



## JISC Final Report

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## 1 Acknowledgements

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## 2 Project Summary

The main aim of the Greening Events II project was to build on the work of the initial exploratory Greening Events project<sup>1</sup>, in order to provide an exemplar in profiling the extent and sustainability impacts of HE events and travel within the University of Bristol, with a view to informing and helping other institutions undertake similar initiatives.

There were two main strands of work proposed in the project plan:

1. An Academic Event Profiler tool to allow the University of Bristol (and other universities) to systemically profile their event and travel footprints (including financial costs and Greenhouse Gas (GHG) emissions) in order to provide a baseline on which to measure any subsequent changes.
2. An Events Planning Toolkit to help event organisers think through what type of event (if at all) they need to hold (physical, virtual or combined (hybrid)) and then to provide assistance in the form of guidelines and technology tools with each stage in the process to enable to reduce the sustainability impacts of the event.

In addition to the two original planned strands, the project also undertook an “Alternatives to Travel” pilot within the University to promote and support the use of virtual meeting technologies within Bristol as a way of substituting travel for some physical face-to-face meetings.

## 3 Main Body of Report

### 3.1 Project outputs and outcomes

Output / Outcome Type (e.g. report, publication, software, knowledge built)	Brief Description and URLs (where applicable)
Annotated Bibliography	List of references related to the project research <a href="http://greeningevents.ilrt.bris.ac.uk/files/2011/05/Greening_Events_Bibliography_2505111.pdf">http://greeningevents.ilrt.bris.ac.uk/files/2011/05/Greening_Events_Bibliography_2505111.pdf</a>
Carbon Assessment Methodology	Description of the work undertaken to complete a Scope III carbon assessment of the business travel occurring at the University of Bristol. See <i>Appendix A</i> for the full document.
Automated Tools for Scope 3 Aggregation and Calculation	These are available on request to <a href="mailto:greening-events-team@bristol.ac.uk">greening-events-team@bristol.ac.uk</a>
Events Planning Toolkit	Information about making meetings and events more

<sup>1</sup> <http://greeningevents.ilrt.bris.ac.uk/>

	sustainable through best practice guidelines for a range of events from traditional face-to-face meetings to fully virtual events or combinations of the two (hybrid events). <a href="http://www.bris.ac.uk/environment/green_event_toolkit/">http://www.bris.ac.uk/environment/green_event_toolkit/</a>
Event Amplification Report	Current and emerging best practice in the field of amplified and hybrid events within the UK higher and further education sector to help improve the sustainability outcomes of events. See <i>Appendix B</i> .
Updated MyMobile Bristol Code	Further developments to the existing MyMobile Bristol code. Publicly downloadable code available from <a href="https://github.com/ilrt/mca">https://github.com/ilrt/mca</a> , website from <a href="http://m.bristol.ac.uk/">http://m.bristol.ac.uk/</a>
Alternatives to Travel Pilot	See Section 3.3.2 below for an account of the work undertaken and <i>Appendices C, D, E, F, G</i> for the supporting documents
Virtual Meetings Guidance	Guidance materials to promote the use of virtual meetings within the University of Bristol <a href="https://www.bris.ac.uk/it-services/advice/virtualconference/index.html">https://www.bris.ac.uk/it-services/advice/virtualconference/index.html</a>

## 3.2 How did you go about achieving your outputs / outcomes?

### 3.2.1 Changes to aims and objectives

A few minor clarifications to the project were made at the first meeting of the Greening Events II Steering Committee. The Steering Committee consisted of senior managers within the University of Bristol support departments as well as academic input from Dr Chris Preist and Paul Shabajee from the Cabot Institute<sup>2</sup>. The group helped to define the project terms and definitions at the first meeting; they felt that the term ‘academic events’ was misleading and didn’t convey that this also included operational, administrative and managerial events and that term ‘HE events’ would be clearer.

The Committee also agreed to the following amended measures of success for the project:

- Establishing a baseline for academic travel for the University of Bristol to measure any subsequent changes
- A reduction in the negative impacts of business travel by academics or an increase in the utility of the business travel undertaken
- Evidence of policy or behavioural changes at the University of Bristol

A fairly significant change was made to the project plan as a result of a scoping survey of departments which was carried out early on in the project. The results of this indicated that travel choices occurring in the University of Bristol, in general, have a good sustainability profile, even if this is generally motivated by cost issues rather than sustainability ones. Because of this finding<sup>3</sup> the larger follow-up survey and subsequent pilot focused on possible alternatives to travel rather than travel mode choices as previously planned.

Another significant change was around the travel profile for the University. Discussions with the University finance team revealed that consistent financial data prior to the introduction of a new

<sup>2</sup> See <http://greeningevents.ilrt.bris.ac.uk/people/> for a full list of the Steering Committee membership

<sup>3</sup> See *Appendix C* for more information

financial management system (Proactis<sup>4</sup>) would be difficult to gather because of the need to draw information held in a wide range of different IT systems with information in different forms and levels of detail. Given the paucity and irregularity of data we had to revise our initial aim of creating baseline business travel figures for 2009-10 and instead worked towards creating a methodology/system that would allow finer grained monthly reports to be created and compared. We are also in ongoing discussions with the finance team to see what changes might be possible to the Proactis system to allow future data collection to be made easier.

### 3.2.2 Carbon assessment methodology

The carbon assessment methodology document is intended to provide the reader with all the information necessary to complete a Scope III carbon assessment of the business travel occurring at the University of Bristol (as well as highlight issues for other institutions wishing to undertake similar work).

The methodology document contains:

- A description of the reporting guidelines and protocols being adhered to and the emissions factors used
- Definitions for “Business travel” and “Scope III emissions”.
- A description of the internal and external data sources used, how they can be accessed and who the stakeholders are.
- A description of any data that is not available.
- An outline of the carbon calculations undertaken.
- The results of the carbon assessment.
- A discussion of future work and possible refinements to the process.

See *Appendix A* for the full methodology document and Section 3.3.1 for a discussion about what we learnt from the process.

### 3.2.3 Automated tools for Scope 3 aggregation and calculation

The project created a tool to help automate some of the processes for aggregating and calculating the University of Bristol’s Scope 3 business travel.

The tool allows you to:

- Aggregate University travel data into a single data structure
- Augment the data with distance and carbon calculations (using AMEE<sup>5</sup>)
- Export data for analysis elsewhere

Data relevant to Scope 3 emissions calculation is held in several systems across the University and its suppliers, and resulting exports from these systems produce data that is incompatibly formatted. Combining this data manually is a tedious and error-prone process. The project tool attempts to address this by automating the transformation of the exported data into a common internal format. The automation also extends to augmenting the imported data with emissions calculations performed both locally and via communication with third-party web-based services.

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<sup>4</sup> Proactis <http://www.proactis.com/>

<sup>5</sup> AMEE <https://www.amee.com/>

At the time of writing the tool is configured to aggregate data from three sources; the University of Bristol's Proactis financial management system, the University's travel agent Key Travel and the University's preferred vehicle hire supplier Enterprise.

The tool was built using freely available permissively licensed software (e.g. Google Refine<sup>6</sup>) and freely licensed data services (e.g. AMEE). The software created within the project will also be made available under a permissive Open Source licence.

