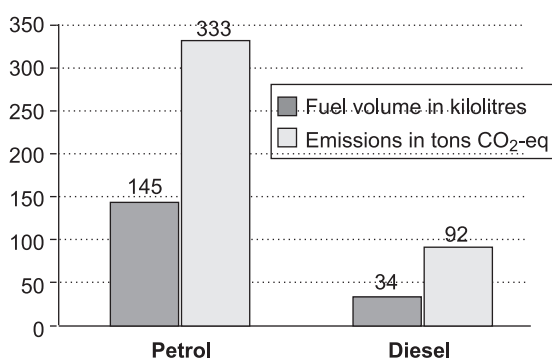
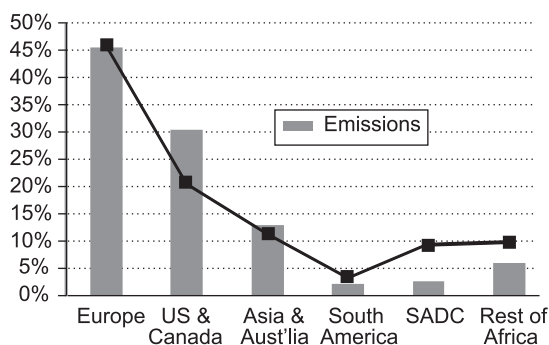


**Figure 7: Distribution of GHG emissions due to daily commuting to UCT campuses**



**Figure 8: Fuel quantities and resulting emissions from UCT vehicle fleet for year 2007**



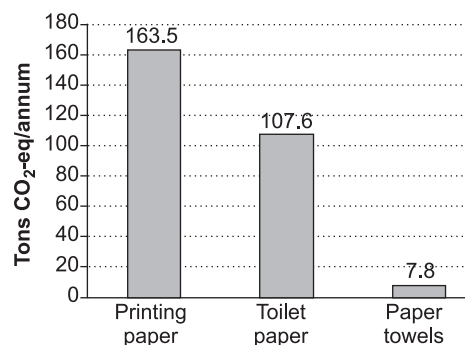
**Figure 9: Distribution of trips and emissions from international official flights in 2007**

It must be noted that because of unavailability of data on domestic flights for official UCT business, the emission value reported in this section is an underestimation of the actual UCT carbon footprint resulting from official flights.

### 3.3 Emissions from goods and services

#### Paper

Figure 10 shows the emission contribution of each type of paper to the university's carbon footprint for the year 2007.



**Figure 10: Life-cycle emissions from the use of paper on UCT campuses in 2007**

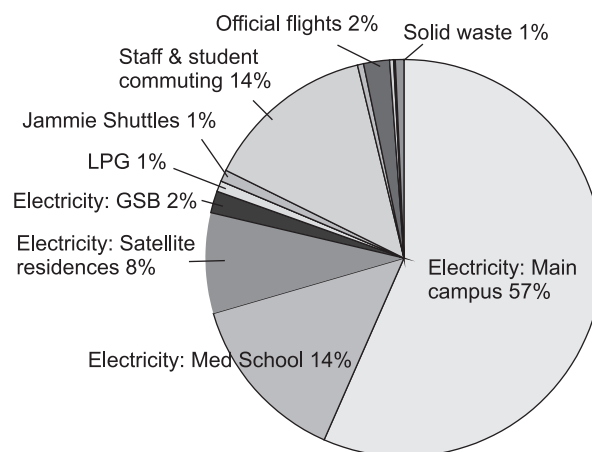
#### Solid waste and wastewater

The results showed that solid waste contributes about 595.1 tonnes of CO<sub>2</sub>-eq emissions per annum to the University's total carbon footprint. These are only emissions associated with the wet waste that is taken to the landfill, and assumes that all the recyclables are actually recycled and do not contribute to UCT's carbon footprint.

The contribution of wastewater to the total carbon footprint of the University was found to be about 113.1 tonnes of CO<sub>2</sub>-eq per annum for 2007.

### 3.4 Total carbon footprint of UCT

Table 2 shows the total carbon footprint of the University of Cape Town for the year 2007. University activities for the year of 2007 led to the release of about 85 000 tons of CO<sub>2</sub>-eq emissions into the atmosphere, with about 80% of those emissions coming from the consumption of electricity alone. Daily commuting to campus and official international flights were the second and third most carbon-intensive activities at the University in 2007 with contributions of 14% and 2% respectively.



