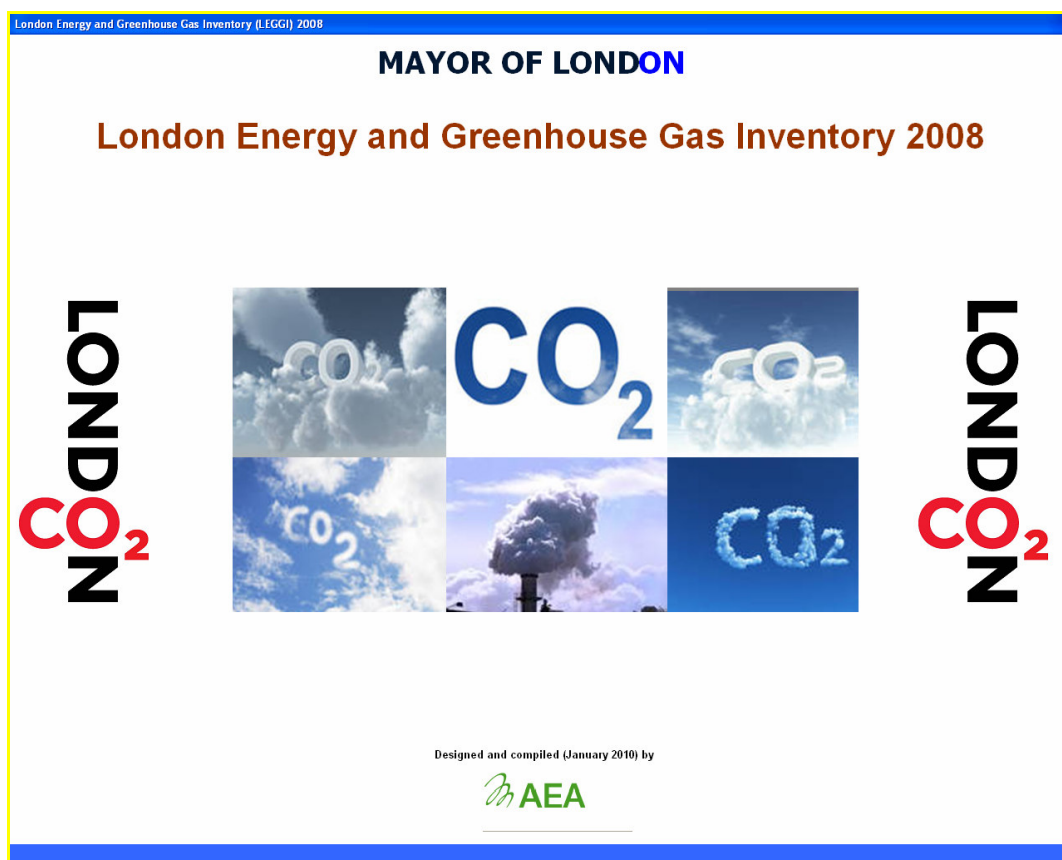


London Energy and Greenhouse Gas Inventory (LEGGI) 2008


User Guide



LONDON



January 2010

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1. An overview of LEGGI 2008

1.1. What is LEGGI 2008?

The LEGGI 2008 is a database of geographically referenced datasets of fuel/energy consumption within the Greater London area and estimates of the quantity of resulting greenhouse gases (GHGs) - carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆) - emitted into the air.

1.2. Uses of the LEGGI 2008

The LEGGI is used for assessing the spatial distributions and relative significance of the various fuel/energy consumption sources and sectors and greenhouse gases emissions to reach informed opinions when formulating, monitoring and evaluating energy policies and preparing energy and climate change reports. The LEGGI plays a major role in the development and implementation of the Mayor's Climate Change Mitigation and Energy Strategy (CCMES).

1.3. Background of the LEGGI 2008

The LEGGI 2008 emission estimates are predominantly based on the “bottom up” methods outlined in the LEGGI 2008 Emissions Estimation Methodology Manual, which can be found on the LEGGI 2008 CD-ROM. Where insufficient local data existed, a combination of some of the “bottom up” and “top down” methodologies and datasets developed by the AEA Emissions Inventory Team for the compilation of the 2007 regional and sub-regional greenhouse gas emissions inventories and the United Kingdom (UK) Greenhouse Gas Inventory GHGI and National Atmospheric Emissions Inventory (NAEI) 2007¹, have been used. The NAEI and GHGI are generally based on a combination of both “bottom up” and “top-down” source specific data from the UK Department of Energy and Climate Change (DECC), Department for Environment, Food and Rural Affairs (DEFRA) and the annually released “top down” energy data such as those presented in the Digest of United Kingdom Energy Statistics (DUKES), published by the UK Department of Business, Innovation and Skill (DBIS).

The LEGGI 2008 is the latest version of the LEGGI series released by the Greater London Authority (GLA). Since its establishment in 2000, the GLA has updated and released five versions (i.e., including the current version, LEGGI 2008) of the LEGGI: London Energy Database (LED) 2000, released in April 2003; London Energy and Carbon dioxide Inventory (LECI) 2003, released in April 2006; LEGGI 2004-2005, released in December 2008; LEGGI 2006, released in April 2009; and the current LEGGI, 2008, released in February 2010.

¹The NAEI can be found at: <http://www.naei.org> - The NAEI is a "top down" inventory in which national data is allocated to smaller areas on the basis of the resident population and other appropriate indicators of regional activity. However, it contains some "bottom up" data such as on individual power stations and large industrial plants. The LAEI 2008 is a "bottom up" inventory in which local data is used to compile an inventory of local emissions. However, the LAEI and the NAEI are, to a certain degree, complementary.

1.4. Spatial scope of the LEGGI 2008

The geographical area covered by the LEGGI includes the 32 London boroughs and the City of London (see [Figure 1](#)). The total area covered by the LEGGI is approximately 1,604 km². For reporting and analytical purposes, the LEGGI study area is geographically divided into three sub-areas: **Central**, **Inner** and **Outer** Greater London areas. To spatially analyse and allocate emission estimates across the LEGGI study area, the UK Ordnance Survey's 1-km² National Grid is used as the geographical framework for data output and presentation in the LEGGI. Each 1-km² grid cell (there are 1,604 1-km² grid cells covering the entire LEGGI area) has a unique identification number and is assigned a value for the level of fuel/energy consumption and greenhouse gas emissions occurring within that 1-km² grid cell. The 1-km² grid cells that make up the London boroughs are mutually exclusive (i.e., each 1-km² grid cell belongs to no more than one London borough) and collectively exhaustive (i.e., every 1-km² grid cell belongs to a London borough). The rule applied when one 1-km² grid cell falls in more than one London borough is that of simple plurality: the London borough with the *largest share* of the 1-km² grid cell's area gets the 1-km² grid cell.

For reporting and analytical purposes, the LEGGI area is geographically divided into:

- **Central London** - roughly corresponds to the boundary of the old (2003) Central London Congestion Charging Zone (CCZ) and is made up of some of the 1-km² grid cells in the boroughs of Camden, City of London, Islington, Lambeth, Southwark, Tower Hamlets, and Westminster (see [Figure 2](#)).
- **Inner London** - consists of some 1-km² grid cells in the boroughs of Camden, Greenwich, Hackney, Hammersmith and Fulham, Haringey, Barnet, Islington, Kensington and Chelsea, Lambeth, Lewisham, Newham, Southwark, Tower Hamlets, Wandsworth, Westminster, Waltham Forest and Redbridge (see [Figure 3](#)).
- **Outer London** - consists of some 1-km² grid cells in the boroughs of Enfield, Barking and Dagenham, Barnet, Bexley, Brent, Bromley, Croydon, Ealing, Harrow, Havering, Hillingdon, Hounslow, Kingston-upon-Thames, Merton, Richmond-upon-Thames, Redbridge, Sutton and Waltham Forest (see [Figure 4](#)).

1.5. Temporal scope of the LEGGI 2008

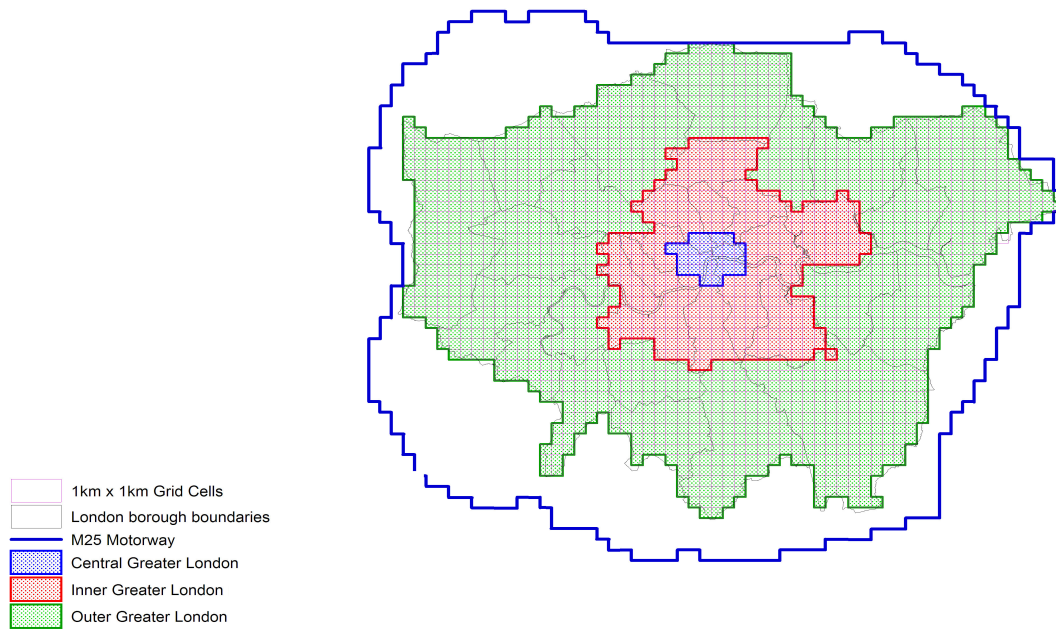
The base year for the LEGGI 2008 is the 2008² calendar year with forward and backward projections to 2011 & 2015 and 2006, 2004 & 2003, respectively. The LEGGI contains average fuel/energy consumption and greenhouse gas emission estimates for the base years and these averages are not necessarily indicative of energy use and greenhouse gas emissions for a given day.

Energy consumption is expressed in kilowatt-hours per year (kWh/yr) and greenhouse gases emissions in carbon dioxide equivalent-tonnes per year (CO₂eq tonnes/year)³.

² The 2008 base year (and in some cases 2007) is the most recent year for which adequate and reliable datasets were available at the time (September 2009-December 2009) the LEGGI 2008 was compiled.