The tool provides two user interfaces (import and export) as shown below:

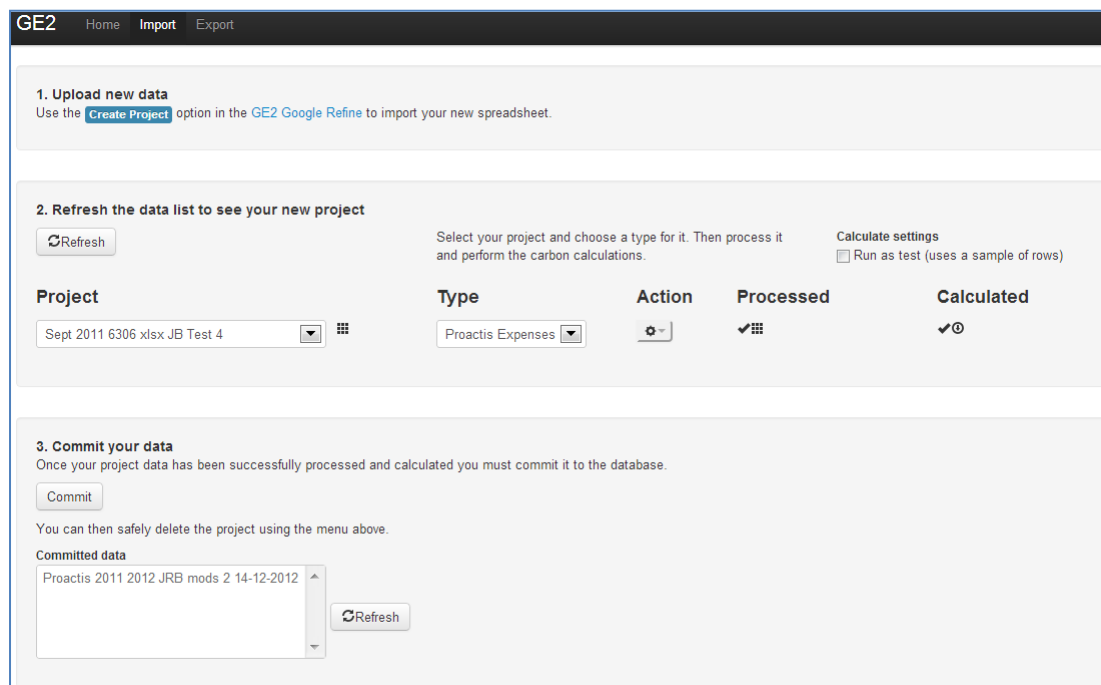


Figure 1: Import interface for aggregating scope 3 data

The user controls the import process using the interface as follows:

- Upload a newly exported spreadsheet and identify which system has provided it
- Trigger the transformation of data to common format
- Trigger emissions calculations on transformed data
- Store resulting data set

The spreadsheet upload and transformation is handled by the project's installation of Google Refine. This tool allows a user to interactively define a series of data 'cleaning' edits which can be saved and automatically reapplied to subsequent spreadsheets from the same supplier.

Once the data has been cleaned and reformatted it is augmented with the results of calculations performed locally and by third-party services. Examples of the calculations include:

- Carbon I/O = cost \* carbon factor
- Carbon estimated = cost \* factor (miles per GBP) \* carbon factor
- Carbon calculated = distance (provided) \* carbon factor

<sup>6</sup> Now known as Open Refine

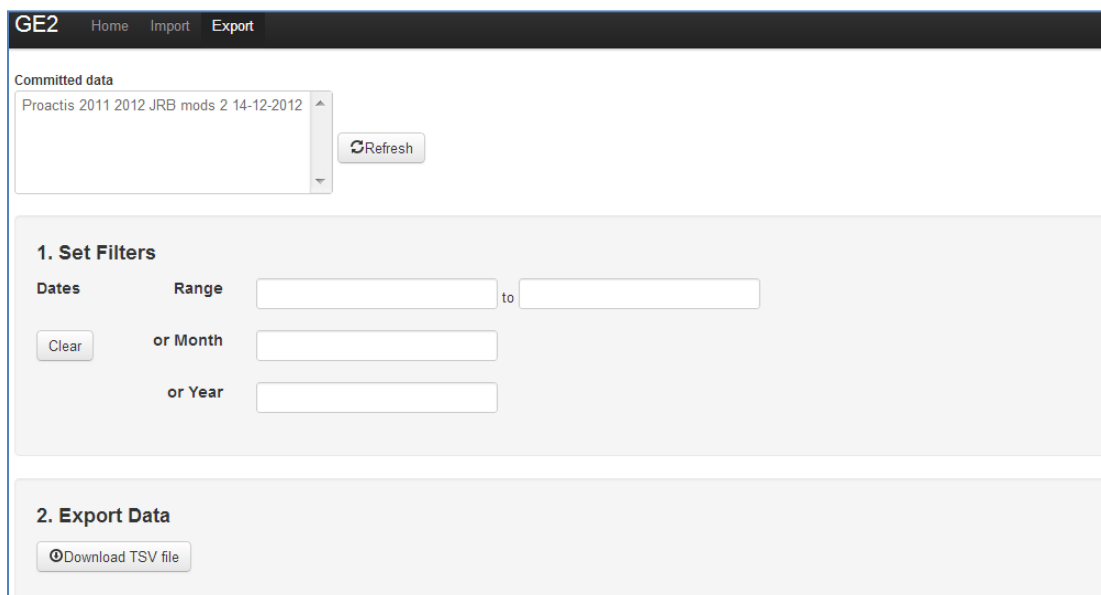
The factors used are dependent on the mode of transport.

The tool also queries AMEE. Using this third-party service we can look up distances and carbon emissions for the following modes of transport:

- Train. AMEE will attempt to resolve the free-text place names provided to UK stations. If it succeeds it provides distance and carbon emissions. We always assume national-type rail travel.
- Air. To do this calculation AMEE requires airport codes. These are not normally available in the imported travel data. The tool therefore uses other services<sup>7</sup> to attempt to resolve the free-text place names provided to airport codes.

The user can check the spreadsheet both after it has been transformed and after it has been augmented by calculated data. At any stage the spreadsheet can be edited and the processes rerun.

Once the user is satisfied with the resulting data set it is committed to storage. Only at this point does the new data set become part of the entire committed data set. Exports from the entire data set will now include this data.



The screenshot shows the GE2 web application interface. At the top, there are navigation links for 'Home', 'Import', and 'Export'. Below this, a 'Committed data' section contains a dropdown menu with the text 'Proactis 2011 2012 JRB mods 2 14-12-2012' and a 'Refresh' button. The main area is divided into two sections: '1. Set Filters' and '2. Export Data'. The 'Set Filters' section has a 'Dates' label, a 'Range' input field followed by 'to' and another input field, a 'Clear' button, and two more options: 'or Month' with an input field and 'or Year' with an input field. The 'Export Data' section has a 'Download TSV file' button.

Figure 2: Export interface for aggregated data

The user can create tab-separated export files using the interface pictured above. These can be limited by various date range filter options. The file thus produced is suitable for import and analysis by third-party statistical tools.

### 3.2.4 Sustainable event planning toolkit

The Sustainable Event Planning Toolkit was produced to help make meetings and events more sustainable through the use of best practice guidelines for a range of events from traditional face-to-face meetings to fully virtual events or combinations of the two (hybrid events). It also provides ideas about how information communication technologies can be used to maximise the value of events for organisers and attendees. It is aimed at anyone working within the education sector who

<sup>7</sup> The tool uses the service at <http://airportcode.riobard.com/> to attempt to resolve the free-text place names provided to airport codes. Where more than one code is returned, the biggest airport is used (based on number of direct flights as provided by the service at <http://airports.pidgets.com/v1/>)

is thinking about holding a meeting or event that will involve participants across campuses or outside of their institution. The toolkit pulls together the outputs from various workpackages and includes information on:

- What is a sustainable event?
- What are the benefits of organising a sustainable event?
- Using technology as an alternative to a face-to-face event
- Types of events:
  - Physical
  - Virtual
  - Combined (hybrid)
  - Amplified
- Supporting tools
  - Live video streaming tools
  - Twitter
  - Other live discussion tools
  - Resource sharing tools
  - Event capture tools
- Evaluation and metrics
- Cost Issues on Running and Amplifying HE events
- Carbon Footprinting event

The toolkit is available from: [http://www.bris.ac.uk/environment/green\\_event\\_toolkit/](http://www.bris.ac.uk/environment/green_event_toolkit/)

### 3.2.4.1 Event amplification report

One of the specific workpackages within the project was allocated to UKOLN<sup>8</sup> to look at current and emerging best practice in the field of amplified and hybrid events within the UK higher and further education sector to help improve the sustainability outcomes of events. This was produced as a formal report; in addition much of this work has been incorporated into the online Event Planning Toolkit described above. The report includes:

- Template for planning hybrid events
- Perspectives of hybrid events from different participants (delegates, speakers, suppliers)
- Risk analysis checklist
- Tools for supporting hybrid events
- Case studies of hybrid events
- Evaluation and metrics for hybrid events
- Estimation of the carbon impact of technologies to deliver amplified and hybrid experiences

A copy of the report is available as *Appendix B* and from: <http://opus.bath.ac.uk/30275/>

### 3.2.4.2 Updated MyMobile Bristol code

One of the strands of work associated with the Event Planning Toolkit was to update the MyMobile Bristol code to promote the use of public transport for visitors to the University of Bristol. MyMobile Bristol is a JISC funded project to develop a web application to deliver content optimized for smartphones within a 'just in time' and 'on the move' context. The information is targeted at students, staff and visitors of the University of Bristol and aggregates data from the University, Bristol City Council and other third parties. For the Greening Events 2 project, some of the

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<sup>8</sup> UKOLN <http://www.ukoln.ac.uk/>



development work focused on improving the MyMobile Bristol code. This development activity included adding new data sources, improving existing data sources and further developing the underlying software to improve functionality and robustness.