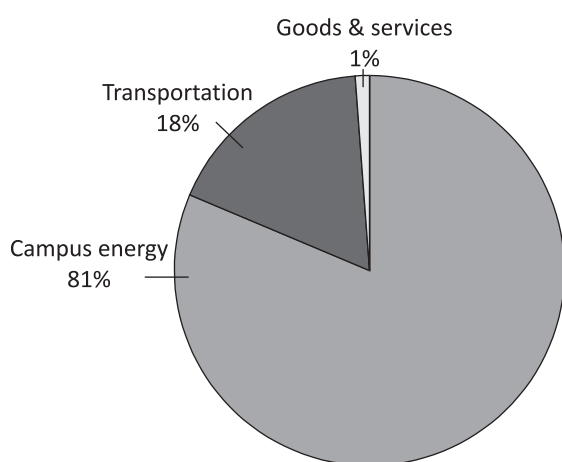
**Figure 11: Overall UCT CO<sub>2</sub> emissions**

Figure 11 is an overview of the carbon footprint of the University of Cape Town, highlighting only the most significant contributors (greater than 0.5%)

**Table 2: UCT's carbon emissions for the year 2007**

| Category         | Emissions source                           | Emissions<br>[tons CO <sub>2</sub> -eq/yr] | % contribution |
|------------------|--|--|----------------|
| Campus energy    | Electricity: Main Campus                   | 48 061.7                                   | 56.59%         |
|                  | Electricity: Medical School Campus         | 11 810.5                                   | 13.91%         |
|                  | Electricity: Graduate School of Business   | 1 518.4                                    | 1.79%          |
|                  | Electricity: Satellite residences          | 6 936.6                                    | 8.17%          |
|                  | LPG  | 755.2                                      | 0.89%          |
|                  | Acetylene                                  | 0.7  | 0.001%         |
| Transportation   | Jammie Shuttles                            | 802.8                                      | 0.95%          |
|                  | Staff and student commuting                | 11 837.2                                   | 13.94%         |
|                  | UCT vehicle fleet                          | 424.8                                      | 0.50%          |
|                  | Official flights                           | 1 790.4                                    | 2.11%          |
| Goods & Services | Printing paper, toilet paper, paper towels | 278.9                                      | 0.33%          |
|                  | Wastewater                                 | 113.1                                      | 0.13%          |
|                  | Solid waste                                | 595.1                                      | 0.70%          |
| TOTAL            |  | 84 925.5                                   | 100%           |

contribution). Of the three emission categories, Campus energy has the largest share of GHG emissions at 81%, followed by Transport at 18% and lastly Goods and services with 1% (Figure 12).

**Figure 12: Distribution of UCT's carbon footprint by emission category**

#### 4 Benchmarking against other universities

Information on the carbon footprints of other South African universities could not be found; instead the carbon footprint of UCT was compared to those of international universities, which have published such studies.

Figures 13, 14 and 15 (overleaf) compare UCT's carbon footprint with that of other academic institutions around the world. Specifically, Figure 9 compares the emissions per capita from direct energy consumption (excluding transport emissions) of the different universities, and UCT is found to be at 3.2 tons CO<sub>2</sub>-eq per student, well below the average of 8.4. What seems interesting in the Figure is that all

American universities have higher per capita emission values than UCT while the two British universities and the National University of Lesotho perform better than UCT.

Of the universities compared in Figure 13, only nine could further be compared in terms of emissions from sectors other than direct energy use. Figure 14 compares UCT's emissions from Transportation, Waste and Other sources with those of other universities, while Figure 11 compares the total annual carbon footprints of these universities per student.

It is clear from both Figures 14 and 15 that UCT outperforms all the other universities included in the analyses in terms of emissions intensity.

It is worth noting that UCT's value of 4.0 Tons CO<sub>2</sub>-eq/student is rightfully lower than the country's 2007 per capita emissions estimate of 10.4 Tons CO<sub>2</sub>-eq/capita (Appendix) because the former only reflects the student's carbon footprint associated with the University activities.

#### 5 Conclusions and recommendations

- The total carbon emissions for the University of Cape Town for the year 2007 were estimated at 84 900 CO<sub>2</sub>-eqt. Although this value is an underestimation because of unavailability of some of the activity data, it is the best estimation that was possible with the data available, and it gives a good idea of the size of the University's annual carbon footprint.
- Electricity usage on UCT campuses is the largest sole contributor to the University's carbon footprint. In 2007, about 80.5% of UCT's carbon footprint resulted from the use of electricity.
- The unavailability of data was the biggest problem to determining a complete and comprehensive carbon footprint for the University of Cape



