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Office buildings and carbon dioxide emissions: some preliminaries [1]

Appendix of assumptions and methods used in the analysis

These are the assumptions and analysis details for the calculation of commuting-based CO_2 emissions for the studied UK buildings.

1. Single building spreadsheet

Input:

- Home postcode.
- Number of days spent at work.
- Method of transport.
- Time taken to and from work.

Output:

- Total weighted mileage in one direction per transport mode.
- Total number of participants per transport mode.
- Average best, normal and worst journey times per transport mode.

Assumptions and methods used:

- Only those participants who provided postcodes and modes of transport have been included in the analysis.
- Travel time averages only include those who provided the information (i.e. blanks are treated as missing).
- All own car, lift, cycle and bus distances (i.e. those journeys with a 'carbon component') are taken from Google Maps, inputting both home and destination postcodes and recording the mileage supplied.
- Train, flight, ferry and walking distances are measured by using the measuring tool on Google Maps.
- Underground rail distances are assumed to be the same by road.
- All journey distances are approximate as actual occupant route is unknown and are based on the postcodes provided by participants.
- Only main modes of transport have been used. If, for example, a respondent has put down more than one mode of transport then the data are split 50:50 (i.e. drive or cycle) but it has to be seen as realistic, i.e. if someone has put "I walk and drive" but lives 20 miles away it is unlikely they walk 20 miles but park up close to work an

1 Title to be decided

walk a short distance. Therefore the full 20 miles is assumed to be driven and no allowance has been made for the short walk.

- The data take part-time members of staff into account. Weekly emissions are weighted and spread out to give a weekly working average.

2. Spreadsheet for all study buildings combined

Input:

- Total number of participants per transport mode.
- Total weighted mileage in one direction per transport mode.
- Average best, normal and worst journey times per transport mode.
- CO_2 emissions per transport mode.

Output:

- Total daily average commute related CO_2 emissions per employee (who has provided data) per office.
- Total annual average commute related CO_2 emissions per employee (who has provided data) per office.
- Total daily average commute distance (2 directions) per office per person (providing data).
- Total daily average time spent commuting per employee (who has provided data) per office.
- Total annual average time spent commuting per employee (who has provided data) per office.

Assumptions:

- CO_2 emissions are based on figures and information taken from (Hampton, 2007, Hillman, 2004, Hampton, 2006, Lynas, 2007). [2]
- CO_2 emission coefficients are approximate as because the precise details of e.g. car model, age, fuel consumption, energy capacity, etc. are not known.
- Average daily CO_2 emissions per employee are based on a return journey by the same mode in each direction.
- If people car share the CO_2 emissions for their daily commute are halved.

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2 HAMPTON, D. (2006) The Edge Pledge: Carbon Audit Excel Spreadsheet. http://www.at-theedge.org.uk/edgepledge/EDGE%20PLEDGE%20HOUSEHOLD%20CO2%20FOOTPRINTS%20V71 1.xls. Accessed 31.05.2007

HAMPTON, D. (2007) MSN Carbon Emissions Calculator: Assumptions and calculations. http://news.uk.msn.com/carbon_calculator_assumptions.aspx. Accessed 11.06.2007

HILLMAN, M. (2004) How we can save the planet, London, Penguin.

LYNAS, M. (2007), The Carbon Calculator, London, Collins.

- The one person in the study who flies is assumed to travel to England and back once a week and the 2.7 CO_2 'forcing factor' has been included.
- Walking and cycling have no CO_2 emissions.
- Average days per year spent commuting, kg CO_2/yr in emissions terms and mileage are based on the average employee working 235 (47 weeks) days annually.

3. Travel mode map graphic

Software for dartboard graphic

- Photoshop.

Input:

- Home postcode.
- Office postcode.
- Transport mode per participant giving data.

Output:

- Mileage by road per participant.
- Approximate geographic location in relation to the office (Google Maps 10 mile scale).
- Coloured dot according to transportation mode.

Methods:

- When comparing distances between the dartboard graphic and the spreadsheet results; one is as the crow flies, the other by using Google Maps respectively.
- Graphic is not to scale but all distances are relative.
- The matching up of dot on Google Maps and on the Photoshop file has been done by eye with both open web page and Photoshop file side-by-side on the screen.