### The Software

Mobile Bristol uses the *Mobile Campus Assistant (MCA)* software to deliver information and data to mobile devices. MCA provides a solution that is capable of aggregating information from disparate sources and produces a website that is suitable for modern mobile devices.<sup>9</sup> For example, MCA delivers the m.bristol.ac.uk and m.jisc.ac.uk websites.

MCA was originally developed as a JISC-funded rapid innovation project in 2009.<sup>10</sup> It was then further developed in the *MyMobileBristol* project during 2010-11, funded by JISC through their Business and Community Engagement (BCE) programme.<sup>11</sup>

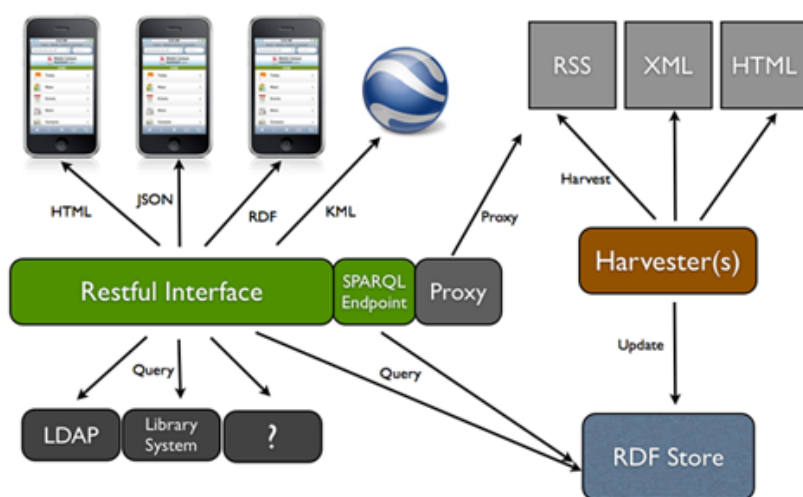


Figure 3: Architecture of the MCA software

The MCA Software is made of a number of key components:

- A Resource Description Framework (RDF) store holds data that is loaded when the application starts and data harvested from remote sources.
- Harvesters that retrieve data (HTML, XML, RSS etc.) from remote websites convert the data to RDF and store it in the RDF store.
- A RESTful web interface that queries the data store and return the results as HTML, JSON, RDF or KML. The web interface returns HTML that is used by web browsers found on mobile devices. The pages might include JavaScript that will then query the service for points of interest (POI) and display them on a map.

<sup>9</sup> For documentation on the MCA software see <https://wikis.bris.ac.uk/display/mca/Home>

<sup>10</sup> <http://mobilecampus.ilt.bris.ac.uk>

<sup>11</sup> <http://mymobilebristol.com>

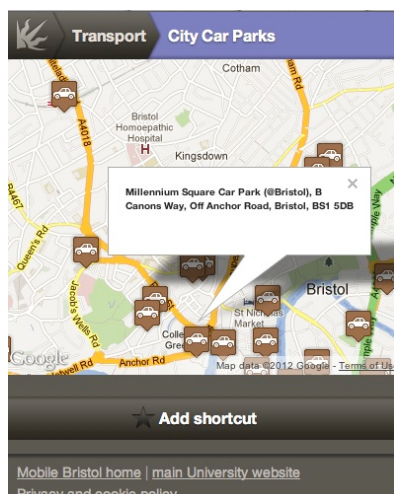


Figure 4: Points of interest on a map

## Software Development

Software development covered a number of areas:

- The facility to get information on a POI (point of interest) on a map was improved, providing more flexibility in what is displayed in an information bubble. This was particularly useful in displaying details of city car parks.
- The way URIs are handled in the system as improved to remove unresolvable URIs.
- The code for getting geo data from OpenStreetMap was improved. In the past it was stored in a number of locations and files – they are now all loaded in the RDF store.
- A 'Dynamic Navigation' feature was added, so that it was possible to create a navigation list from harvested data rather than being preconfigured.
- The system was updated so that you could add ordered POI to provide a list of points on a map to provide directions.
- There were numerous updates to how geo-location data was stored and retrieved within the system.
- There were general improvements across the code base.<sup>12</sup>

## Data

A key feature of the development activity for the Greening Events II project was to improve the existing data sources used in Mobile Bristol and adding new ones.

### OpenStreetMap

An initial task was to refresh the data held about local amenities, such as cafes, pharmacies and cinemas. A key source of data for this information is the community driven OpenStreetMap (OSM). Some effort was given to improving the quality of information about POI (points of interest) around the University precinct, such as adding missing bicycle racks, post boxes and cash points. It was possible to use the tools on the OSM website for improving the quality of the data. A fresh export was then taken from OSM, converted to RDF and then used by the Mobile Bristol website.

### Bristol City Council

Bristol City Council provides some data about local facilities. We took an XML file of local car parks and modified it slightly – we removed on street parking (as there were too many data points which made the map unusable) and fixed some incorrect latitude and longitude values. We were then able to include a map of city car parks.

<sup>12</sup> A full commit history can be seen at <https://github.com/ilrt/mca/commits/master>

## Naptan

The Mobile Bristol website provides a map of city bus stops derived from the NaPTAN (National Public Transport Access Node) data source. The data was out of date (2009) and was inaccurate in some areas – for example, it had a cluster of bus stops within a city park. A fresh export was taken and process for adding the data and using it within the system was updated.

## University of Bristol

A number of new data sources from the University of Bristol were added to the system. For example, the locations of Video Conference Rooms were added so that staff might be encouraged to stay in Bristol for meetings rather than travel.

We added walking directions from travel hubs to the University precinct, which coincided with travel information provided for visitors to the 2012 Open Days.

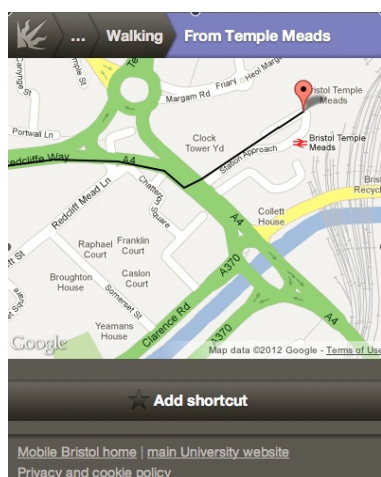


Figure 5: Walking directions from Bristol Temple Meads

The software and sample data sources are available at <https://github.com/ilrt/mca> under a permissive Open Source license.

The updated software was promoted to prospective students visiting the University at an Open Day in June 2012 to encourage them to walk/use public transport on the day. Results from the students evaluation of the day showed that just over 10% of the visitors had made use of MyMobile Bristol and out of those 66% rated the usefulness as good or excellent.

### 3.2.4.3 Virtual meetings guidance

A pilot programme of interventions to promote the use of virtual conferencing technologies was conducted during the project. Materials to promote the use of virtual meetings were produced, these include:

- Information about what virtual meeting tools are available at Bristol
- When best to use particular tools
- Links to short videos describing use of tools such as Skype
- Advice on purchasing equipment
- Guidelines for successful meetings
- Information about videoconference rooms, capacity etc
- Case studies of virtual meeting use at Bristol
- Support to get people started using virtual meetings – access to equipment, training, etc.

