



Scenario A - 200 staff work from office in the UK

| Building Type | Office type 3 Air-conditioned Standard (CIBSE, 2000) | | | | | | |
|--|--|--------------------------|---|-------------|-------------|---------|---------|
| Floor Area | Total 2000m ² | | Assumed treated[1] area 1800m² | | | | |
| Gas Consumption | 97 | kWh/m ² | CIBSE Guide F (Good Practice) | | | | |
| Electricity Consumption | 128 | kWh/m ² | CIBSE Guide F (Good Practice) | | | | |
| Gas/CO ₂ Conversion factor | 0.18385 | kgCO ₂ /kWh | GHG Reporting Factors 2019 | | | | |
| Electricity/CO ₂ Conversion | 0.31598 | kgCO ₂ /kWh | GHG Reporting Factors 2019 (elec + T&D + WTT) | | | | |
| Petrol/CO ₂ Conversion | 2.20904 | kgCO ₂ /litre | GHG Reporting Factors 2019 | | | | |
| Travel modes | Car | Car - passenger | Bus | Rail | Underground | Walking | Bicycle |
| No. of trips per person per year | 159 | 21 | 24 | 20 | 9 | 32 | 11 |
| Share of trips | 58% | 8% | 9% | 7% | 3% | 12% | 4% |
| No. of miles per commuting journey | 10 | 7.7 | 5.3 | 20.4 | 9.7 | 0.9 | 3.3 |
| No. of miles per commuting journey(return) | 20 | 15.4 | 10.6 | 40.8 | 19.4 | 1.8 | 6.6 |
| Weighted | 19.46333333 | | | 34.15862069 | | | |

[1] The treated floor area is the gross areas less plant rooms and other areas (e.g. stores, covered car parking, and roof spaces) not directly heated, cooled or lighted.

The Building

The calculations used in this study have drawn upon accepted energy demand benchmarks set out in the Energy Consumption Guide: Energy use in Offices[1] a document produced by the Chartered Institution of Building Services Engineers (from this point onwards this document will be referred to as ECON, 19). This guide sets energy consumption benchmark figures in relation to four generic types of offices. These range from naturally ventilated cellular offices to prestige air-conditioned spaces. For the purposes of this study the 'air-conditioned, standard' office type was chosen which is managed using good practice. Good practice means that the energy consumption is being managed well however there is still scope for further cost-effective savings.

ECON 19 provides the best snapshot of the energy requirements of a typical air-conditioned building. These figures take into consideration energy demand for heating, cooling, fans, pumps, humidification, lighting, office equipment, and catering therefore providing an accurate estimation of the total annual energy demand per square meter.

Staff Travel

These figures represent national average commuting figures as compiled by National Statistics and the Department for Transport, 2003[1]. The average miles per gallon figures were taken from studies produced by the Department for Transport and National Statistics[2]. In the absence of actual data national average data represents the most accurate way of modelling the travel carbon emissions. The total number of travel days made annually per employee was calculated to be 231. This figure takes into consideration weekends, annual leave and public holidays.

Finally the carbon dioxide figures, in relation employee travel were also calculated using DEFRA 2005[3] figures

[1] National Statistics and Department for Transport. Travel to Work in GB Available at <http://www.dft.gov.uk/>

[2] National Statistics and Department for Transport (2006). Energy and the Environment. Available at <http://www.dft.gov.uk/>

[3] The Department for Environment, Food and Rural Affairs (2005) Guidelines for Company Reporting on Green House Gas Emissions. Available at <http://www.defra.gov.uk>

Scenario B - 200 staff work from home in the UK, and heat just their home office - not the whole house

| Building Type | 2 bed flat, with two external walls | |
|--|-------------------------------------|---|
| Floor Area | 80m ² average flat size | 25m ² space occupied during the working day[1] |
| Gas Consumption | 100 | kWh/m ² |
| Electricity Consumption | 25 | kWh/m ² |
| Gas/CO ₂ Conversion factor | 0.18385 | kgCO ₂ /kWh |
| Electricity/CO ₂ Conversion | 0.31598 | kgCO ₂ /kWh |
| PC Energy consumption | 150 | W |
| Small Power Energy Consumption | 5 | W |
| Hours of Operation | 1920 | hours per annum |

(Calculated based on a 5 day working week, 10 hour working day, 48 working weeks per year)

The floor area, gas and electricity consumption figures are based on best practice guidelines. Best practice consumption guidelines give outline annual energy consumption figures. These figures, which are taken from large studies, reflect summer and winter conditions.

The floor area under consideration was reduced from 80m² to 25m² to reflect the area for the home actually used during the working day. This is important as considering the whole flat area would inflate the carbon dioxide figures therefore reducing the accuracy of the study. The number of operational hours was calculated based on employees working 48 weeks per year, 5 days per week and 10 hour days, to reflect employee annual leave and public holidays. PC and small power energy consumption figure are based on benchmark values calculated by the Chartered Institution of Building Services Engineers. Gas and Electricity conversion factors are the same as those utilised in the Scenario A

Scenario C - 200 staff work from home, and heat their whole house in winter

| Building Type | 2 bed flat, with two external walls | |
|--|-------------------------------------|------------------------|
| Floor Area | 80m ² average flat size | |
| Gas Consumption | 100 | kWh/m ² |
| Electricity Consumption | 25 | kWh/m ² |
| Gas/CO ₂ Conversion factor | 0.18385 | kgCO ₂ /kWh |
| Electricity/CO ₂ Conversion | 0.31598 | kgCO ₂ /kWh |
| PC Energy consumption | 150 | W |
| Small Power Energy Consumption | 5 | W |
| Hours of Operation | 1920 | hours per annum |

This scenario uses the same input data and assumptions as Scenario B. The only difference is the entire floor area (80m²) of the two bedroom flat is assumed to be 'treated' (i.e. total floor area which is cooled, heated and lighted). Scenario C therefore represents the CO₂ footprint of homeworking employees who heat and light their entire flat during their working day and not just the rooms in which they occupy.