waste | 0 | 16.7 | 0 | 416 | 0.555% |
| Recycled waste | 0 | 0 | 0 | 0 | 0% |
| **Total** | **73,544** | **20.2** | **0.837** | **74,996** | **100%** |

# Summary by Company Unit

| Company Unit | $tCO_2e$/year | FTE | $tCO_2e$/FTE |
|---|---|---|---|
| The University of Edinburgh | 74,996 | 7,934 | 9.45 |
| Academic estate | 65,200 | - | - |
| Accommodation | 9,795 | - | - |

# Annual Activity Data

| Source of Emissions | Value | Unit |
|---|---|---|
| **Company-Owned Vehicles** | | |
| Cars | | |
| Average diesel car | 39,984 | mi |
| Average petrol car | 8,000 | mi |
| Large diesel car | 8,360 | mi |
| Large petrol car | 14,062 | mi |
| Small diesel car | 90,126 | mi |
| Small petrol car | 6,659 | mi |
| Other fuel(s) | | |
| Diesel | 73,828 | l |
| Petrol | 323 | l |
| Rigid HGVs | | |
| Average HGV | 4,329 | mi |
| Trucks | | |
| Articulated HGV (3.5-33t) average load | 8,137 | mi |
| Vans | | |
| Average diesel van | 33,613 | mi |
| Large diesel van | 57,075 | mi |
| Small diesel van | 72,663 | mi |
| Small petrol van | 1,155 | mi |
| **Premises** | | |
| Electricity | | |
| Electricity consumption | 65,353,909 | kWh |
| Natural gas | | |
| Natural gas consumption | 212,237,846 | kWh |
| Other fuel(s) | | |
| LPG | 74,542 | l |
| Water supply | | |
| Water supply | 669,000 | m3 |
| Water treament | | |
| Water treatment (Europe) | 635,550 | m3 |
| **Waste** | | |
| Composted waste | | |
| Composted waste | 247 | tonne |
| Incinerated waste | | |
| Waste, incinerated (no heat recovery), MSW | 110 | tonne |
| Landfilled waste | | |
| Waste, landfilled, MSW | 750 | tonne |
| Recycled waste | | |

| | | | |
|---|---|---|---|
| | Waste, recycled | 1,217 | tonne |

# References

Defra/DECC (2011). 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.

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

IPCC 2006. IPCC Guidelines for National GHG Inventories Smith et al 2001. Waste management options and climate change

Smith, A., K. Brown, S. Ogilvie, K. Rushton, and J. Bates, 2001: Waste management options and climate change. Final Report ED21158R4.1 to the European Commission, DG Environment, AEA Technology, Oxfordshire.

# Assessment Summary for Academic estate

# Gross Overall Emissions: 65,200 $tCO_2e$

### 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 |
|---|---|
| 616,231 Floor area (square metres) | 0.106 $tCO_2e$ per Floor area (square metres) |

### Summary by Activity ($tCO_2e$)

| By Activity | $tCO_2e$/year | % |
|---|---|---|
| Premises | 64,409 | 98.8 |
| Company-Owned Vehicles | 305 | 0.467 |
| Waste | 487 | 0.747 |
| Total | 65,200 | 100 |

### Summary by WBCSD/WRI Scope ($tCO_2e$)

| Scope | $tCO_2e$/year | % |
|---|---|---|
| Scope 1 | 35,823 | 54.9 |
| Scope 2 | 26,272 | 40.3 |
| Scope 3 | 3,106 | 4.76 |
| Total | 65,200 | 100 |

### Summary by Greenhouse Gas

| Greenhouse Gas | GWP | tGHG/year | $tCO_2e$/year |
|---|---|---|---|
| $CO_2$ | 1 | 63,913 | 63,913 |
| $CH_4$ | 25 | 19.8 | 495 |
| $N_2O$ | 298 | 0.712 | 212 |
| Biogenic $CH_4$ | 24 | 0.988 | 23.7 |
| $CO_2e$ | 1 | 557 | 557 |
| Total | | | 65,200 |

# Assessment Summary for Accommodation

# Gross Overall Emissions: 9,795 $tCO_2e$

### Summary by Activity ($tCO_2e$)

| By Activity | $tCO_2e$/year | % |
|---|---|---|
| Premises | 9,779 | 99.8 |
| Company-Owned Vehicles | 16.2 | 0.166 |
| Total | 9,795 | 100 |

### Summary by WBCSD/WRI Scope ($tCO_2e$)

| Scope | $tCO_2e$/year | % |
|---|---|---|
| Scope 1 | 3,731 | 38.1 |
| Scope 2 | 5,514 | 56.3 |
| Scope 3 | 550 | 5.62 |
| Total | 9,795 | 100 |

### Summary by Greenhouse Gas

| Greenhouse Gas | GWP | tGHG/year | $tCO_2e$/year |
|---|---|---|---|
| $CO_2$ | 1 | 9,631 | 9,631 |
| $CH_4$ | 25 | 0.395 | 9.87 |
| $N_2O$ | 298 | 0.125 | 37.3 |
| $CO_2e$ | 1 | 118 | 118 |
| Total | | | 9,795 |