- Posters for display within pilot departments to encourage use of virtual meetings and linking to online guidance

Pages with materials are available at:

[https://www.bris.ac.uk/it-services/advice/virtualconference/index\\_html](https://www.bris.ac.uk/it-services/advice/virtualconference/index_html)

### **3.3 What did you learn?**

#### **3.3.1 Carbon assessment**

The University of Bristol's new financial system (Proactis) has been rolled out over a two year period, with the initial pilot departments entering the system in March 2009 and the last departments being introduced in the summer of 2011. Prior to Proactis there was insufficient comparable data to attempt to carbon profile the University's business travel therefore it was impossible to produce a benchmark figure prior to 2011. Because of this the objective to benchmark at the start of the project to observe trends was revised and replaced with simply producing a benchmark figure against which future improvements can be measured.

Depending on the data availability there are several different carbon calculations that it is possible to make and these range in quality from quick and dirty scoping assessments based only on the cost of the travel, through distance based calculations that rely on estimated distance and fuel information to a fully robust distance and fuel based calculation with secure data sources. For roughly half of the University of Bristol's spend on business travel it is not yet possible to get journey distance information reliably. Therefore in line with DEFRA's guidelines an initial scoping estimation was made based on the cost of the different modes of travel using economic input/output data.

An input/output economic model describes in monetary terms how goods and services produced in different parts of the economy are used by other sectors. For example for a bakery to produce a loaf of bread it requires input from the agricultural sector (wheat production), the food industry (flour production), the transport industry, and the energy industry (electricity to light the bakery or the gas to heat the ovens). For every pound spent on buying the loaf of bread a portion of that price goes to the supporting industries.

In carbon terms it is possible to make an assessment using published Input/Output based emissions factors to link the monetary flows between different sectors of the economy to information about the greenhouse gas produced by those different sectors. This allows estimates of greenhouse gas emissions to be made based solely on the price of the goods or services purchased.

The obvious downside of this method of calculation is that the published emissions factors are created using aggregated figures. So for example the carbon emissions per pound spent for road travel are calculated from, and applied to, transport ranging from a small family car to a coach or freight lorry. And as such the accuracy of this style of calculation is low.

However it can be used as a high level diagnosis tool that will determine both the scale of the greenhouse gas emission involved and any hotspot areas that might warrant more detailed attention. This form of assessment is, in addition, typically very fast to complete as most institutions have financial records whereas the data necessary to make carbon calculations (for example the distance travelled when dealing with transport emissions) might be harder to obtain.

In order to improve upon the accuracy of the initial scoping assessment it was possible to estimate the distance travelled for different transport modes, based on the cost of that travel.

A two stage process was used to make the distance estimations necessary. First for data where distance information was available, distance travelled per £ spent was calculated for each travel mode. That factor was then applied to the cost of the travel where distance information was not available; producing an estimate of the overall distance travelled using that mode. It was then possible to apply standard DEFRA emissions factors to calculate the carbon produced for that mode of transport. See *Appendix A* for more information on the estimation process.

Whilst estimating the direct emissions in the way outlined in this section is in accordance with the good practice guide provided by HEFCE, the accuracy of the calculation varies depending on the data sources used.

The majority of the work involved in conducting the carbon assessment for the University's business travel is in data collection and aggregation. As already noted data relating to travel is held in several systems in several different formats. In addition much, of the data is hand entered by end claimants and as such is 'untidy' and does not lend itself to automatic processing. Therefore the initial work flow for processing the data was largely manual and involved converting the various data sources to a Microsoft Excel format, thus enabling the data to be combined and the necessary carbon calculations to be made. See Section 3.2.3 for details about the tools produced to help automate some of this process.

The I/O scoping carbon footprint of the University's business travel for the period starting August 1<sup>st</sup> 2011 and ending July 31<sup>st</sup> 2012 was found to be 5,502 tonnes. The more refined distance based estimation of carbon emissions was found to be 3,036 tonnes. To attempt to put these numbers into a context the University of Bristol CEMARS Greenhouse Gas Emissions Inventory Report calculated the University's total emissions to be 54,938 tonnes for the period running from 1<sup>st</sup> August 2010 to 31<sup>st</sup> July 2011.<sup>13</sup>

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<sup>13</sup> It should be noted that the two figures are for different years. This comparison is therefore intended for context only