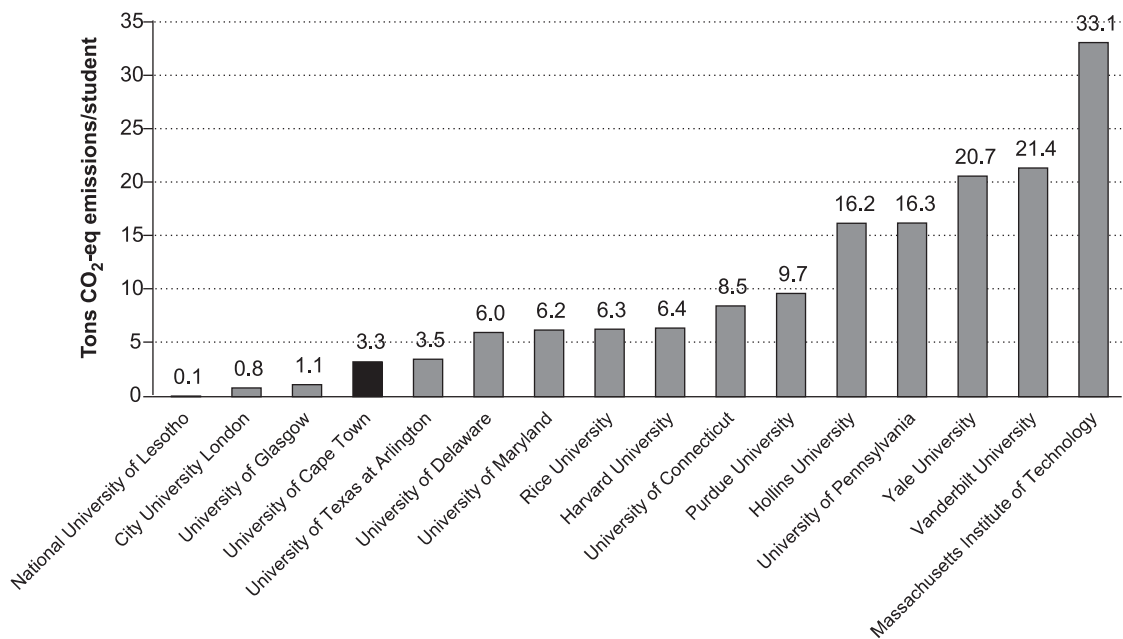


Figure 13: Per capita emissions from energy consumption of different universities

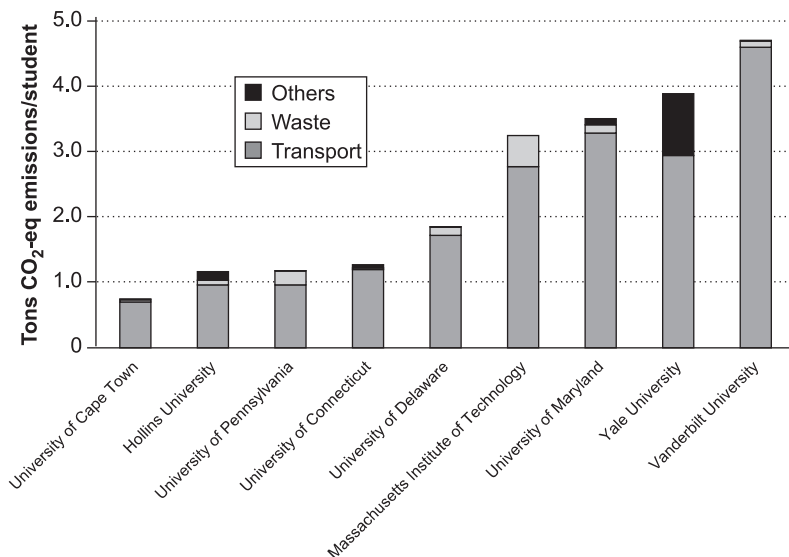


Figure 14: Per capita emissions from transport, waste and other sources for different universities

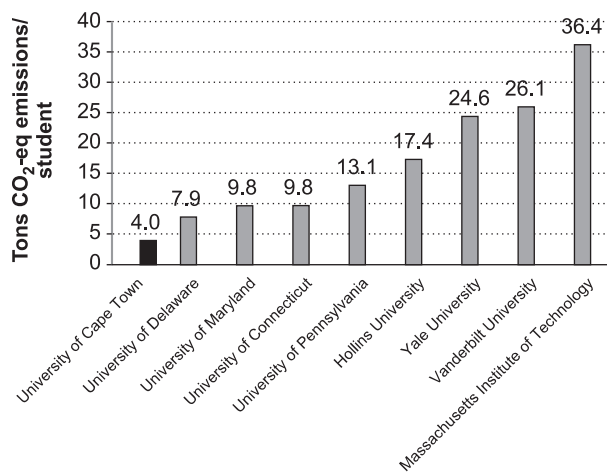


Figure 15: Comparing the total per capita emissions of the different universities

Town. It is recommended that all activity data – electricity consumption in all UCT campuses, LPG consumption data, Acetylene consumption data, UCT fleet data, Jammie Shuttle diesel consumption and waste data – should constantly be monitored and updated, at least on a yearly basis.

