Environmental measuring and monitoring training session

University of Cambridge ‘cheat sheet’

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| **Typical energy consumptions (wattage)** |
| Dishwasher | 1050-1500W |
| Kettle | 2200-3000W |
| Microwave | 600-1500W |
| Fridge | 40-120W |
| Fridge-freezer | 200-400W |
| Freezer | 150W |
| Plasma TV | 280-450W |
| LCD TV | 125-200W |
| Video, DVD or CD | 20-60W |
| Laptop | 20-50W |
| Desktop computer | 80-150W |
| Tablet (charge) | 10W |
| Smart phone (charge) | 2.5-5W |
| Pc Monitor | 40-100W |
| Tungsten filament bulb | 40-100W |
| CFL light bulb | 10-15W |
| Office strip light | 6W-80W |
| LED bulb | 2W-60W |
| Photocopier | 30-50W |
| ULT Freezer (old) - average over day | 1000W |
| ULT Freezer (new) - average over day | 400W |
| Large Drying Cabinet (old) | 1500W |
| Large Drying Cabinet (new) | 1100W |
| Small Drying Cabinet (old) | 425W |
| Small Drying Cabinet (new) | 230W |
| Lab Oven - average over day | 250W |
| Incubator (@37'C) - average over day | 180W |
| Microbiological Safety Cabinet (old) | 700W |
| Microbiological Safety Cabinet (new) | 150W |

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| Typical impact per UK person/household |
| Average household consumption per day (electricity) |  8.5 | kWh |
| Average household consumption per year (electricity) | 3100 | kWh |
| Average household consumption per day (gas) |  32.9 | kWh |
| Average household consumption per year (gas) | 12000 | kWh |
| Average UK waste output per person | 416.2 | KG |
| Average UK waste output per household | 1007.4 | KG |
| Average person's carbon footprint in tonnes | 6.5 | tonnes |

<https://www.ofgem.gov.uk/gas/retail-market/monitoring-data-and-statistics/typical-domestic-consumption-values>

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| **University environmental impact (2017/18 figures)** | **Per University staff & student:** | **University total:** |  |
| Carbon emissions from energy use (scope 1 & 2) per year | 2.20 | 65832.8 | tonnes |
| Carbon emissions from energy use (scope 1 & 2) per day | 6.03 | 180363.8 | KG |
| Waste generated per year (tonnes) | 0.18 | 5531.2 | tonnes |
| Waste generated per day (KG) | 0.51 | 15153.9 | KG |
| Water used per year | 15.6 | 466814.4 | m3  |
| Water used per day | 42.7 | 1278944 | litres |
| Emissions from flights per FTE | 1.09 | 32617.2 | tCO2e |

Source: University annual report 2017/18

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| Average weights of University bins |
| Average weight of 1100 litre wheeled external bin  | 79.9 | KG |
| Average weight of Dry Mixed Recycling wheeled external bin (1100litre) | 68.6 | KG |
| Average weight of General Waste wheeled external bin (1100litre) | 87.8 | KG |
| Average weight of food waste bin (240l wheelie bin) | 32.7 | KG |
| Average weight of 8 yard skip | 1380.7 | KG |

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| **Conversion factors for volume (m3) to mass (tonnes) of waste** |  |
| Paper and cardboard | 0.21 | tonnes per m3 |
| Biodegradable kitchen and canteen waste | 0.2 | tonnes per m3 |
| Mixed municipal waste | 0.26 | tonnes per m3 |

Source: WRAP

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| Typical costs (University) |
|  £0.11  | cost per kWh in £ (electricity) |
|  £0.03  | cost per kWh in £ (gas) |
|  £0.15  | General waste - cost for disposal per kg |
|  £0.08  | Mixed recycling - cost for disposal per kg |
|  £0.92  | Water cost per m3 |
|  £1.98  | Sewerage cost per m3 |
| **Carbon factors - purchasing** |
| Item | kg CO2e | Per… |
| Books (primary material) | 0.96 | kg |
| Books (reused) | 0.80 | kg |
| Glass (primary) | 0.90 | kg |
| Glass (open loop) | 0.02 | kg |
| Glass (closed loop source) | 0.53 | kg |
| Clothing (primary) | 22.31 | kg |
| Clothing (reused) | 0.15 | kg |
| Clothing (open-loop) | 0.15 | kg |
| Food and drink | 4.06 | kg |
| WEEE - mixed | 1.15 | kg |
| Metal: mixed cans (primary) | 6.56 | kg |
| Metal: mixed cans (closed loop source) | 2.19 | kg |
| Plastics: average plastics (primary material) | 3.12 | kg |
| Plastics: average plastics (open loop) | 0.66 | kg |
| Plastics: average plastics (closed loop source) | 2.30 | kg |
| Paper and board: mixed (primary material) | 0.87 | kg |
| Paper and board: mixed (closed loop source) | 0.80 | kg |

[www.gov.uk/government/collections/government-conversion-factors-for-company-reporting](http://www.gov.uk/government/collections/government-conversion-factors-for-company-reporting)

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| **Carbon factors – waste disposal** |
| Item/Activity | kg CO2e | Per… |
| Municipal waste disposal by recycling |  21.38 | tonne |
| Municipal waste disposal by combustion |  21.38 | tonne |
| Municipal waste disposal by landfill | 586.53 | tonne |
| Municipal waste disposal by anaerobic digestion |  21.38 | tonne |
| Commercial and industrial waste disposal (recycling) |  21.38 | tonne |
| Commercial and industrial waste disposal (combustion) |  21.38 | tonne |
| Commercial and industrial waste disposal (landfill) |  99.77 | tonne |
| Commercial and industrial waste disposal (anaerobic digestion) |  21.38 | tonne |
| Organic (food and drink) waste - combustion |  21.38 | tonne |
| Organic (food and drink) waste - composting |  10.26 | tonne |
| Organic (food and drink) waste - landfill | 626.97 | tonne |
| Organic (food and drink) waste - anaerobic digestion |  21.38 | tonne |

[www.gov.uk/government/collections/government-conversion-factors-for-company-reporting](http://www.gov.uk/government/collections/government-conversion-factors-for-company-reporting)

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| **Carbon factors - travel** |
| Activity | kg CO2e | Per… |
| UK average car journey |  0.29 | mile |
| Flight (short-haul, to/from UK) |  0.16 | passenger km |
| Flight (long-haul, to/from UK) |  0.21 | passenger km |
| Bus (average local) |  0.1  | passenger km |
| Rail (national) |  0.04 | passenger km |
| Rail (international) |  0.01 | passenger km |
| Delivery by diesel van |  0.54 | tonne.km |
| Delivery by electric van |  0.34 | tonne.km |

[www.gov.uk/government/collections/government-conversion-factors-for-company-reporting](http://www.gov.uk/government/collections/government-conversion-factors-for-company-reporting)

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| **Carbon factors – foods**  |
| Item/Activity | kg CO2e | Per… |
| Tropical Fruits |  1.15  | kg |
| Puff pastry (butter) |  5.4  | kg |
| Puff pastry (vegan) |  2.32  | kg |
| Tea |  6.42  | kg |
| Coffee |  17.72  | kg |
| Beef |  23.45  | kg |
| Poultry |  6.57  | kg |
| Tofu |  1.07  | kg |

[www.tuco.ac.uk/ghgcalculator/](http://www.tuco.ac.uk/ghgcalculator/)

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| **Carbon factors - energy** |
| Activity | kg CO2e | Per… |
| Natural Gas |  0.204 | kWh |
| Electricity |  0.283 | kWh |

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