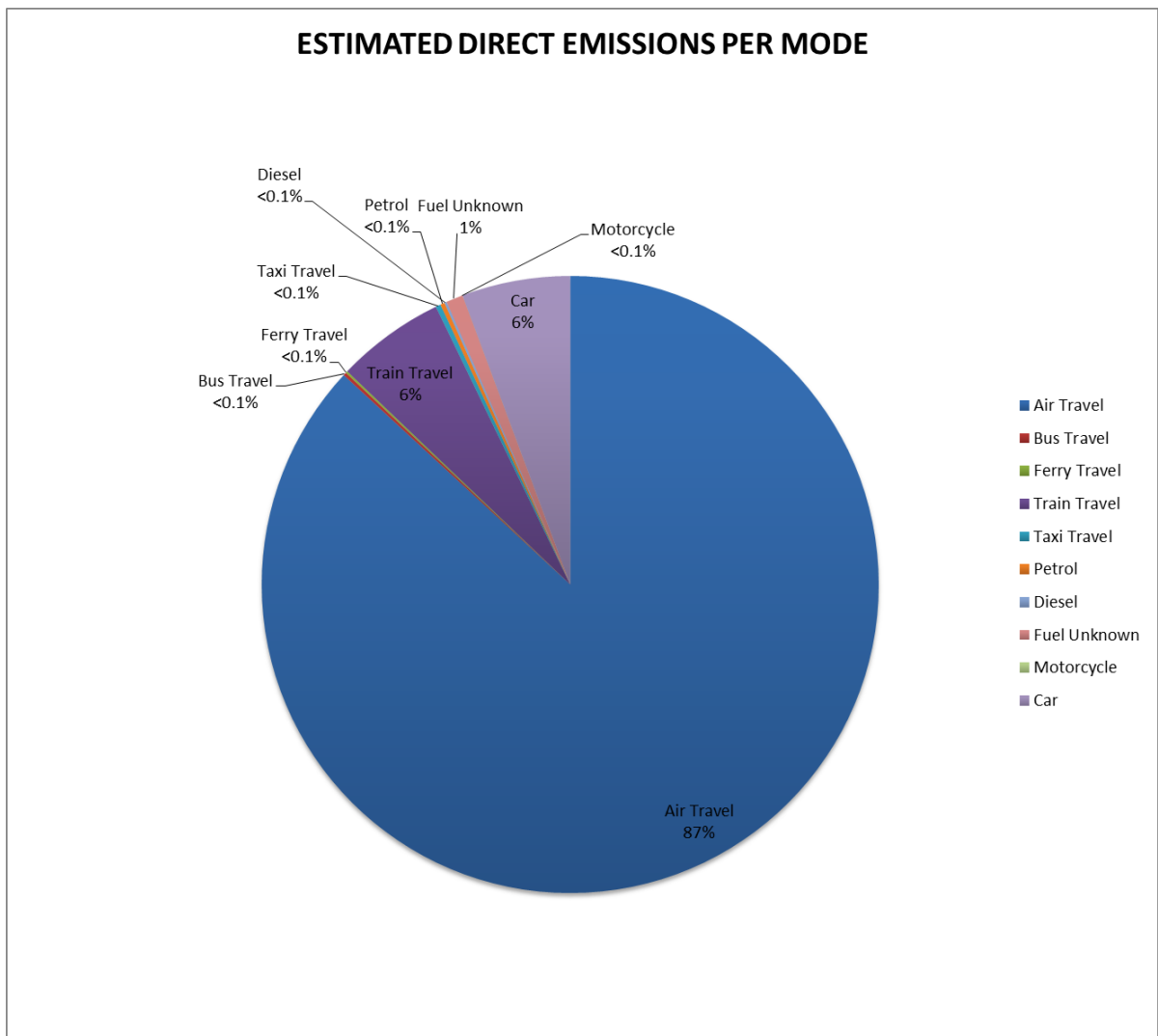
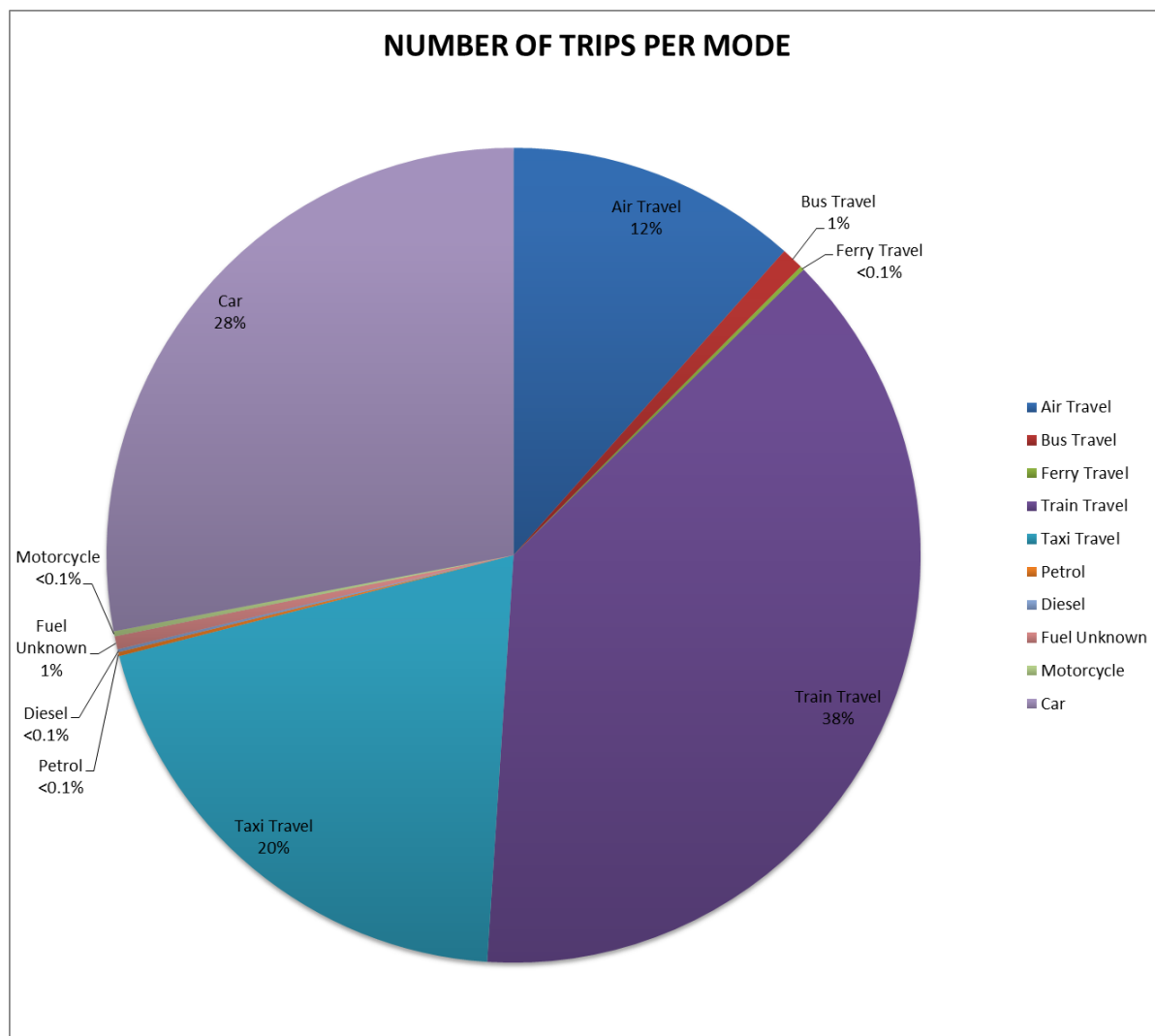


Figure 6: Estimated Carbon Emissions for the University of Bristol 2011-2012

At first glance travel carbon footprint is dominated by air travel which accounts for 87% of the travel footprint, with the next highest contributor being train travel (6%) and employee owned car mileage (6%) This air travel dominance was entirely expected and fits well with the CEMARS carbon inventory for the previous year.



**Figure 7: Number of University of Bristol staff trips in 2011-2012 by mode of travel**

When looking at the number of trips taken it is train travel that dominates at 38% with air travel dwindling to 12% of the total number of trips taken. Air travel however tends to be for greater distances and also has a higher carbon intensity explaining the disproportionate effect it has on the carbon profile.

Despite initial appearances it transpires that the employees at the university are actually very conscious about the travel choices they make. These tends to be motivated by financial concerns rather than environmental ones but in the case of using train travel where possible rather than flying or taking a car there are incidental environmental rewards in addition to the financial ones.

The dominance of train travel within the UK is for several reasons. Firstly employees are encouraged by the University to take the train instead of flying to destinations closer than Newcastle, in spite of the costs sometimes being in favour of the cheap airlines. In addition (often despite belief to the contrary) the cost and time benefits of flying are often overestimated. For example, the fact that airports tend to be located outside towns necessitating additional road travel (often taxi where a city is unfamiliar) to reach the final destination means that the cost and time benefits of flying are eroded. Another example is check-in times, which also lessen the time savings of taking a domestic flight.

Another reason train is a desirable option is that a high proportion of university business trips are to other academic institutions or industry based in large urban centres that are served well by the rail network. Parking costs and the difficulty of navigating in unfamiliar cities adds to the attractiveness of rail, especially in London where the addition of congestion charging adds to the cost of car travel over and above already high parking charges.

However despite this consciousness when you look at the total number trips taken in private vehicles (cars and motorbikes) plus taxi journeys the number of trips taken becomes roughly equal to the number of trips taken by rail (roughly 6%). This is in part because taxi travel is quite often combined with train travel where the destination is unknown and knowledge of the public transport options lacking. In addition, the fact remains that privately owned road transport is often viewed as the most convenient way to travel, legitimately so when it is necessary to transport equipment or when the destination is rural and not served well by public transport links. It should be noted however that in terms of both cost and environmental impact if the car has multiple occupancy then the choice to take this form of transport is actually a sound one.

Looking at the carbon profile in isolation did not throw up any surprises, it is known that air travel is extremely carbon intensive. However, international collaborations, conferences and student recruitment are activities that are essential to the operation and success of the University and as such artificially limiting international travel without changing the success criteria of a Russell Group University might be considered counterproductive.

The next obvious target for improvement is the use of private vehicles and taxis. However the fact remains that compared to air travel reducing the number of taxi journeys taken from train stations is going to have a negligible effect on the result carbon profile.

In short, there is no immediately obvious way to reduce the carbon footprint of business travel at the University by looking at the modes of travel taken alone. Given the need for travel to happen, the carbon profile indicates that the University on the whole already makes very sustainable choices.

However, there are two simple changes that can be made that would both promote the University and improve the travel footprint.

The first is to improve, promote and better utilise alternatives to travel for example using video conferencing, desktop conferencing, telephone conferencing and Skype. Remote meeting technologies of one form or another have been around for decades and are reasonably well understood, however despite predictions to the contrary they have never managed the penetration and success that was predicted.

In times of fiscal constraint, there is usually an upsurge in the popularity of alternatives to travel and in combination with newly available research on when such technologies are best employed and strategic planning from the University, more benefit than is currently can be achieved from the technologies would be possible.



### 3.3.1.1 Outstanding issues

There is a substantial amount of data still not included within the University of Bristol's carbon assessment:

- Cash Passports
- Purchasing Cards
- Purchasing Orders
- International Office – Travel Counsellors

To conform to HEFCE and GHG protocol guidelines it is important to measure the effect that these data gaps have on the final results. The quantitative general rule states that if the missing data represents 5% or more of the whole emissions inventory then it is to be considered to be a material discrepancy. Completing this size estimation will inform the urgency with which the missing data needs to be incorporated.

Please see *Appendix A* for full details of the carbon assessment.