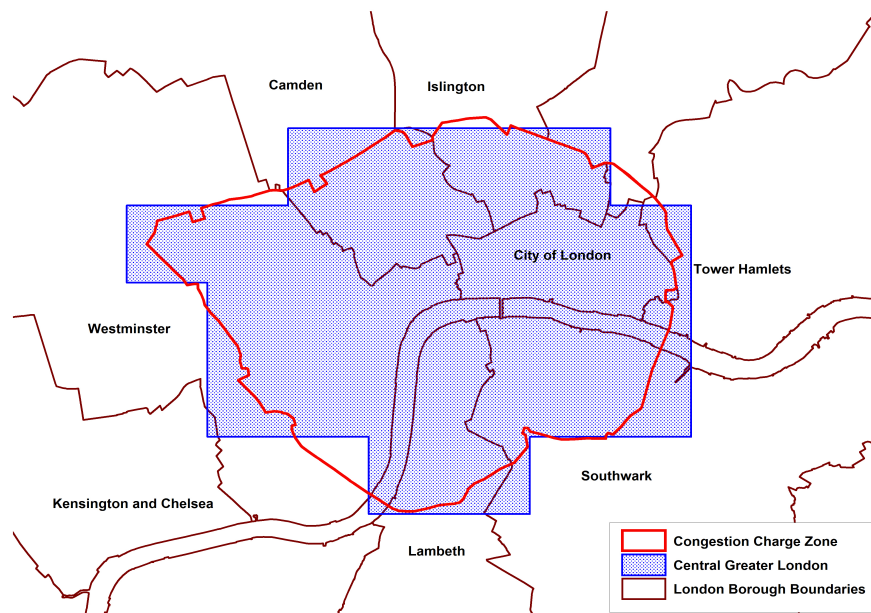
³ Carbon dioxide equivalent (CO₂eq) is an internationally accepted metric measure that expresses the amount of global warming of greenhouse gases (GHGs) in terms of the amount of carbon dioxide (CO₂) that would have the same global warming potential (GWP), measured over a specified timescale (generally, 100 years).

Figure 1: LEGGI area



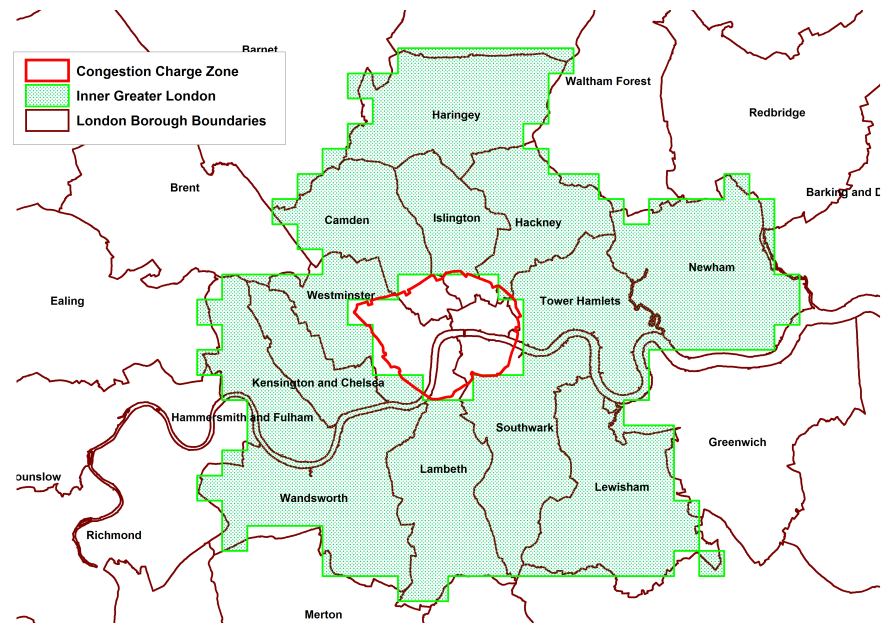
OS data © crown copyright. All rights reserved (GLA) (LA100032379), 2010

Figure 2: Central Greater London area



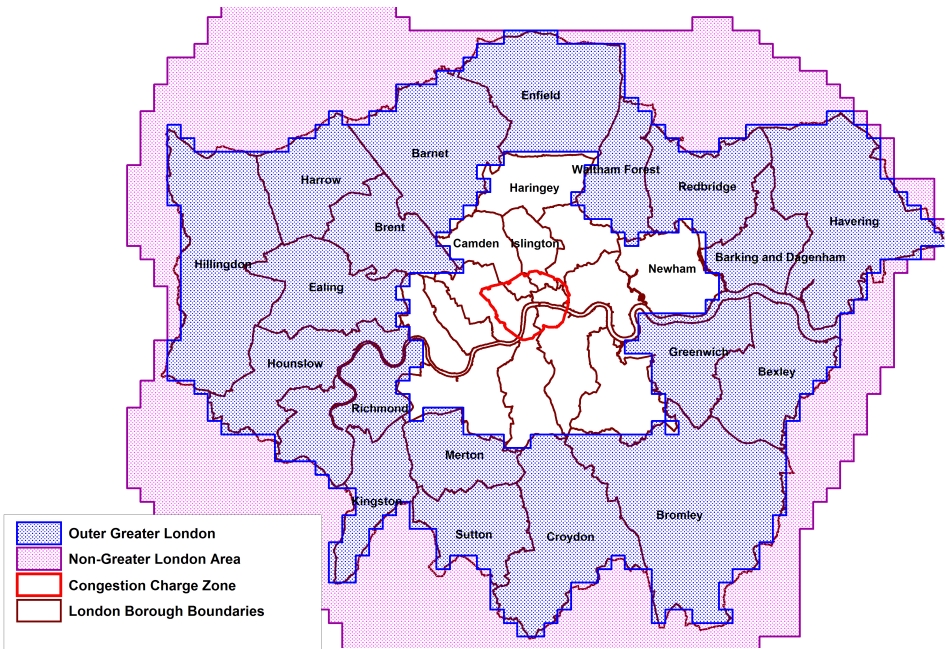
OS data © crown copyright. All rights reserved (GLA) (LA100032379), 2010

Figure 3: Inner Greater London area



OS data © crown copyright. All rights reserved (GLA) (LA100032379), 2010

Figure 4: Outer Greater London area



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1.6. Simplified energy/fuel source and sector split in the LEGGI 2008

Energy/fuel consumption estimates (and the corresponding greenhouse gas emissions) in the LEGGI 2008 have been grouped into the following **sources**:

- Road Transport
- Civil Aviation
- Rail Traffic
- Shipping
- Electricity
- Gas
- Oil
- Coal
- Wastes & Renewables

The aforementioned fuel/energy consumption estimates (and greenhouse gas emissions) have been further grouped into the following three broad **sectors**:

- Domestic
- Industrial & Commercial
- Transport

All fuel/energy consumption estimates that cannot be separately, easily and reliably classified as industrial⁴ or commercial⁵ have been grouped into the Industrial & Commercial sector. This simplified grouping is necessary in order to provide fuel/energy consumption and greenhouse gas emission estimates in a format that is meaningfully comparable to the energy consumption and greenhouse gas emission estimates in the UK Department for Energy and Climate Change (DECC) Energy Statistics and Department for Environment, Food and Rural Affairs (DEFRA) Statistics on CO₂ Emissions at Local Authority and Regional Level, respectively.

1.7. Availability of the LEGGI 2008

The LEGGI 2008 is available from the Environment Team, Greater London Authority (GLA), on a CD-ROM as a "zipped" (i.e., compressed) folder (**LEGGI_2008.zip**) that contains all the necessary files and the actual LEGGI 2008 Microsoft® Access database that are needed to fully utilise the LEGGI 2008. A user guide (**LEGGI 2008 User Guide**) that provides clear and comprehensive information on how to copy and use the LEGGI 2008 accompanies the CD-ROM.

The "unzipped" (decompressed) LEGGI_2008 folder must be copied to a suitably named directory/folder on your PC or network and it contains all the necessary files (including the GIS maps in MapInfo® Professional, ESRI ArcGIS®, Microsoft® Excel, Microsoft® Word and Adobe Acrobat® Reader file formats) needed to fully utilise the LEGGI 2008. The LEGGI_2008 folder also contains the actual LEGGI 2008 database

⁴ The Industrial sector includes power stations, plants regulated as combustion processes under Integrated Pollution Control (IPC), refineries, integrated steelworks, coke ovens, cement clinker manufacture, lime manufacture and other plants regulated under IPC, etc.

⁵ The Commercial sector includes commercial offices, communication and transport, hotel and catering, retail, sport and leisure, warehouses, education, Government and health sub-sectors, etc.

(LEGGI_2008.mdb), which was developed using the Microsoft® Access 2002 database management system (DBMS).

Important!

Because the LEGGI 2008 uses the Microsoft® Access 2002 application as its database management system (DBMS) you MUST have Microsoft® Access 2000 or later installed on your PC or else you will NOT be able to use the LEGGI 2008 database (i.e., the LEGGI_2008.mdb file) and its user-friendly interfaces to easily and quickly navigate and query the underlying LEGGI 2008 emission datasets.

The LEGGI 2008 was created using Access 2002 and do not need to be converted for use with Office Access 2007. You can open the LEGGI 2008 (.mdb file format) and modify data and object design in Office Access 2007 (*.accdb file format) - compatibility mode is automatically on when you open a file that was saved in the old file formats and most functionality in the LEGGI 2008 (old versions of Access) is available in Office Access 2007, with some exceptions. When the Office 2007 program is in compatibility mode, it will be indicated in the document title bar.*

1.8. Price of the LEGGI 2008

The GLA provides the LEGGI 2008 to London boroughs and other users free of charge. Requests for the LEGGI 2008 CD-ROM must be made to the Greater London Authority:

Public Liaison Unit
Greater London Authority
City Hall
The Queen's Walk
London SE1 2AA
United Kingdom

Fax: 020 7983 4057

Email: mayor@london.gov.uk or laei@london.gov.uk

1.9. Technical support for the LEGGI 2008

Use the contact details below for LEGGI 2008 **technical support**:

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<http://www.aeat.com>

2. How to copy the LEGGI_2008 folder to your PC/Network

Before copying the "zipped" **LEGGI_2008** folder from the LEGGI 2008 CD-ROM to your PC or network, you should be familiar with the Windows environment. It is assumed that you know how to use Windows Explorer to locate folders and files on a CD-ROM and on hard drives (local and/or network), create folders, move and copy folders and files, expand and collapse directory trees, and are familiar with the basic functionality in Microsoft® Office suites.

The "zipped" **LEGGI_2008** folder provided on the LEGGI 2008 CD-ROM is **NOT** an executable file (that is, it is not a file in a format that your PC can directly execute). Therefore, you must copy the **LEGGI_2008** folder in the same way you copy any other conventional folder/file for the Windows operating system.

2.1. System requirements for the LEGGI 2008

In order to copy and use the LEGGI 2008 in its entirety, your PC system must meet the following basic requirements:

- Pentium 11 processor or higher (recommended);
- Windows 2000/XP Professional/NT 4.x or later;
- At least 2 Gigabyte (GB) of free hard disk space on your PC or network;
- At least 256 Megabytes (MB) RAM on your PC (512 MB RAM recommended);
- SVGA with higher screen resolution (1024 x 768 pixels recommended) and higher colour (24 bit recommended);
- Microsoft® Access 2000 or later and Microsoft® Excel 2000 or later;
- Adobe Acrobat® Reader; and
- A Geographic Information Systems (GIS) application – MapInfo® Professional version 7 or later and/or ESRI ArcGIS 9.0 or later.