## Note

1. All data for year 2007 with the exception of University of Glasgow (2006), University of Texas Arlington (2005), Yale University (2002) and Massachusetts Institute of Technology (2003).

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## See appendices overleaf

## Appendices

### A. Data for other universities

| University                  | No of students<br>2008 <sup>a</sup> | Emissions [Tons CO <sub>2</sub> -eq] |                |       |        | Total<br>emissions | Total emis-<br>sions/capita<br>Tons CO <sub>2</sub> eq<br>/student | Year | Source <sup>b</sup> |
|-----------------------------|-------------------------------------|--------------------------------------|----------------|-------|--------|--------------------|--|------|---------------------|
|                             |                                     | Energy                               | Transportation | Waste | Others |                    |  |      |                     |
| National Univ. of Lesotho   | 8 566                               | 573                                  |                |       |        |                    |  | 2007 | 1                   |
| City Univ. London           | 12 861                              | 10 686                               | -              |       | 1 597  | 12 283             | 0.96   | 2007 | 2                   |
| University of Glasgow       | 23 590                              | 27 000                               |                |       |        |                    | 0.00   | 2006 | 3                   |
| University of Cape Town     | 21 175                              | 69 083                               | 14 855         | 708   | 279    | 84 925             | 4.01   | 2007 |                     |
| Univ. of Texas at Arlington | 25 297                              | 88 830                               |                |       |        | 98 700             | 3.90   | 2005 | 4                   |
| University of Delaware      | 19 359                              | 116 614                              | 33 336         | 2 538 | 54     | 152 542            | 7.88   | 2007 | 5                   |
| University of Maryland      | 36 014                              | 224 733                              | 118 466        | 4 560 | 3 386  | 351 145            | 9.75   | 2007 | 6                   |
| Rice University             | 5 061                               | 31 986                               |                |       |        | 69 032             | 13.64  | 2007 | 7                   |
| Harvard University          | 29 900                              | 192 230                              |                |       |        |                    |  | 2007 | 8                   |
| University of Connecticut   | 20 229                              | 171 993                              | 24 248         | 487   | 1 025  | 197 753            | 9.78   | 2007 | 9                   |
| Purdue University           | 39 102                              | 378 400                              |                |       |        | 668 800            | 17.10  | 2007 | 10                  |
| Hollins University          | 1 039                               | 16 874                               | 1 000          | 75    | 137    | 18 086             | 17.41  | 2007 | 11                  |
| Univ. of Pennsylvania       | 26 537                              | 317 000                              | 25 548         | 5 750 | 0.48   | 348 298            | 13.13  | 2007 | 12                  |
| Yale University             | 11 851                              | 244 814                              | 34 904         |       | 11 236 | 290 954            | 24.55  | 2002 | 13                  |
| Vanderbilt University       | 11 577                              | 247 877                              | 53 308         | 1 098 | 134    | 302 417            | 26.12  | 2007 | 14                  |
| Massachusetts IT            | 5 909                               | 195 861                              | 16 407         | 2 807 | 0      | 215 075            | 36.40  | 2003 | 15                  |

#### Notes

a. Obtained from: Top Universities. University Profiles: Statistics. 2009 [Available from: [www.topuniversities.com](http://www.topuniversities.com).]

b. Most of the reports are available on the following website: [www.aashe.org/resources/ghg\\_inventories.php](http://www.aashe.org/resources/ghg_inventories.php)

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### B. Estimating South Africa's 2007 per capita emissions

| Information                       | Value | Units                 | Source   |
|-----------------------------------|-------|-----------------------|--|
| 2007 country emissions            | 498.5 | MTons CO <sub>2</sub> | Winkler, H., ed. Long Term Mitigation Scenarios: Technical Report. 2007, Prepared by the Energy Research Centre for Department of Environment Affairs and Tourism, Pretoria, October 2007. |
| 2007 mid-year population estimate | 47.9  | Million people        | <a href="http://www.southafrica.info/about/people/population.htm">www.southafrica.info/about/people/population.htm</a>   |

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