### 3.3.2 Community engagement

The initial scoping consultation with University of Bristol staff took the form of 16 one-to-one interviews across a broad cross section of university employees. When asked about what considerations went into making travel choices the response from all but one interviewee was that cost was the main consideration.<sup>14</sup> It is probably worth noting that only two of the interviewees mentioned environmental concerns at all. It is therefore extremely unlikely that these will ever outweigh cost concerns when planning travel.

Other considerations stated were:

- Speed (particularly for more frequent travellers)
- Timing
- Convenience
- Amount of accompanying baggage
- Number of people travelling
- Health and safety

Travel choices made by employees of the University already tend to be reasonably sustainable. For example train is usually preferred over car travel unless there are extenuating circumstances such as the need to carry a large amount of baggage, making a rural trip without good transport links, or many people going to a single destination being able to car share.

Given that most travel conducted by the university already appears to be conducted in as sustainable manner as is reasonably possible, any changes to the travel behaviours themselves are unlikely to result in large environmental gains compared to the significant amount of effort required promoting these changes. For more details about the initial consultation process see *Appendix C*.

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<sup>14</sup> The International Office was the only case where the personal safety and wellbeing of the employee was stated to be the highest consideration. This is probably because the interviewee was the head of the department and therefore had the safety of her employees explicitly in her mind in a way that travellers themselves might not, whilst intuitively avoiding options that would put themselves at risk.

However a consistent comment across the University is that although substitution technologies such as video conferencing are used, their uptake remains limited. Therefore a decision was made to use the follow up university-wide survey to focus on alternatives to travel.

The University of Bristol runs an all-staff 'Travel to Work' Survey every two years which is championed by the Deputy Vice Chancellor. The Greening Events II project team were able to add in questions about business travel and a specific section on 'alternatives to travel' to the survey in order to take advantage of the high response rate that the survey generally receives. The alternatives to travel section asked respondents about their use of virtual conferencing technologies and their attitudes to the possibility of making additional use of these in the future as well as any barriers that may preclude their use of these technologies. There were over two thousand responses (41% return rate) to the survey and a brief overview of the results pertaining to virtual conferencing is attached as *Appendix D*.

From the survey we identified 695 staff within the university who were interested in being involved in further research on virtual conferencing. From this group of people we chose a pilot group of Schools and Departments to do further work with on 'alternatives to travel'.

### **3.3.2.1 Alternatives to travel pilot departments**

For the pilot we worked with the following group of Schools and Departments:

- School of Arts (Archaeology, Drama, Music and Philosophy)
- School of Community and Social Medicine
- Department of Geographical Sciences
- School of Physiology and Pharmacology
- Graduate School of Education

3 stages of interaction were planned with the pilot departments:

1. Research current attitudes and behaviours of staff, via an online survey with a short staff workshop and/or follow-up interviews.
2. Implement a 'campaign' to support the use of alternative technologies within the School, to include emails to staff, optional training sessions, posters in the coffee room and admin areas, posters for printing out to place around workstations, a support hotline.
3. Re-visit staff attitudes and behaviours after the campaign. Have things changed? Has use of alternative technologies - and positive attitudes to them - increased? What works and what doesn't?

#### **3.3.2.1.1 Current attitudes and behaviours**

An online attitudinal questionnaire was distributed to staff in the 5 academic departments to look at current behaviour and attitudes to using technology as an alternative to travelling to meetings. We received 85 responses across the 5 departments (a response rate of approximately 6%). Because of the low response rate it is not likely to be representative of the population but provides some indication of attitudes of the sub-set that were inclined to respond. Of those of did respond:

- 63% had participated in a virtual meeting during the past 12 months
- The majority of these took part in virtual meetings every few months

- The most popular virtual meeting solution was audio conferencing, followed by instant messaging and videoconferencing
- 55% agreed that they enjoyed travelling as part of their work (14% disagreed and 24% were neutral)

With regards to attitudes towards virtual meetings:

- 38% agreed that virtual meeting technology is reliable (20% disagreed and 28% were neutral)
- 18% agreed that virtual meetings were difficult to set up (40% disagreed and 32% were neutral)
- 38% believed virtual meetings are more convenient than face-to-face meetings, (26% disagreed and 33% were neutral)
- 66% thought communication is not as effective in virtual meetings as face-to-face meetings, (5% disagreed and 25% were neutral)
- 34% thought virtual meetings were a good substitute for face-to-face meetings (24% disagreed, 36% were neutral)

Staff were also asked about specific examples where virtual meetings could be used effectively, responses included:

- Contact with mentors in schools via virtual meetings, also additional supervision of PGCE students at a distance
- Interim catch ups during projects and collaborations
- Meeting with co-applicants on grant applications where they live in different parts of the country or abroad
- Can be quite effective for job interviews, but very often the panel will want a face-to-face follow-up interview with a candidate successful at videoconference

Examples where they felt that virtual meetings couldn't be usefully used included:

- Meeting new colleagues for the first time
- Contract negotiations
- Fieldwork/data collection
- In-depth planning meetings
- Large conferences
- Student observations

For more information about the survey results see *Appendix E*.

It was originally planned to follow these up with short workshops to further examine attitudes and behaviours to travel and virtual conferencing. In the end because of time constraints of participants it was only possible to conduct follow ups with two of the pilot departments (School of Community and Social Medicine and the Graduate School of Education).

Some observations from staff in the workshops/interviews regarding travel vs. virtual meetings included:

- Virtual meetings are more to the point, less chatty.
- Pauses in virtual meetings can be awkward. Face to face is more immediate.
- Alternating face-to-face meetings with virtual meetings can be effective.

- It is an issue not knowing what is available or possible with regard to virtual meeting technologies and equipment.
- Tolerance for mistakes and problems is higher for travel, possibly because people are more knowledgeable about travel and more able to recover from problems.
- Recognising voices in an audio conference when you do not know the person is difficult.
- Open plan offices make audio and video conferencing difficult. People feel that they need to talk loudly on a conference call and so are reluctant to use them in shared spaces
- There are some advantages to face-to-face meetings around:
  - Artefact sharing
  - Body language
  - Face-to-face meetings offer serendipitous conversations. Alternatives do not support this particularly well. An online presence via something like Skype does not necessarily lead to a conversation, however when people are face to face they have a tendency to be more sociable.

In terms of what is needed to encourage them to participate more in virtual meetings, these included:

- Knowing what services and equipment is available in the university
- Having bookable, dedicated rooms in each department. Most staff worked in shared offices and are reluctant to disturb colleagues by holding a web conference/Skype session in their room. Having to travel for 20 minutes to use virtual conferencing equipment is annoying.
- Being able to trust the equipment (need better support and 'hand holding')

### **3.3.2.1.2 Campaign**

The research on current attitudes and behaviours fed into the design of a campaign to encourage staff to make more use of ICT to support or replace face-to-face meetings where participants were required to travel in or outside of Bristol. The project produced online support materials and the offer of training and free webcams and headsets to get staff started with using virtual meetings.

The pilot ran from June to December 2012, this was initiated with an email sent from the Head of Department (or sent on their behalf) to all staff to promote the pilot (with reminders sent out in September/October). The emails were supported by a series of posters which were provided to departments to put up in public areas such as coffee areas, lifts, backs of toilet doors, etc. See *Appendix F* for examples of the posters produced for the campaign.

The campaign attempted to draw on Robert Cialdini's 6 Principles of Persuasion<sup>15</sup>, to encourage uptake within the pilot departments, these principles are:

#### **1. Reciprocity**

People tend to return a favour, thus the pervasiveness of free samples in marketing.

How it was applied to the project:

- Provision of headsets ("we'll give you the headsets, you make the calls!")
- Provision of help & support ("we'll help you, you make the calls!")

#### **2. Commitment and Consistency**

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<sup>15</sup> [http://en.wikipedia.org/wiki/Robert\\_Cialdini](http://en.wikipedia.org/wiki/Robert_Cialdini)

How it was applied to the project:

- Disruption of consistent behaviours (i.e. non-use) by inserting strong messages when people are 'in limbo' and potentially open to them e.g. posters in coffee areas, on the back of toilet doors, in lifts, etc encouraging them to use virtual meetings

### **3. Social Proof**

People are more likely to commit to things when they see other people are also committed.