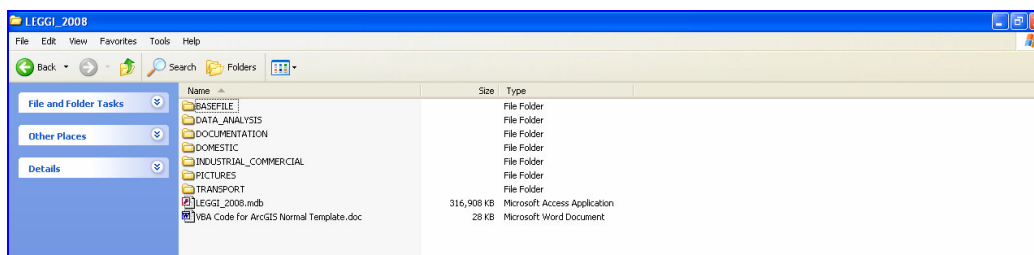
2.2. How to copy the LEGGI_2008 folder to your PC

1. Use My Computer or Windows Explorer to locate a suitable hard drive (local or network, e.g., C:\ or S:\) with enough free space (at least 2 GB) and create a new folder. Rename the newly created folder as "**GLA_LEGGI_2008**".
2. Insert the LEGGI 2008 CD-ROM into your computer's CD/DVD-ROM drive (e.g., D:\). The operating system should detect the LEGGI 2008 CD-ROM. Use My Computer or Windows Explorer to locate the "zipped" **LEGGI_2008** folder on the LEGGI 2008 CD-ROM in your PC's CD/DVD-ROM drive.⁶
3. Right-click the "zipped" **LEGGI_2008** folder and select the 'Extract All...' option from the pop-up menu (note that there might be slight variations to the pop-up menu options depending on the type of decompression tools installed on your PC). The Unzip window or the Extraction Wizard will open and then simply follow the Wizard's instructions.

⁶ The "zipped" LAEI_2008 folder is in a compressed form; therefore, it must be decompressed before using it. The most popular decompression tool is WinZip, an easy-to-use program that can be downloaded from the Internet. In addition, some Windows systems (e.g., Windows Vista, Windows XP Professional, Windows 2000 Professional) allow you to open compressed files in Windows Explorer.

4. Make sure the "Unzip to Folder" destination folder is the "GLA_LEGGI_2008" folder you created in Step 1. You can also use the Browse options to locate the "GLA_LEGGI_2008" folder.
5. After the LEGGI_2008 folder has been extracted or decompressed, click the "Close" or "Finish" button to exit the Unzip window or Extraction Wizard.
6. Locate the **GLA_LEGGI_2008** folder (earlier created in Step 1) to access the decompressed version of the LEGGI_2008 folder (now without the .zip extension). Open the **LEGGI_2008** subfolder in the **GLA_LEGGI_2008** folder and make sure it contains all of the files needed to fully use the LEGGI 2008. The content of the **LEGGI_2008** folder should now look exactly as depicted in Figure 5- seven subfolders and the **LEGGI_2008.mdb** file (Microsoft Access Application). The structural layout and a brief description of the **LEGGI_2008** folder are available in Appendix A. The **LEGGI_2008.mdb** file is the Microsoft® Access database management system that manages all the LEGGI 2008 database objects and provides the basic functionality to access other linked applications and the entire LEGGI 2008 files.

Figure 5: Content of the LEGGI 2008 folder



7. Right-click the **LEGGI_2008** (Type: Microsoft Access Application) file and from the pop-up menu create a shortcut to the **LEGGI_2008** file. Locate the newly created **Shortcut to LEGGI_2008** file and copy it to your PC's desktop by dragging and dropping. Once copied to your PC's desktop, you will see a new icon on your desktop entitled **Shortcut to LEGGI_2008**. You can right-click and rename this icon to "**LEGGI 2008**" or anything of your choice. Double-clicking the **Shortcut to LEGGI_2008** icon (or the "**LEGGI 2008**" icon if you renamed the Shortcut) on your PC's desktop provides a very easy and convenient method of opening the LEGGI 2008 database and it is highly recommended that you use this method to open the LEGGI 2008 at all times.

Now that you have copied the **LEGGI_2008** to your PC and created the **Shortcut to LEGGI_2008** icon on your PC's desktop, you are ready to open and use the LEGGI 2008 database through its graphical user interfaces (GUI).

Note: You can copy or move the **LEGGI_2008** folder (from the LEGGI 2008 CD-ROM or another location) to any other folder/directory or hard disk (local or network) of your choice but you **MUST** ensure that all the seven subdirectories/subfolders and the LEGGI_2008.mdb (Microsoft Access Application) file and its shortcut are always copied to the same root directory or folder.

Please refrain from renaming the folders and files in the LEGGI 2008 as this may lead to serious problems. The names of folders and files in the LEGGI 2008 have been programmed using Visual Basics for Applications (VBA) language to operate as a whole.

You can copy or move the **LEGGI_2008** file (i.e., the Microsoft Access Application) alone (i.e., without the seven subfolders) to any other folder/directory or hard disk (local or network) of your choice and use the LEGGI 2008 database to fully run LEGGI 2008 queries; export query results to Excel; view emission totals and reports, etc. However, you will **NOT** be able to access the other important files that are linked with MapInfo® Professional, ArcGIS®, Microsoft® Excel and Adobe Acrobat® Reader applications through the LEGGI 2008's friendly graphical user interfaces.

To fully benefit from the LEGGI 2008, you should be familiar with the basic functionality in Microsoft® Excel and either MapInfo® Professional or ArcGIS® applications.

2.3. Additional steps for ESRI ArcGIS 9.0 or later users ONLY

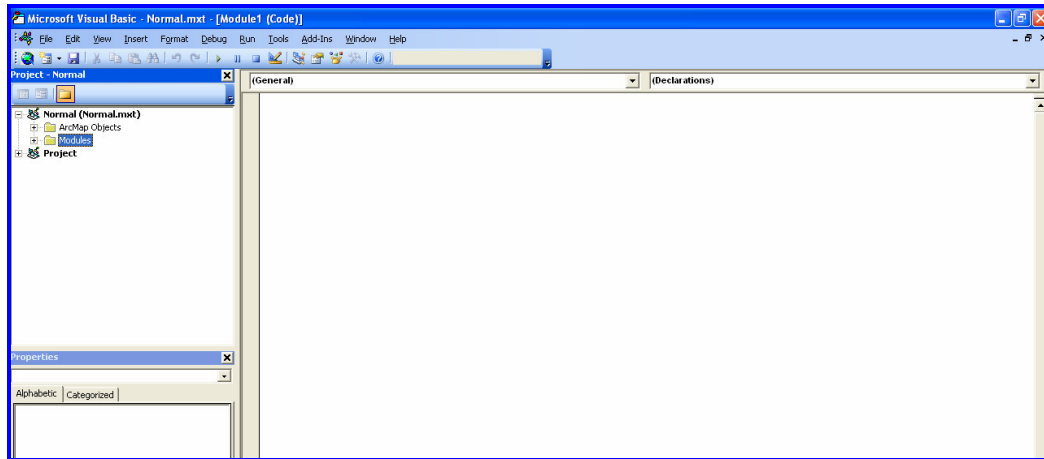
The LEGGI 2008 provides improved and integrated links to the most common Geographic Information Systems (GIS) applications (i.e., MapInfo® Professional and ArcGIS®); ensuring that users benefit from the mapping, visualisation and querying functionality offered by these GIS applications. The LEGGI 2008 seamlessly links with MapInfo Professional without this additional step. However, **all ArcGIS 9.0 or later users MUST create a new module in their ArcGIS ArcMap application** as follows:

1. Start **ArcGIS** from **Start All Programs – ArcGIS - ArcMap** or from a desktop shortcut
2. Open an existing map document (.mxd) or add layers to the empty (Untitled) map document.
3. Click the **Tools** menu, point to **Macros**, then click **Visual Basic Editor**.



This opens the **Visual Basic Editor** (see [Figure 6](#)). ArcGIS applications come with Visual Basic for Applications and Visual Basic Editor embedded in the applications. The VBA project for the opened document is called **Project** followed by the name of the document in brackets. For example, in ArcMap it is named Project (<name of document>.mxd), and the VBA project for the Normal template is called **Normal** (Normal.mxt).

Figure 6 Visual Basic Editor in ArcGIS ArcMap



4. In the VBA project explorer window (Click **Project Explorer** from the View menu if not already displayed), expand the Normal (Normal.mxt) node to expose the **ArcMapObjects** and **Modules** nodes.
5. Select the Modules node and then click Modules from the Insert menu to insert a new module. A new Module is added to the Normal.mxt project at the Module node.
6. In the **Properties** window, rename the newly inserted module “Module1” (Figure 7) as “modLayers” (see Figure 8 and Figure 9).

Figure 7 Properties window for the “Module1” module

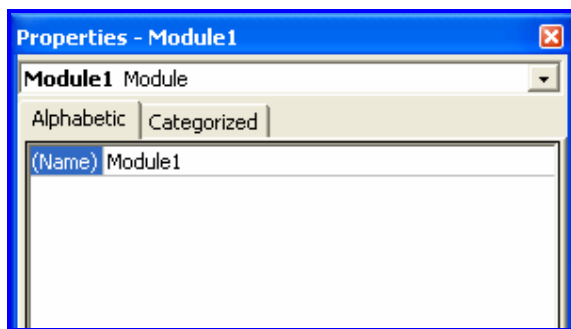


Figure 8 Properties window for the “modLayers” module

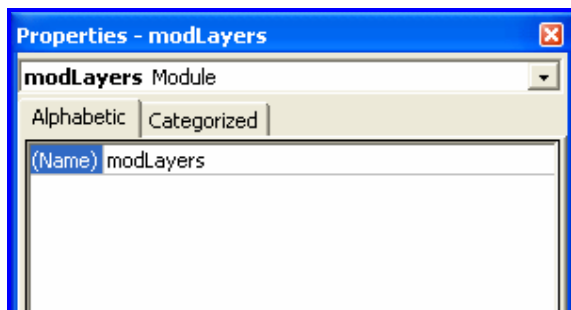
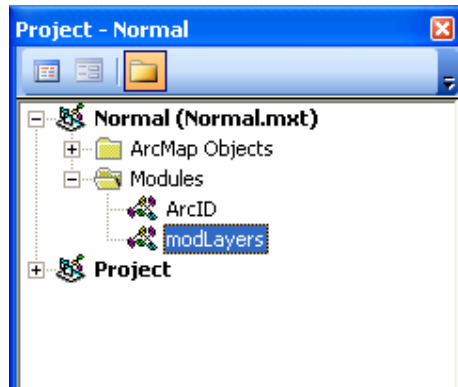
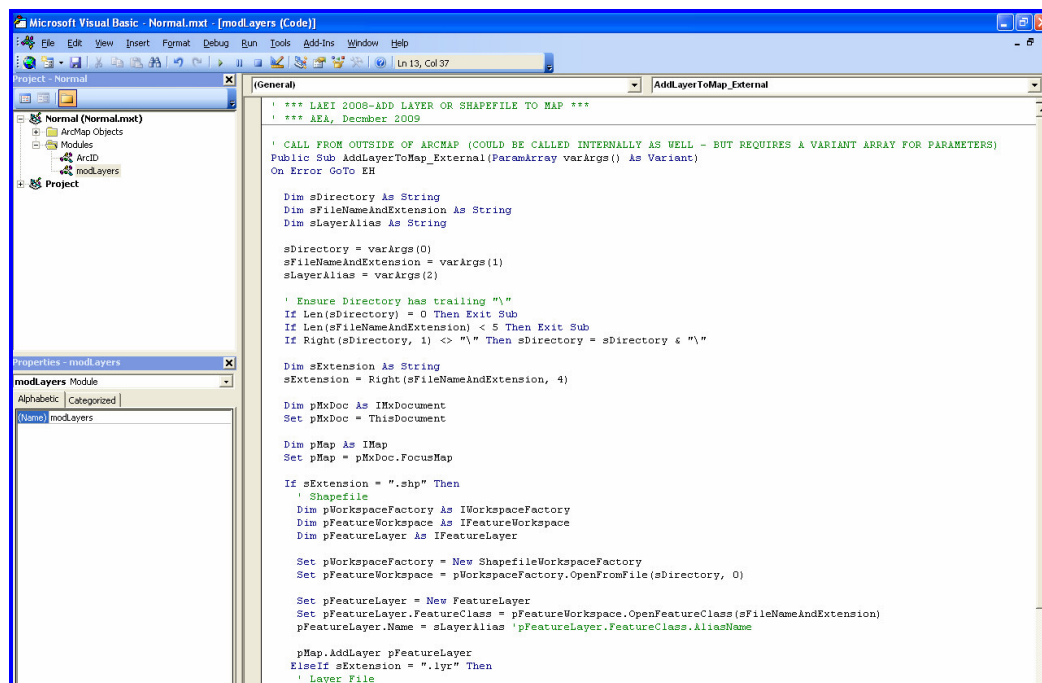


Figure 9 Newly named modLayers module in the Project Explorer window



7. Minimise the Visual Basic Window, navigate to the LEGGI_2008 folder, locate the “ArcGIS Normal Template.doc” file and open it.
8. Select all the texts from the “ArcGIS Normal Template.doc” file, maximize the VBA and open the modLayers module that you created in Step 6.
9. Paste the entire content (i.e., the VBA code) of your clipboard (with the copied text from the “ArcGIS Normal Template.doc” file) into the modLayers module as shown in Figure 10.

Figure 10 The modLayers module with the copied code in the VBE window

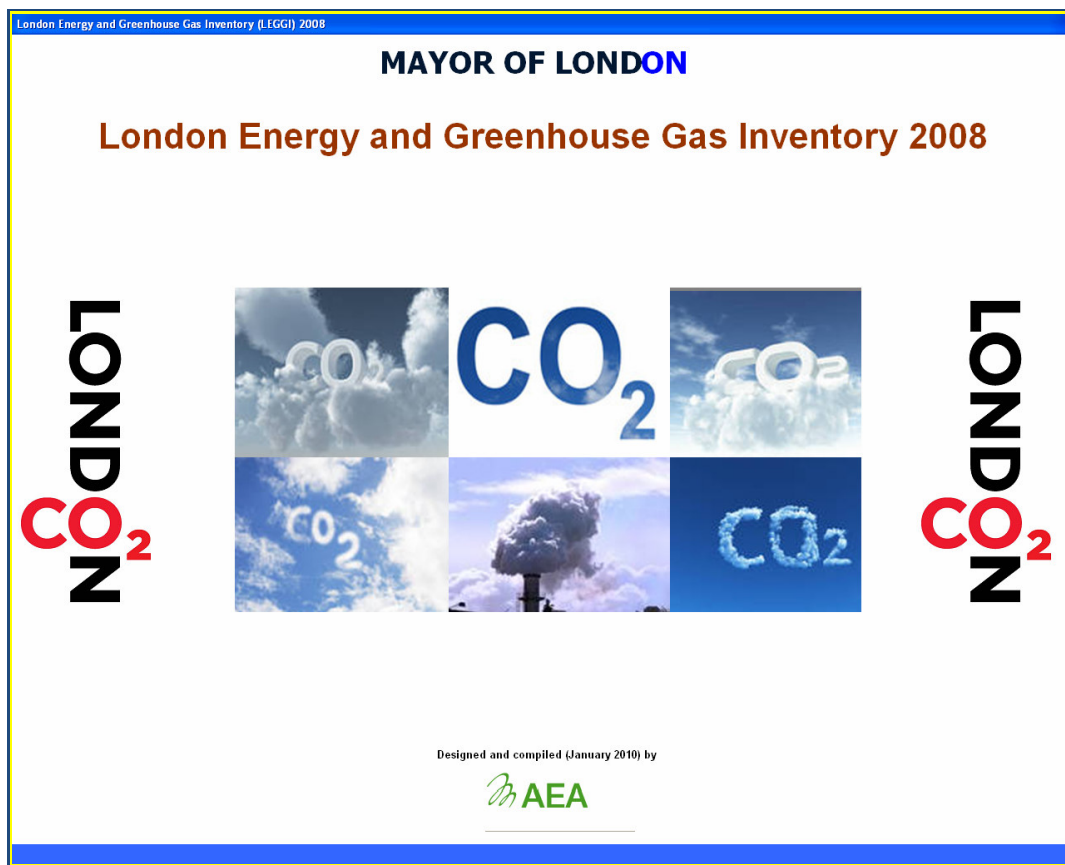


10. Save **Normal.mxt** while in VBA by clicking **Save** on the Visual Basic Editor.
11. Click the Close button on the Visual Basic Editor and **exit ArcMap**.

3. Using the LEGGI 2008

Locate and double-click the **Shortcut to LEGGI 2008** icon on your PC's desktop to open the **LEGGI 2008** database. On opening the LEGGI 2008 database, the **LEGGI 2008 Welcome Screen** (Figure 11) is displayed for approximately eight seconds, after which it immediately switches to the **Introduction Screen** (Figure 12).

Figure 11: LEGGI 2008 Welcome Screen



The Introduction Screen provides a brief description of the LEGGI 2008 as well as a disclaimer note for the LEGGI 2008.

At the bottom of the Introduction screen are two buttons (see Figure 12):

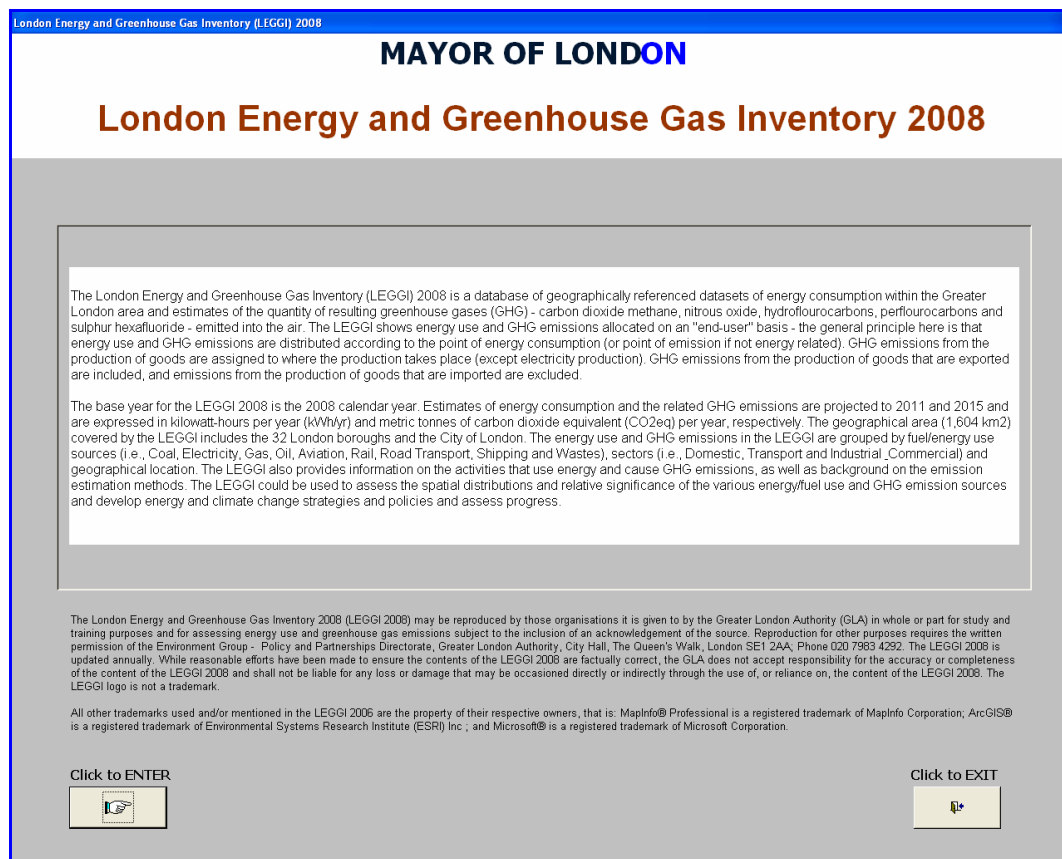
The **Click to ENTER** button – clicking this button opens the **Main Switchboard** (Figure 13), which allows you to enter and navigate the entire LEGGI 2008 database.

The **Click to EXIT** button – clicking this button allows you to completely exit the LEGGI 2008 database.

The **Main Switchboard** is the key launching pad for the LEGGI 2008 database and its objects. For clarity and navigational purpose, we have organised the key LEGGI 2008 component files into six main groups on the Main Switchboard as follows:

- User Guide and Methodology Manual
- Domestic Sector
- Industrial and Commercial Sector
- Transport Sector
- Statistical Summaries and Trends
- Background maps and Road Traffic Datasets

Figure 12: Introduction Screen

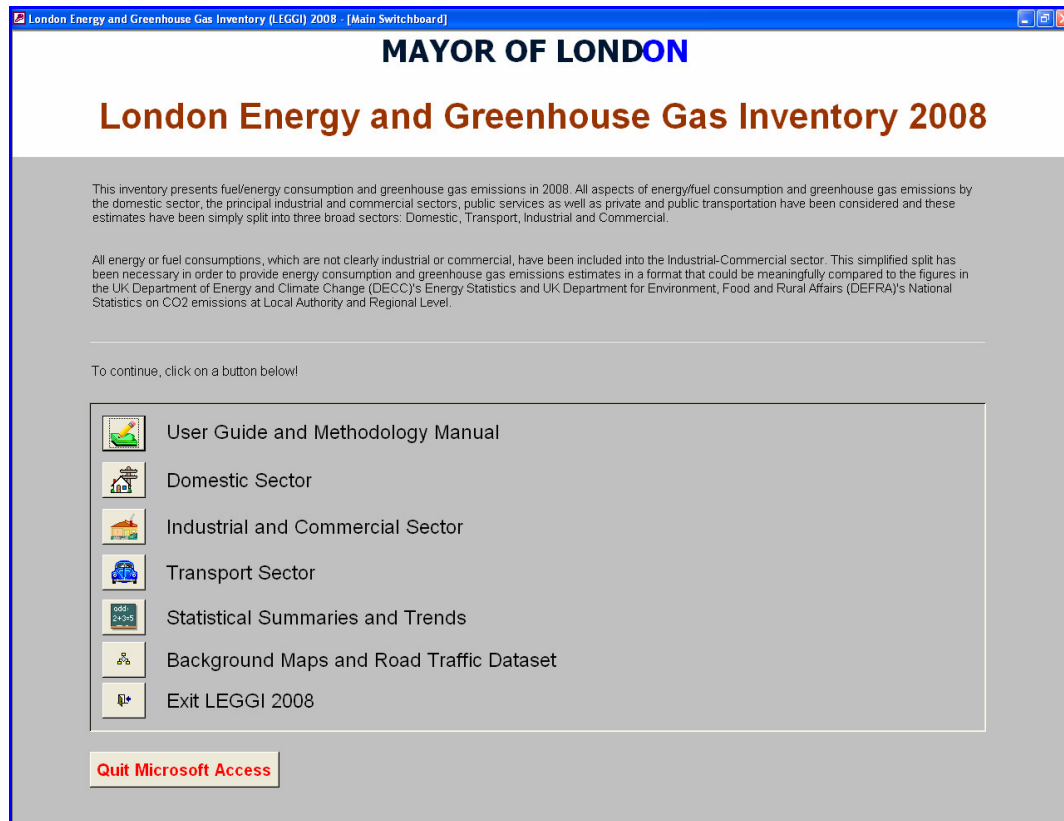


The six main groups (with their corresponding buttons) on the Main Switchboard provide users with options to display specially designed forms when clicked.