How it was applied by the project:

- Ensured that there was Head of Department buy-in
- Provided case studies about benefits

### **4. Authority**

People will tend to obey authority figures.

How it was applied to the project:

- Supporting message from the Deputy Vice Chancellor
- Asked Head of Departments to send out email messages supporting the pilot to staff

### **5. Likeableness**

People are easily persuaded by other people that they like.

How it was applied to the project:

- Attempted to get popular staff as departmental champions to promote the pilot

### **6. Scarcity**

Any perceived scarcity will generate demand. For example, saying offers are available for a "limited time only" encourages sales.

How it was applied to the project:

- Limited number of headsets and videocams made freely available during pilot (in return for a case study)

The project team also tried to address the issues brought up in the pre-questionnaire and workshops around knowing what equipment and rooms were available for booking virtual meetings and offering one-to-one support and training to get people started. This information was made available through: <https://www.bris.ac.uk/it-services/advice/virtualconference/index.html>

The uptake of training and requests for equipment was disappointingly low; there were ten formal training sessions undertaken during the six month pilot across the 5 departments. The low uptake may have been due to poor timing of the initial email communication and lack of ongoing promotion within the department (see next section for more reflection on this). 8 out of the 10 sessions were held with staff in Geographical Sciences which was the smallest department in the pilot with around 89 staff (as compared to the largest which Social and Community Medicine which has over 2,500), which could suggest that there was better promotion/penetration within Geographical Sciences given the relative smallness of the department.

Reactions and feedback from those undertaking the training and/or offer of equipment however was very positive:

- "Thank you for all your assistance ...Everything worked out just perfectly!"

- “The chap who came and set up Skype for me was great! I've been using it regularly ever since.”
- “Thanks for all your help. One happy punter.”

### **3.3.2.1.3 Post-questionnaire**

A post pilot questionnaire was distributed to the departments at the end of pilot period in December, this repeated the questions from the original survey to see if or how attitudes and behaviours had changed within that period. We received 109 responses across 4 of the original 5 departments (unfortunately the Graduate School of Education were not able to distribute the survey in time for inclusion) this equated to just over an 8% return rate across the 4 departments and therefore a slightly higher return than the pre-questionnaire (which perhaps could be attributed to when in the academic term the survey was distributed). Of those 109 responses:

- 77% had participated in a virtual meeting during the past 12 months (as opposed to 63% in the previous survey)
- The majority of these took part in virtual meetings every few months
- The most popular virtual meeting solution was still audio conferencing, followed by videoconferencing and instant messaging

With regards changes in attitudes towards virtual meetings:

- 47% said that they enjoyed travelling as part of their work (26% disagreed and 24% were neutral)
- 40% thought that virtual meeting technology is reliable. This was a small increase from 38% from the previous survey
- 19% believed virtual meetings are difficult to set up which is slightly higher than the previous survey at 18%
- 56% believed virtual meetings are more convenient than face-to-face meetings. This was quite a considerable rise from the previous survey at 38%
- 63% thought communication is not as effective in virtual meetings, this was a slight decrease from 66% in the previous survey
- 37% thought virtual meetings were a good substitute for face-to-face meetings as opposed to 34% previously

Staff were again asked about specific examples where they thought virtual meetings could be used effectively, responses here included:

- Already use them in preference to F2F (face-to-face)
- As a replacement for frequent visits and co-tutoring students
- I am part of a virtual team and so already extensively use virtual meetings
- I have several PhD students based in other institutions around Europe with whom I keep in touch via Skype. This has been fantastic.
- We have discussed this for reviewing grants at a virtual meeting rather than flying abroad
- My work meetings will probably double next year and at least half of those could be done virtually

When asked for examples where they didn't think virtual meetings could be used effectively, responses again included:

- Anything involving new ideas, new people, new collaborations... must have a prelim[inary] face-to-face at least
- Conferences
- External examinations/vivas
- Training on equipment or software
- When there is a large group of people

For more information about the survey results see *Appendix G*.

Comparing the responses from the pre-questionnaire distributed in February 2012 and the post-questionnaire responses in December 2012 there does appear to be a growing sense of acceptance of the usefulness/role of virtual meetings. There are inevitably some differences of opinions in what virtual meetings can and can't be used for; notably PhD vivas are cited in both categories. However situations that require meeting people for the first time or handling sensitive topics seem to be situations that still call for face-to-face meetings.

In terms of the impact of the campaign the results were very disappointing; only 8.3% of respondents were aware that there was a pilot project running in their department during the latter half of 2012. Therefore any increases in use/acceptance of virtual meetings cannot really be attributed to the campaign.

The low awareness of the pilot may be due in part to poor timing for the promotion, the first emails were sent out in late June which may have coincided with the start of staff holidays/research leave, etc and reminders were sent out in September/October which again may have clashed with the start of the new academic year. However given increasingly busy workloads and pressures on staff it would always be difficult to find a good time to promote this sort of campaign. The email messages were backed up by posters which were distributed in public areas around the departments. Ideally there should have also been some general clinics/workshops arranged for each department rather than relying on individuals or groups to request these, however again with competing demands on staff attention these proved too difficult to arrange.

On reflection a key outcome of this work is the finding that there are key custodians of travel services, and a relatively small proportion of high-mileage travellers. We propose that future work of this type should concentrate on a programme of targeted training directed towards very high-mileage travellers and/or departmental administrators and those involved in setting up and supporting meetings rather than directing a campaign at all staff.

### **3.4 Immediate Impact**

#### **3.4.1 Within the University of Bristol**

##### **Carbon assessment**

- The project has delivered a robust and versatile methodology for calculating the carbon burden of different forms of transport for different emissions standards.
- The project has successfully identified where key areas of uncertainty lie, and what changes in data collection need to be made in order to rectify this for the University of Bristol and other organizations that choose to use this methodological framework. For the first time, the degree of uncertainty and the amount by which this could affect total footprint calculations is quantifiable.

- Core staff within the Sustainability Department have worked with the project researcher on the carbon assessment work to ensure that knowledge and skills are transferred to the ongoing team.

### **Community engagement/alternatives to travel**

- The Alternatives to travel pilot initiated discussion and a draft plan within IT Services about provision of information and support for virtual meeting technologies.
- Staff from the 5 pilot departments benefitted from online training materials on virtual meeting technologies and tools, these training materials are now being made more widely available for general use within the University (these will be maintained by IT Services).
- A small group of staff took advantage of face-to-face training and free equipment to get them started with virtual meetings. Although uptake was low these staff will hopefully act as champions for using these tools with their colleagues in the future. Geographical Sciences staff in particular have been active in using virtual technologies and have held a number of online meetings since the pilot ended.
- Met with number of support departments and individuals during the project to explain how the tools (carbon assessment and event planning toolkit) will potentially benefit their work, for example the Conference Office are keen to make use of the online Sustainable Event Planning Toolkit to help support their clients.

### **3.4.2 Wider community impact**

#### **Carbon assessment**

- The Carbon Assessment document provides useful information to institutions beginning to think about the process of conducting a Scope 3 carbon assessment for their staff travel especially in helping them to decide at what level of detail they might want to conduct their assessment (i.e. to use I/O (Input/Output) analysis<sup>16</sup> or a more refined process) as well as highlighting the complexities of dealing with disparate data.
- The tools created to automate some of the processes for aggregating and calculating the carbon assessment data are freely available to allow other institutions to use. The workflow will require adaptation as it is currently built specifically around University of Bristol data and processes, however the tools are based on Open Source software so can be adapted and reused as required.

### **Community engagement/alternatives to travel**

- All of the other support materials created for the project i.e. the virtual meetings advice pages and the Sustainable Event Planning Toolkit have all been made available through a Creative Commons licence to allow other institutions to reuse and adapt.
- JANET will now provide the user community with usage statistics on video-streaming as a result of a request from The Greening Events II Project team. This came about through an attempt by the team to evaluate the carbon usage of an event presented by the JISC SUSTE-IT project in collaboration with the EUAC Travel Co-ordinator's Group, the Welsh Video

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<sup>16</sup> [http://www.censa.org.uk/docs/CENSA\\_Special\\_Report\\_FAQ\\_IOA.pdf](http://www.censa.org.uk/docs/CENSA_Special_Report_FAQ_IOA.pdf)



Network and the University of Warwick on the potential uses and benefits of conferencing for universities and colleges.<sup>17</sup>

### **3.5 Future Impact**

#### **Carbon assessment/financial**

- The carbon assessment methodology and associated tools will be embedded within the Sustainability Department to help the University monitor Scope 3 emissions for staff travel.
- Staff in the Sustainability Department will continue to work with the finance department to try to standardise information and refine the collection of financial travel data within the University.

#### **Community engagement/alternatives to travel**

- The Sustainable Event Planning Toolkit will be maintained and promoted by the University's Sustainability Department
- The virtual meeting support materials created as part of the project will be maintained and developed by IT Services for continued use within the University

## **4 Conclusions**

#### **Carbon assessment/financial**

As expected, data quality and availability has been found to be key to the success of the carbon assessment element of the project. It is the nature of Scope 3 emissions that data required to calculate them are generated by third parties, such as employees and travel management organisations. The onus on correct reporting lies on the institution, whereas, at present, the third party has little impetus to provide data which are either correct or complete. In some cases, data have been submitted for which the methodology of production has not been disclosed, or for which the units of reporting have not been clear. It would be useful if the HE sector (perhaps through the auspices of JISC/HEFCE) could collectively put pressure on third party agencies to standardise on methods to make collection and use more transparent.

#### **Community engagement/alternatives to travel**

There are mixed feelings to substituting travel to meetings with information communication technologies, some staff clearly view travel outside of the University as a perk which gives them a breathing space from their day-to-day work to think or an opportunity to catch up on work (such as reading/writing) that they may not be able to do at their desks. In these cases trying to substitute face-to-face meetings may be counter-productive.

One of the findings of the project is that there are key custodians of travel services, and a relatively small proportion of high-mileage travellers. Therefore we propose that future work of this type should concentrate on a programme of targeted training directed towards very high-mileage travellers and/or departmental administrators and those involved in setting up and supporting meetings rather than directing a campaign at all staff.

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<sup>17</sup> <http://www.jisc.ac.uk/events/2012/03/videoconferencing.aspx>

## 5 Recommendations

### 5.1 Recommendations for the University of Bristol

#### Carbon assessment/financial

- The University of Bristol needs to work with travel service providers and employees to develop a consistent template for the production of travel information. This would aid financial management as well as improve the process for the carbon assessment.
- There is a strong case for the introduction of drop down menus in the University's Proactis financial system to allow for consistent inputting of data, for example the 'to' and 'from' sections of expense claims, mileage reports, etc.
- Training for University of Bristol employees on the use of the Proactis finance system would also help with consistency of information input.
- There are still some sources of data missing from the carbon assessment (see *Appendix A*), completing this size estimation will inform the urgency with which the missing data needs to be incorporated into the overall assessment.
- It may be desirable to target some individuals with the largest carbon burdens to manage down their impact. The production of more regular personal travel information and feedback to the traveller may make the case to the employee stronger than any awareness campaign.

#### Community Engagement/Alternatives to travel

- There needs to be a centralised reassessment of the digital tools required to reduce the need to travel, and training sessions with video conferencing suites. There appears to be demand for easy-to-use and reliable tools for holding group meetings and the University should consider investigating the use of Blackboard Collaborate or similar functionality.
- Many staff share offices with colleagues and are reluctant to hold meetings at their own desks for fear of disturbing their workmates. This was cited as a major inhibitor to the use of desktop conferencing therefore bookable rooms with appropriate equipment installed are urgently needed across the University.
- There needs to be more publicity for alternatives to travel. Mentoring seems to be the most effective way to change behaviours, and working with a small number of high-mileage travellers seems likely to be more effective than a traditional mass marketing campaign. However this will require time and resource.
- Staff need to be made aware that there are some conditions, such where all participants know each other well, where alternatives to travel can work as well as a physical meeting, as well as some of the constraints of virtual meetings.

### 5.2 Recommendations for other Universities

#### Carbon assessment/financial

- Don't underestimate the work involved in undertaking a carbon calculation for business travel, data is likely to be held in multiple sources and formats which has a considerable pre-processing overhead.
- Given the reliance on third party data it may be difficult to access and interpret certain data sources.
- Depending on the fullness of your data it may be worth considering restricting your calculations to an Input / Output analysis (although please see Section 3.2.3 on Open Source tools created for aiding with a more refined calculation)

### **Community engagement/alternatives to travel**

- We have developed a simple hierarchy for reducing the impact of events which other organisations may wish to take on board. These should have the effect of reducing travel and emissions whilst paradoxically broadening the reach and influence of events by opening it up to people who may not otherwise have chosen to attend. The hierarchy is also designed to socialise the desirability of green venues amongst conference and event hosting community.

The steps involve:

1. Assessing whether a physical meeting is necessary at all.
2. Promoting the use of remote accessing technology like Skype so delegates do not have to be at the event in person. If a physical meeting is necessary then:
3. Making intelligent choices about venues and accommodation
4. Encouraging delegates to travel to the event in a sustainable way.
5. Reducing energy and water consumption at the event
6. Reducing, reuse and recycle waste
7. Reducing the impact of food
8. Reducing the need for physical event materials
9. Encouraging sustainable venue, delegate and exhibitor behaviour.

This guidance is incorporated in the Sustainable Events Planning Toolkit<sup>18</sup> which other institutions are welcome to reuse and adapt in your own organisation.

- If an institution is thinking about encouraging alternatives to travel within their organisation it would be worth identifying and targeting high-mileage travellers as well as custodians of travel services such as departmental administrators, etc.

## **5.3 Recommendations for JISC**

### **Carbon assessment/financial**

- Work with HEFCE to encourage the standardization of scope 3 data. A template for institutions reporting on travel emissions for each mode would be highly beneficial, and that organisations are asked to request this standard reporting in procurement contracts for travel services. The requirements of the data are not only useful for carbon management but would also be consistent with sound financial control.

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<sup>18</sup> [https://www.bris.ac.uk/environment/green\\_event\\_toolkit/](https://www.bris.ac.uk/environment/green_event_toolkit/)

- a) Travel data from third parties should contain for each organisation a unique passenger/traveller number and a unique journey number, associated with a number of legs of the journey
- b) Third party provided data would need to show cost and distance data for each leg of each journey stipulating number of passengers, and a methodology for how carbon emissions have been calculated.
- c) Expenses data filed by employees of the organisation needs to show the same unique traveller number and a unique journey number which can be associated with leg data.
- d) Responses for source and destination need to be controlled. Postcode, at least at sector level, should be used (as it is now extremely readily available) for car mileage and taxi journeys. Responses should be limited for stations and airports.
- e) We also propose that organisations should work with Travel Management Organisations to be able to provide each traveller at the end of each year giving the carbon burden of her travel against a national average.

## **6 Implications for the future**

### **Carbon assessment/financial**

HEIs will be able to report scope 3 carbon emissions through Estate Management Statistics, collected by the Higher Education Statistics Agency (HESA), from 2012-13, although at present travel and supply chain emissions are recommended as opposed to mandatory. This of course may change in and all UK HEIs should be thinking about conducting a carbon assessment of their business travel in the near future.

### **Community engagement/alternatives to travel**

There is strong anecdotal evidence that, where all participants know each other well, that alternatives to travel can as work as well as a physical meeting. However, events which have networking as a primary end are still difficult to replace digitally. More work needs to be done to understand what tools are required for digital networking, and for collaboration to flourish. Further research into the multiple explicit and implicit roles of academically related events within the wider research, pedagogic and socio-economic contexts would help inform decisions when re-thinking events so avoiding or acknowledging the risks of negative unintended consequences of changes.

## **7 Appendices**

Appendix A - Carbon Methodology Document

Appendix B - Event Amplification Report

Appendix C - Initial User Consultation

Appendix D - Headline Results from University of Bristol Travel to Work Survey

Appendix E – Pre-questionnaire results from Alternatives to Travel Pilot

Appendix F – Alternatives to Travel Posters

Appendix G – Post-questionnaire results from Alternatives to Travel Pilot