- ❑ The **User Guide and Methodology Manual** button – enables you to access the **User Guide and Methodology Documents Form** (Figure 14), which provides access to two important LEGGI 2008 documents - "*LEGGI 2008 User Guide*" and "*LEGGI 2008 Methodology Manual*", which are available in Adobe® (*.pdf) file format; so you must have Adobe® Acrobat® Reader installed on your PC in order to view and print them.

The User Guide and Methodology Documents form also provides access to two buttons – "**What are Greenhouse Gases?**" and "**What is CO2 Equivalent (CO2eq)?**" – that provide background information on the type of greenhouse gases covered in the LEGGI 2008 and their units of measurements in the LEGGI 2008, respectively.

Figure 13: Main Switchboard



- ❑ The **Domestic Sector** button – enables you to access the **Domestic Sector Form** (Figure 15), which displays information about fuel/energy consumption and greenhouse gas emissions from the domestic sector. In the LEGGI 2008, these are: **Electricity, Gas, Coal and Oil**.
- ❑ The **Industrial and Commercial** button – enables you to access the **Industrial and Commercial Form** (Figure 16), which displays information about fuel/energy consumption and greenhouse gas emissions from industrial and commercial sectors. In the LEGGI 2008, these are: **Electricity, Gas, Coal, Oil and Wastes & Renewables**.
- ❑ The **Transport Sector** button – enables you to access the **Transport Sector Form** (Figure 17), which displays information about fuel/energy consumption and greenhouse gas emissions from the transport sector. In the LEGGI 2008, these are: **Road Transport, Rail Traffic, Domestic Aviation and Domestic Shipping**.

- ❑ The **Statistical Summaries and Trends** button – provides access to the **Totals of Energy Use and Greenhouse Gas Emissions in greater London Form** (Figure 20), which displays information about the total fuel/energy consumption and greenhouse gas emissions from all the sources in the entire Greater London.
- ❑ The **Background Maps and Road Traffic Datasets** button – provides access to the **GIS Base Maps and Road Traffic Data Form** (Figure 24), which allows users to display several useful GIS maps and the road traffic network that can be used for further spatial analyses or presentational purpose. For example, the 2008 traffic flow data and network; the LEGGI 1-km² grid cells; the administrative boundaries of London boroughs; outlines of the Central, Inner and Outer London boundaries can all be assessed from this form.
- ❑ The **Exit LEGGI 2008** button – enables you to exit the LEGGI 2008 database but leaves the Microsoft® Access application running in the background.
- ❑ The **Quit Microsoft Access** button - enables you to completely exit both the LEGGI 2008 database and the Microsoft® Access application at the same time.

Figure 14: User Guide and Methodology Documents Form

The screenshot shows a web application window titled "London Energy and Greenhouse Gas Inventory (LEGGI) 2008 - [User Guide and Methodology Documents]". The header features the "MAYOR OF LONDON" logo and the title "London Energy and Greenhouse Gas Inventory 2008". Below the header, there are two buttons: "What are Greenhouse Gases?" and "What is CO2 equivalent (CO2eq)?". The main section is titled "LEGGI 2008 DOCUMENTATION" and contains the text "Please take time and read these documents. Click a button below to view the appropriate LEGGI 2008 document." Below this text, there is a box containing two buttons: "LEGGI 2008 User Guide" and "LEGGI 2008 Energy and GHG Emissions Methodology Manual". At the bottom of the form, there is a button labeled "Return to the Main Switchboard".

Figure 15: Domestic Sector Form

London Energy and Greenhouse Gas Inventory (LEGGI) 2008 - [Domestic Sector]

File Edit Navigate Sectors Maps Help

Type a question for help

MAYOR OF LONDON

London Energy and Greenhouse Gas Inventory 2008

ENERGY USE AND GREENHOUSE GAS EMISSIONS FROM THE DOMESTIC SECTOR - ELECTRICITY, 2008

1. Select a Source:

Electricity

Electricity use and greenhouse gas emissions calculated from actual or estimated meter reading at domestic premises.

2. Select a Year:

2008

3. Click the button below to export the 2008 Electricity data (gridded at 1km x 1km resolution) to Excel

Export to Excel

Energy Use (kWh/yr): 13,776,090,000

Greenhouse Gas (GHG): Total GHG Emissions (CO2eq tonnes/yr)

Carbon dioxide (CO2):	7,343,208
Methane (CH4):	3,168
Nitrous Oxide (N2O):	43,395
Hydrofluorocarbons (HFCs):	0
Perfluorocarbons (PFCs):	0
Sulphur Hexafluoride (SF6):	0
Total:	7,389,771

Documentation for Electricity

Methodology

Adobe (*.pdf) Format

Data Workbooks

MS Excel (*.xls) Format

Mapped Datasets

MapInfo (*.tab) Format

Mapped Datasets

ArcGIS (*.shp) Format

Close Form

Figure 16: Industrial and Commercial Sector Form

London Energy and Greenhouse Gas Inventory (LEGGI) 2008 - [Industrial and Commercial Sector]

File Edit Navigate Sectors Maps Help

Type a question for help

MAYOR OF LONDON

London Energy and Greenhouse Gas Inventory 2008

ENERGY USE AND GREENHOUSE GAS EMISSIONS FROM THE INDUSTRIAL AND COMMERCIAL SECTOR - ELECTRICITY, 2008

1. Select a Fuel/Energy Use Category:

Electricity

Energy use and greenhouse gas emissions associated with industrial and commercial electricity consumption, including electricity consumption by over ground electric trains and the London Underground trains.

2. Select a Year:

2008

3. Click the button below to export the 2008 Electricity data (gridded at 1km x 1km resolution) to Excel

Export to Excel

Energy Use (kWh/yr): 26,093,440,000

Greenhouse Gas (GHG): Total GHG Emissions (CO2eq. tonnes/yr)

Carbon dioxide (CO2):	15,190,170
Methane (CH4):	6,001
Nitrous Oxide (N2O):	82,194
Hydrofluorocarbons (HFCs):	0
Perfluorocarbons (PFCs):	0
Sulphur Hexafluoride (SF6):	0
Total:	15,278,370

Documentation for Electricity

Methodology

Adobe (*.pdf) Format

Data Workbooks

MS Excel (*.xls) Format

Mapped Datasets

MapInfo (*.tab) Format

Mapped Datasets

ArcGIS (*.shp) Format

Close Form

Figure 17: Transport Sector Form

MAYOR OF LONDON

London Energy and Greenhouse Gas Inventory 2008

ENERGY USE AND GREENHOUSE GASES EMISSIONS FROM THE TRANSPORT SECTOR - DOMESTIC AVIATION, 2008

1. Select a Fuel/Energy Use Category:
 Energy use and greenhouse gas emissions from fuel use in civil aviation (i.e., domestic and international flights and aircrafts in the landing and take-off flight phases up to 1,000m) and management of airports (including airside support vehicles, stationary heating and auxiliary power units, etc) at London Heathrow, London City, Battersea, Biggin Hill, Denham, Elstree, Lippits Hill, Northolt and Stapleford airports.

2. Select a Year:

3. Click the button below to export the 2008 Domestic Aviation data (gridded at 1km x 1km resolution) to Excel.

Greenhouse Gas (GHG):	Total GHG Emissions (CO ₂ eq. tonnes/yr)
Carbon dioxide (CO ₂):	1,387,015
Methane (CH ₄):	17,171
Nitrous Oxide (N ₂ O):	13,076
Hydrofluorocarbons (HFCs):	0
Perfluorocarbons (PFCs):	0
Sulphur Hexafluoride (SF ₆):	0
Total:	1,417,263

Documentation for Domestic Aviation.

Methodology	Data Workbooks	Mapped Datasets	Mapped Datasets
<input type="button" value="Adobe (.pdf) Format"/>	<input type="button" value="MS Excel (.xls) Format"/>	<input type="button" value="MapInfo (.tab) Format"/>	<input type="button" value="ArcGIS (.shp) Format"/>

Click on the button below to view detailed energy use and emissions data for the Domestic Aviation sector.

At the bottom of the Transport Sector form is the **Detailed data for the Domestic Aviation ...** button or **Detailed Data for the Road Transport Sector...** button - each button enables users to access a special form, **Energy Use and Greenhouse Gas Emissions from Domestic Aviation Form** (Figure 18) or **Energy Use and Greenhouse Gas Emissions from Road Transport Form** (Figure 19), with detailed emissions data for domestic aviation and road transport, respectively.

Both the **Energy Use and Greenhouse Gas Emissions from Domestic Aviation** and **Energy Use and Greenhouse Gas Emissions from Road Transport** forms are accessible only through the **Transport Sector Form** when it is open and active.

Figure 18: Energy Use and GHG Emissions from Domestic Aviation Form


Energy Use and Greenhouse Gas Emissions from Domestic Aviation

ENERGY USE AND GREENHOUSE GAS EMISSIONS AT LONDON CITY AIRPORT - 2008

1. Select an Airport:
 Energy use and greenhouse gas missions from London City Airport

2. Select a Year:

3. Click the button below to export the 2008 London City data to Excel.



Energy Use (kWh/yr):

Greenhouse Gas (GHG): Total GHG Emissions (CO2eq tonnes/yr)

Carbon dioxide (CO2):	64,156
Methane (CH4):	794
Nitrous Oxide (N2O):	605
Hydrofluorocarbons (HFCs):	0
Perfluorocarbons (PFCs):	0
Sulphur Hexafluoride (SF6):	0
Total:	65,555

Methodology:

Data Workbooks:

Mapped Datasets:

Mapped Datasets:

Figure 19: Energy Use and GHG Emissions from Road Transport Form

Detailed Road Transport Energy Use and Greenhouse Gas Emissions


DETAILED ROAD TRANSPORT FUEL USE AND EMISSIONS - MINOR ROADS (CO2), 2008

1. Select a Road Transport Source:
 Gridded fuel use and greenhouse gas emissions from minor roads (roads for which there are no detailed data/information for each road link and as such are gridded at 1km x 1km resolution based on total vehicle kilometres travelled .

2. Select a Year:

3. Select a Greenhouse Gas:

4. Click the button below to export the 2008 Minor Roads (CO2 emissions) data to Excel.




Vehicle Type: Total Emissions (CO2eq tonnes/yr)

Motorcycles:	8,037
Cars:	682,356
Taxis:	12,740
Buses and Coaches:	33,950
Light Goods Vehicles:	96,463
Rigid HGV:	56,351
Articulated HGV:	8,339
Total (All Vehicles):	898,235

FUEL ENERGY USAGE ON MINOR ROADS - 2008

1. Click the button below to export the 2008 Minor Roads Fuel Use data to Excel.



Vehicle Type:	Fuel Use: (1,000 litres/yr)	Energy Use: (GWh/yr)
Motorcycles:	3,171	30
Cars (Petrol):	215,526	2,069
Cars (Diesel):	62,444	684
Taxis (Diesel):	4,725	52
Buses and Coaches (Diesel):	12,506	137
LGV (Petrol):	4,952	48
LGV (Diesel):	31,302	343
Rigid HGV (Diesel):	20,865	229
Articulated HGV Diesel):	3,088	34
Total (All Vehicles):	358,578	3,626

Figure 20: Totals of Energy Use and GHG Emissions in Greater London Form

MAYOR OF LONDON

London Energy and Greenhouse Gas Inventory 2008

TOTAL ENERGY AND GREENHOUSE GAS EMISSIONS FROM ALL SECTORS IN THE GREATER LONDON AREA IN 2008

1. Select a Year:
2008

2. Click to export energy and greenhouse gas emissions from all sectors data for 2008 to Excel

Click for Interactive Totals and Trend Analysis...

Greenhouse Gas (GHG):	Total GHG Emissions (CO ₂ eq tonnes/yr)
Carbon dioxide (CO ₂):	44,715,300
Methane (CH ₄):	61,308
Nitrous Oxide (N ₂ O):	228,296
Hydrofluorocarbons (HFCs):	0
Perfluorocarbons (PFCs):	0
Sulphur Hexafluoride (SF ₆):	0
Total:	45,004,900

Please tick an option box below for further summary statistics at various geographical levels (e.g., Greater London, Central, Inner and Outer London, boroughs, etc.)

- ☐ Energy use and greenhouse gas emissions for the entire Greater London area (i.e., 1,604 1km x 1km grid cells)
- ☐ Energy use and greenhouse gas emissions by Location (i.e., Central, Inner and Outer) in Greater London
- ☐ Energy use and greenhouse gas emissions by London borough (i.e., Camden, Harrow, Barnet, etc)

Click to view Selection... Close Form

Displayed at the bottom of the **Totals of Energy Use and Greenhouse Gas Emissions in Greater London** Form are three mutually exclusive check boxes to select from:

- The **Energy Use and Greenhouse Gas Emissions for the Entire Greater London Area...** check box – selecting this option and clicking the **View Selection** button displays the **Relative Contributions of Energy use Sources and Sectors in Greater London Form** (Figure 21), which displays energy consumption and greenhouse gas emissions totals and other pertinent information (energy sources and sectors) for the entire Greater London area.
- The **Energy Use and Greenhouse Gas Emissions by Location...** check box – selecting this option and clicking the **View Selection** button displays the **Relative Contributions of Energy Use Sources and Sectors by London Area Form** (Figure 22), which displays energy consumption and greenhouse gas emissions totals and other pertinent information (fuel/energy sources and sectors) by Central, Inner and Outer London.
- The **Energy Use and Greenhouse Gas Emissions by London Borough...** check box – selecting this option and clicking the **View Selection** button displays the **Relative Contributions of Energy Use Sources and Sectors by London Borough Form** (Figure 23), which displays energy consumption and greenhouse gas emissions totals and other pertinent information (fuel/energy sources and sectors) by London boroughs.

Figure 21: Relative Contributions of Energy Sources and Sectors in London Form

Relative Contributions of Energy Use Sources and Sectors in Greater London

TOTAL ENERGY USE AND GREENHOUSE GAS EMISSIONS IN THE GREATER LONDON AREA FROM ELECTRICITY (DOMESTIC) IN 2008

Greenhouse Gases:	GHG Emissions: Electricity (Domestic), (CO2eq tonnes/yr)	Total GHG Emissions: From all Sectors (CO2eq. tonnes/yr)	Proportion of GHG emissions: From Electricity (Domestic), 2008 (GHG Emissions/Total GHG Emissions)
1. Select an Energy/Fuel Use Category: Electricity (Domestic)	Carbon dioxide (CO2): 7,343,208	44,715,300	16.4%
	Methane (CH4): 3,168	61,308	5.2%
	Nitrous Oxide (N2O): 43,395	228,296	19.0%
	Hydrofluorocarbons (HFCs): 0	0	0.0%
	Perfluorocarbons (PFCs): 0	0	0.0%
	Sulphur Hexafluoride (SF6): 0	0	0.0%
Total:	7,389,771	45,004,900	16.4%
Energy Use (kWh/yr):	13,776,050,000	151,920,200,000	9.1%

2. Select a Year:
2008

TOTAL ENERGY USE AND GREENHOUSE GAS EMISSIONS IN THE GREATER LONDON AREA FROM THE DOMESTIC SECTOR IN 2008

Greenhouse Gases:	GHG emissions: Domestic Sector, (CO2eq tonnes/yr)	Total GHG Emissions: From all Sectors (CO2eq. tonnes/yr)	Proportion of GHG emissions: From Domestic Sector, 2008 (GHG Emissions/Total GHG Emissions)
1. Select a Sector: Domestic	Carbon dioxide (CO2): 15,931,180	44,715,300	35.6%
	Methane (CH4): 18,483	61,308	30.1%
	Nitrous Oxide (N2O): 55,500	228,296	24.3%
	Hydrofluorocarbons (HFCs): 0	0	0.0%
	Perfluorocarbons (PFCs): 0	0	0.0%
	Sulphur Hexafluoride (SF6): 0	0	0.0%
Total:	16,005,160	45,004,900	35.6%
Energy Use (kWh/yr):	64,005,120,000	151,920,200,000	42.1%

2. Select a Year:
2008

Close Form

Figure 22: Relative Contributions of Energy Sources and Sectors by Area Form

Relative Contributions of Energy Use Sources and Sectors by London Area

1. Select a London Area:
Central

The Central London Area roughly corresponds to the boundary of the old (2003) Central London Congestion Charging Zone (CCZ). It excludes the Western Extension (2007) of the CCZ.

ENERGY USE AND GREENHOUSE GAS EMISSIONS FROM ELECTRICITY (DOMESTIC) IN 2008 IN CENTRAL LONDON

Greenhouse Gases:	GHG Emissions: Electricity (Domestic), (CO2eq tonnes/yr)	Total GHG Emissions: From all Sectors (CO2eq. tonnes/yr)	Proportion of GHG emissions: From Electricity (Domestic), 2008 (GHG Emissions/Total GHG Emissions)
2. Select an Energy/Fuel Use Category: Electricity (Domestic)	Carbon dioxide (CO2): 196,241	4,902,115	4.0%
	Methane (CH4): 101	3,437	2.9%
	Nitrous Oxide (N2O): 1,384	20,816	6.6%
	Hydrofluorocarbons (HFCs): 0	0	0.0%
	Perfluorocarbons (PFCs): 0	0	0.0%
	Sulphur Hexafluoride (SF6): 0	0	0.0%
Total:	197,726	4,926,368	4.0%
Energy Use (kWh/yr):	439,410,300	12,503,600,000	3.5%

3. Select a Year:
2008

ENERGY USE AND GREENHOUSE GAS EMISSIONS FROM THE DOMESTIC SECTOR IN 2008 IN CENTRAL LONDON

Greenhouse Gases:	GHG emissions: Domestic Sector, (CO2eq tonnes/yr)	Total GHG Emissions: From all Sectors (CO2eq. tonnes/yr)	Proportion of GHG emissions: From Domestic Sector, 2008 (GHG Emissions/Total GHG Emissions)
1. Select a Sector: Domestic	Carbon dioxide (CO2): 366,452	4,902,115	7.5%
	Methane (CH4): 384	3,437	11.2%
	Nitrous Oxide (N2O): 1,595	20,816	7.7%
	Hydrofluorocarbons (HFCs): 0	0	0.0%
	Perfluorocarbons (PFCs): 0	0	0.0%
	Sulphur Hexafluoride (SF6): 0	0	0.0%
Total:	368,431	4,926,368	7.5%
Energy Use (kWh/yr):	1,451,103,000	12,503,600,000	11.6%

2. Select a Year:
2008

Click for Interactive PivotTable Analysis...

Close Form

Figure 23: Relative Contributions of Energy Sources and Sectors by Borough Form

Relative Contributions of Energy Use Sources and Sectors by London Borough

1. Select a London Borough:
[Barking and Dagenham] London borough boundaries within LEGGI are based on pixelated ("jagged") boundaries of the 1-km2 cells. Therefore, the borough boundaries do not exactly coincide with the actual administrative boundaries of the boroughs. The 1-km grid cells that make up the borough boundaries are mutually exclusive and collectively exhaustive. The London borough with the largest share of the 1-km grid cell's gets all the 1-km grid cell value.

2. Select an Energy/Fuel Use Category:
[Electricity (Domestic)]

3. Select a Year:
[2008]

ENERGY USE AND GREENHOUSE GAS EMISSIONS FROM ELECTRICITY (DOMESTIC) IN 2008 IN BARKING AND DAGENHAM

Greenhouse Gases:	GHG Emissions: Electricity (Domestic), (CO2eq tonnes/yr)	Total GHG Emissions: From all Sectors (CO2eq. tonnes/yr)	Proportion of GHG emissions: From Electricity (Domestic), 2008 (GHG Emissions/Total GHG Emissions)
Carbon dioxide (CO2):	155,532	839,167	18.5%
Methane (CH4):	66	925	7.2%
Nitrous Oxide (N2O):	906	4,501	20.1%
Hydrofluorocarbons (HFCs):	0	0	0.0%
Perfluorocarbons (PFCs):	0	0	0.0%
Sulphur Hexafluoride (SF6):	0	0	0.0%
Total:	156,504	844,592	18.5%
Energy Use (kWh/yr):	287,634,000	2,676,959,000	10.7%

ENERGY USE AND GREENHOUSE GAS EMISSIONS FROM THE DOMESTIC SECTOR IN 2008 IN BARKING AND DAGENHAM

1. Select a Sector:
[Domestic]

2. Select a Year:
[2008]

Greenhouse Gases:	GHG emissions: Domestic Sector, (CO2eq tonnes/yr)	Total GHG Emissions: From all Sectors (CO2eq. tonnes/yr)	Proportion of GHG emissions: From Domestic Sector, 2008 (GHG Emissions/Total GHG Emissions)
Carbon dioxide (CO2):	315,846	839,167	37.6%
Methane (CH4):	478	925	51.7%
Nitrous Oxide (N2O):	1,168	4,501	26.0%
Hydrofluorocarbons (HFCs):	0	0	0.0%
Perfluorocarbons (PFCs):	0	0	0.0%
Sulphur Hexafluoride (SF6):	0	0	0.0%
Total:	317,492	844,592	37.6%
Energy Use (kWh/yr):	1,206,324,000	2,676,959,000	45.1%

[Click for Detailed Interactive Analysis...](#) [Close Form](#)

Figure 24: Background Maps and Road Traffic Datasets Form

London Energy and Greenhouse Gas Inventory (LEGGI) 2008 - [GIS Base Maps and Road Traffic Data]

File Edit Navigate Sectors Maps Help Type a question for help Close

MAYOR OF LONDON

London Energy and Greenhouse Gas Inventory 2008

ROAD TRAFFIC DATA AND GENERIC GIS FILES

These maps are reproduced from and/or based on Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office Crown Copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. (Greater London Authority) (LA1000323/9) (2009).

1. Select Road Traffic Data or a GIS File:
[Administrative boundaries of London boroughs] Administrative boundaries of the 32 London boroughs and the City of London that comprise the Greater London area.

2. Click a button below to open the selected Map in the appropriate GIS application:

[MapInfo \(.tab\) Format](#) [ArcGIS \(.shp\) Format](#)

[Close Form](#)

- The **Background Maps and Road Traffic Datasets** button – provides access to the **Background Maps and Road Traffic Datasets Form** (Figure 24), which allows users to display several useful GIS maps and the road traffic network that can be used for further spatial analyses or presentational purpose. For example, the 2006 traffic flow data and network; the LEGGI 1-km² grid cells; the administrative boundaries of London boroughs; outlines of the Central, Inner and Outer London boundaries can all be assessed from this form.

4. General description of a LEGGI 2008 form

A typical LEGGI 2008 forms have been designed to allow users to easily query the LEGGI 2008 underlying datasets. Each LEGGI 2008 form provides the basic functionality through which the LEGGI 2008 emission datasets can be quickly displayed on screen, printed or exported out to a Microsoft® Excel workbook. The export to MS Excel functionality provides users with the opportunity to use MS Excel's data analytical functionality to examine the underlying LEGGI datasets in detail.

4.2. Customised LEGGI 2008 menu bar

The generic Microsoft® Access menu bars and toolbars have been removed from the LEGGI 2008 database and replaced with a specially customised **LEGGI 2008 menu bar** (Figure 25). The customised LEGGI 2008 menu bar is located at the top of each main form and it provides similar functions to all the LEGGI 2008 forms. These functions include such things as exiting or closing the LEGGI 2008 database, opening other Access databases, and switching between the main LEGGI forms, etc.

Figure 25: Customised LEGGI 2008 menu bar



The customised LEGGI 2008-menu bar has seven menu buttons that lead to various sub-menu items.

The **File** menu button leads to three submenu items:

- New**
- Open**
- Exit**

The **Edit** menu button leads to one submenu item:

- Copy**

The **Navigate** menu button leads to one submenu item:

- Switchboard**

The **Sectors** menu button leads to four submenu items:

- Domestic Sector**
- Industrial and Commercial Sector**
- Transport Sector**

The **Maps and Datasets** menu button leads to one submenu item:

- Base Maps and Traffic Data**

The **Help** menu button leads to one submenu item:

- Technical Support**

4.3. Layout of a typical LEGGI 2008 form

Figure 26 shows a typical LEGGI 2008 form. Each LEGGI 2008 form is designed to have a user-friendly and uniform look. At the very top of each form is the form's caption bar, which displays the version of the LEGGI (e.g., London Energy and Greenhouse Gas Inventory 2008) followed by "-" and then the name of the currently active form. Immediately below the form's caption bar is the customised LEGGI 2008 menu bar. At the top of each form, just below the customised LEGGI 2008 menu bar are the generic "MAYOR OF LONDON" and "London Energy and Greenhouse Gas Inventory 2008" headings.

The **Select a Source** and **Select a Year** selection boxes - show the selection parameters or criteria necessary for querying, displaying and exporting the pertinent greenhouse gas emission datasets for the fuel/energy source category currently displayed in the active form's caption bar. The selection parameters are displayed in selection boxes and they can be selected by clicking the drop-down buttons on the right hand side of the selection boxes to reveal the options for that particular fuel/energy consumption category. Each parameter option selected is used by the LEGGI 2008 database as a filter to generate queries from the underlying emission datasets tables. All the information displayed on each currently active form is directly dependent upon the parameter(s) selected from the selection boxes for that emission source category/sub-category.

Figure 26: Layout of a typical LEGGI 2008 Form

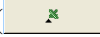
The screenshot shows the 'MAYOR OF LONDON' interface for the 'London Energy and Greenhouse Gas Inventory 2008'. The active form is titled 'ENERGY USE AND GREENHOUSE GAS EMISSIONS FROM THE DOMESTIC SECTOR - ELECTRICITY, 2008'. It features two main selection boxes: '1. Select a Source:' with 'Electricity' selected, and '2. Select a Year:' with '2008' selected. A button with a green arrow icon is labeled 'Click the button below to export the 2008 Electricity data (gridded at 1km x 1km resolution) to Excel'. To the right, a summary table displays 'Energy Use (kWh/yr)' as 13,776,050,000 and 'Greenhouse Gas (GHG)' emissions in CO2eq tonnes/yr for various gases. Below this, a 'Documentation for Electricity' section provides links to 'Methodology', 'Data Workbooks', 'Mapped Datasets', and 'Mapped Datasets' in different formats. A 'Close Form' button is at the bottom right.

Greenhouse Gas (GHG)	Total GHG Emissions (CO2eq tonnes/yr)
Carbon dioxide (CO2)	7,343,208
Methane (CH4)	3,168
Nitrous Oxide (N2O)	43,395
Hydrofluorocarbons (HFCs)	0
Perfluorocarbons (PFCs)	0
Sulphur Hexafluoride (SF6)	0
Total:	7,389,771

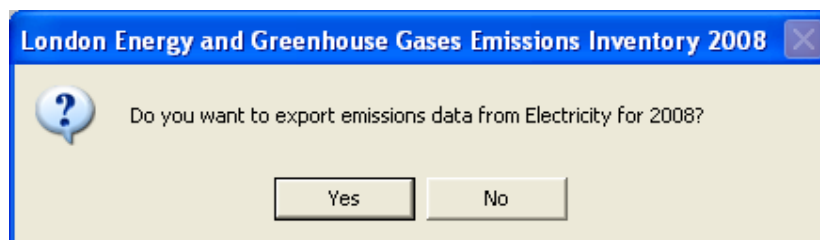
The table on the right of the form displays a summary of total energy consumption (expressed in kilowatt-hours) and greenhouse emissions (expressed in carbon dioxide

equivalent) based on the input parameters or criteria selected from the selection boxes. These summarised and tabulated results are dynamic and they change to reflect your choices as you select and change the parameters or criteria from the relevant selection boxes.

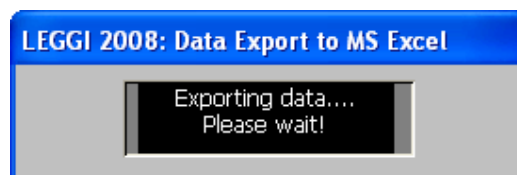
The **Close Form** button – enables you to close the currently active form and automatically switch to the Main Switchboard form.

The button with the **Microsoft® Excel logo** () – enables a data export mechanism to a new Microsoft® Excel workbook. In order to create a query and export the results to Excel, first select the parameters (criteria) from the options in the selection boxes on the open form that you wish to base your query on. Each selected parameter from the options available in the selection boxes becomes a "group by" field for the query and the numeric fields in the query are totalled based on the selected parameter. By identifying the parameters of interest to you in the selection boxes, you can analyse the underlying emission datasets in details and at various levels. The summarised query result, based on your selected parameters, can also be viewed on screen in the table on the active form. If you like what you see, you can then click the button with the Microsoft® Excel logo on the active form to export the query result directly to a new Excel workbook.

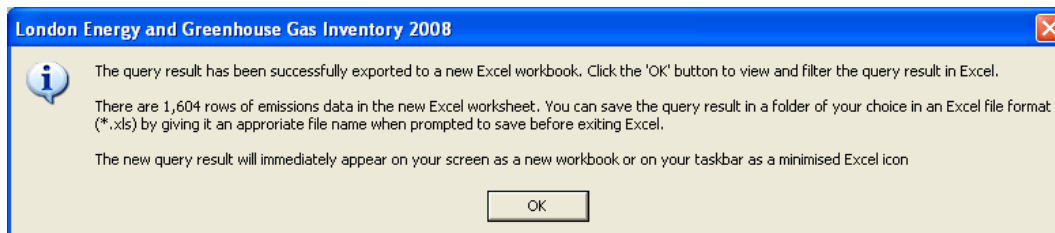
On clicking the button with the Microsoft® Excel logo, a message box similar to the one shown below will appear asking you to confirm your query selection parameters. The content of the message box will vary depending on the parameters you choose from the selection boxes on the active form. Clicking the "Yes" button on the message box shown below will directly export the result of your emissions query to a new Microsoft® Excel workbook.



During the export process to MS Excel, the progress form shown below will appear on your screen and it will disappear once your query result has been successfully exported to an MS Excel workbook.



The LEGGI 2008 data export functionality always displays a message box similar to the one shown below informing you about the number of rows⁷ in the query results every time the data export mechanism to Excel is successfully implemented.



Clicking the "OK" button on the message box above will immediately display the result of your query on your screen (or on your task bar as a minimised flashing MS Excel icon, which you must activate by clicking). An example of a query result in an Excel worksheet is shown in Figure 27. After exporting and displaying the query result in an MS Excel workbook containing the query result, you can save the relevant MS Excel workbook with an appropriate file name of your choice to a suitable folder on your PC.

Figure 27: A query result exported from the LEGGI 2008 database to a MS Excel

ID	Easting	Northing	Location	Area	London_Boroughs	Energy_kWh	CO2_T_a	Methane_T	N2O_T_a	HFC_T	PFC_T	SF6_T	Year
6443	529500	200500	Outer	Greater London Area	Enfield	1,815,805.220	70.671	.036	.436	.000	.000	0	2008
6446	530500	200500	Outer	Greater London Area	Enfield	2,089,205.950	81.312	.042	.501	.000	.000	0	2008
6447	531500	200500	Outer	Greater London Area	Enfield	2,147,643.840	83.586	.043	.515	.000	.000	0	2008
6448	532500	200500	Outer	Greater London Area	Enfield	1,980,462.920	77.080	.040	.475	.000	.000	0	2008
6615	527500	199500	Outer	Greater London Area	Enfield	3,822,462.790	148.770	.076	.917	.000	.000	0	2008
6616	528500	199500	Outer	Greater London Area	Enfield	2,497,579.580	97.206	.050	.599	.000	.000	0	2008
6617	529500	199500	Outer	Greater London Area	Enfield	2,388,292.140	92.952	.048	.573	.000	.000	0	2008
6618	530500	199500	Outer	Greater London Area	Enfield	2,388,257.320	92.951	.048	.573	.000	.000	0	2008
6619	531500	199500	Outer	Greater London Area	Enfield	2,388,261.760	92.951	.048	.573	.000	.000	0	2008
6620	532500	199500	Outer	Greater London Area	Enfield	2,388,246.400	92.951	.048	.573	.000	.000	0	2008
6621	533500	199500	Outer	Greater London Area	Enfield	2,670,300.670	103.928	.053	.641	.000	.000	0	2008
6622	534500	199500	Outer	Greater London Area	Enfield	6,080,969.380	236.671	.122	1.459	.000	.000	0	2008
6623	535500	199500	Outer	Greater London Area	Enfield	12,330,272.960	479.894	.247	2.959	.000	.000	0	2008
6624	536500	199500	Outer	Greater London Area	Enfield	6,015,465.530	234.122	.120	1.444	.000	.000	0	2008
6625	537500	199500	Outer	Greater London Area	Enfield	5,190,919.040	202.031	.104	1.246	.000	.000	0	2008
6786	526500	198500	Outer	Greater London Area	Enfield	4,267,644.050	166.097	.085	1.024	.000	.000	0	2008
6787	527500	198500	Outer	Greater London Area	Enfield	3,990,440.090	155.308	.080	.958	.000	.000	0	2008
6788	528500	198500	Outer	Greater London Area	Enfield	2,732,880.430	106.364	.055	.656	.000	.000	0	2008
6789	529500	198500	Outer	Greater London Area	Enfield	2,503,162.120	97.423	.050	.601	.000	.000	0	2008
6790	530500	198500	Outer	Greater London Area	Enfield	3,130,659.170	121.845	.063	.751	.000	.000	0	2008
6791	531500	198500	Outer	Greater London Area	Enfield	4,311,995.740	167.823	.086	1.035	.000	.000	0	2008
6792	532500	198500	Outer	Greater London Area	Enfield	2,561,585.800	99.697	.051	.615	.000	.000	0	2008
6793	533500	198500	Outer	Greater London Area	Enfield	5,573,272.900	216.912	.111	1.338	.000	.000	0	2008
6794	534500	198500	Outer	Greater London Area	Enfield	11,772,553.110	458.188	.235	2.825	.000	.000	0	2008
6795	535500	198500	Outer	Greater London Area	Enfield	20,336,948.770	791.514	.407	4.881	.000	.000	0	2008
6796	536500	198500	Outer	Greater London Area	Enfield	8,172,650.500	318.080	.163	1.961	.000	.000	0	2008
6797	537500	198500	Outer	Greater London Area	Enfield	3,888,562.990	151.343	.078	.933	.000	.000	0	2008
6956	524500	197500	Outer	Greater London Area	Barnet	8,657,270.460	336.941	.173	2.078	.000	.000	0	2008
6957	525500	197500	Outer	Greater London Area	Barnet	5,131,994.190	199.737	.103	1.232	.000	.000	0	2008
6958	526500	197500	Outer	Greater London Area	Enfield	3,747,556.770	145.855	.075	.899	.000	.000	0	2008
6959	527500	197500	Outer	Greater London Area	Enfield	4,050,568.940	157.648	.081	.972	.000	.000	0	2008
6960	528500	197500	Outer	Greater London Area	Enfield	4,079,736.460	158.783	.082	.979	.000	.000	0	2008
6961	529500	197500	Outer	Greater London Area	Enfield	3,514,905.110	136.800	.070	.844	.000	.000	0	2008
6962	530500	197500	Outer	Greater London Area	Enfield	2,848,536.400	110.865	.057	.684	.000	.000	0	2008
6963	531500	197500	Outer	Greater London Area	Enfield	12,119,276.000	471.682	.242	2.909	.000	.000	0	2008
6964	532500	197500	Outer	Greater London Area	Enfield	19,608,965.220	763.181	.392	4.706	.000	.000	0	2008
6965	533500	197500	Outer	Greater London Area	Enfield	9,371,265.800	364.730	.187	2.249	.000	.000	0	2008

The query result is always displayed in an MS Excel worksheet with specific predefined column labels (with MS Excel's Auto Filter function already applied) and rows. The MS

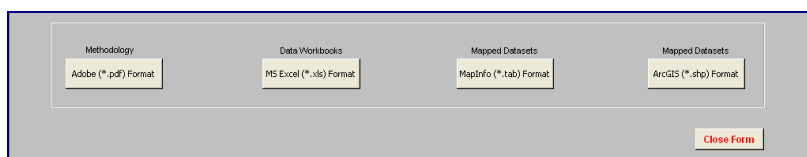
⁷ Note, there are only 65,536 rows in a Microsoft® Excel 2000, 2002 and 2003, worksheet, except in Excel 2007 (which has more than 1,000,000 rows).

Excel's Auto Filter function is automatically applied to the column labels in the first row of the worksheet to allow users to easily filter the query results. The worksheet columns are characterised by several specific text identifiers (column labels in the first row) that vary depending on the parameters that are used to create the query and the emission source category/sub-category that is queried. The first column in a worksheet is often populated with either the ID values of the 1km² grids or the ID values of the Major Roads links. Because different users of the LEGGI 2008 require different units of measurement, the LEGGI 2008 provides different units of measurement in the column labels of the displayed query results (e.g., for the Road Transport category, the major roads link emissions are expressed as g/km/s but the 1 km² gridded emissions are expressed as tonnes/annum). The worksheet rows are characterised by several text and numeric values and the number of these rows varies depending on the parameters that are used to query the emission source category/sub-category on a LEGGI 2008 form.

Because of Microsoft® Excel's flexibility and compatibility with many different databases and GIS applications (including MapInfo® Professional and ArcGIS®), users can statistically and spatially analyse the exported LEGGI 2008 emission datasets in various ways using MS Excel's data analytical and MapInfo's/ArcGIS's functionality without corrupting the underlying emission datasets in the LEGGI 2008 database.

The **Documentation for Electricity** (the text displayed varies depending on the source selected) section – enables users to view the LEGGI 2008 files held in various file formats. In this section, there are usually four command buttons (see [Figure 28](#)) with the texts "Adobe (*.pdf) Format", "MS Excel (*.xls) Format", "MapInfo (*.tab) Format" and "ArcGIS (*.shp) Format" embedded into their backgrounds and the texts "Methodology", "Data Workbooks" and "Mapped Datasets" displayed above them respectively. In some instance only two command buttons with the "MapInfo (*.tab) Format" and ArcGIS (*.shp) Format" texts are available.

Figure 28 Command buttons that provide links to various LEGGI 2008 files



All of these buttons provide direct or indirect (through another pop-up form) links to specific files (in the file format of the software application embedded onto the command button) pertaining to the displayed emissions data for a specific emission source category/sub-category. The files that these buttons link to vary depending on the parameter(s) chosen in the selection boxes on the active form.

- The **"MapInfo (*.tab) Format"** command button provides a direct link to mapped (gridded⁸ and/or line, polygons, points⁹) emissions data in a MapInfo® TAB file format¹⁰. Where there is an indirect link to a MapInfo® TAB file, a

⁸ Note that 'gridded' mean that emissions data are aggregated at a 1km² grid level.

⁹ For air quality modelling purposes, raw emissions data have been provided as points, lines (polylines), polygons (regions) or 1km² grids (in cases where that data is only available in that format) in both MapInfo® TAB file (MapInfo® Tables) and ArcGIS® Shapefile formats.

¹⁰ MapInfo® TAB file refers to the set of files for a MapInfo® table in binary form. MapInfo® TAB files are the native format of MapInfo® and they may consist of four to five separate files that share the same name, but have different extensions (**.dat**, **.id**, **.ind**, **.map**, **.tab**) and must be kept together.

specially designed pop-up form (see Figure 29) opens and displays various buttons for opening the pertinent MapInfo® TAB file in a MapInfo® Professional application. The contents and layout of the specially designed pop-up form that provides direct link to MapInfo® TAB files vary depending on the parameters selected from the selection boxes on the currently active form.

- The "ArcGIS (*.shp) Format" command button provides a direct or indirect link to mapped (gridded and/or line, polygons, points) emissions data in an ArcGIS® Shapefile format¹¹. Where there is an indirect link to an ArcGIS® Shapefile, a specially designed pop-up form (see Figure 30) opens and displays various buttons for opening the ArcGIS® Shapefile in the ArcGIS application. The contents and layout of the specially designed pop-up form that provides direct/indirect link to the ArcGIS® Shapefiles vary depending on the parameters selected from the selection boxes on the main form.

Figure 29: Example of a pop-up form that directly links to MapInfo® TAB files

Figure 30: Example of a pop-up form that directly links to ArcGIS® Shapefiles

¹¹ ArcGIS® Shapefile format defines the geometry and attributes of geographically-referenced features in as many as four files that share the same name, but have different file extensions (.shp, .shx, .dbf, .prj, etc) that should be stored in the same folder or project workspace.

A generic Windows message box (see [Figure 31](#)) with a warning about viruses and their sources is always displayed before opening a MapInfo® TAB file or ArcGIS® Shapefile. This is to inform users that these types of files are able to, and therefore could potentially have viruses. All the LEGGI 2008 files on the LEGGI 2008 CD-ROM have been fully scanned for any virus with a virus scanner and are safe to use. Clicking the "OK" button opens the appropriate GIS file in the MapInfo® Professional or ArcGIS® application. Clicking the "Cancel" button displays another generic message box (see [Figure 32](#) and [Figure 33](#)). This is not a technical error per se; but an error-handling routine for situations where a desired GIS file cannot be opened directly using the pertinent GIS application. To completely cancel the operation of opening the desired GIS file directly, click the "No" button on the generic message box shown in [Figure 32](#) and [Figure 33](#).

Figure 31: Warning by Microsoft® Windows OS before opening a GIS file

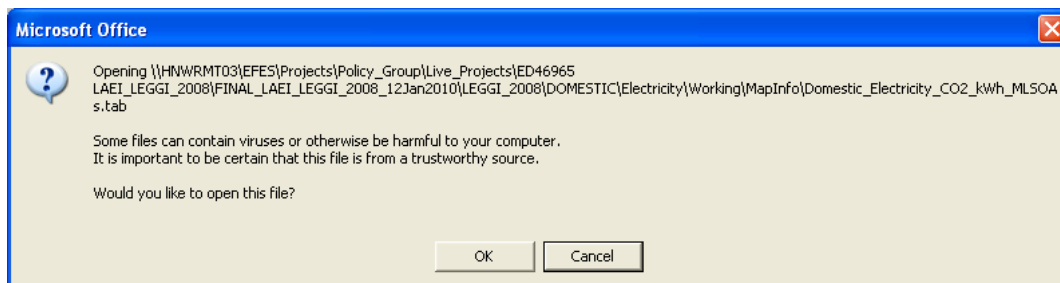


Figure 32: Generic error message box for MapInfo® TAB files

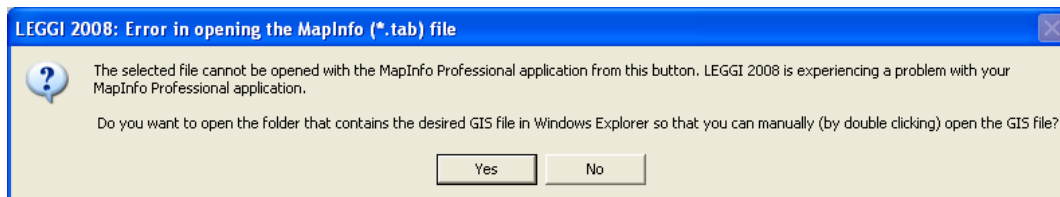
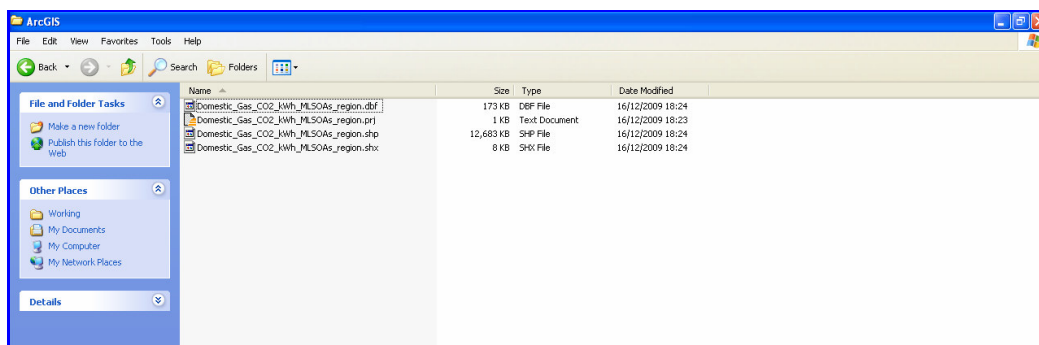


Figure 33: Folder with ArcGIS® Shapefiles opened in Windows Explorer



On the other hand, where clicking the "MapInfo (*.tab) Format" or ArcGIS (*.shp) Format" command buttons on a pop-up form does not directly open the desired GIS file in the appropriate GIS application because of an error¹², a folder containing the desired GIS file will be automatically opened in a Windows Explorer view (see [Figure 33](#)) if you click the "Yes" button on the message box shown in [Figure 32](#). Clicking the "No" button cancels the entire operation of opening the desired GIS file in a GIS application.

After the content of the folder containing the desired GIS file is opened and displayed in Windows Explorer as shown in [Figure 33](#), you will need to find and open the desired GIS file or group of GIS files to automatically open it/them in the appropriate GIS software application (which must be installed on your PC). To automatically open and display a MapInfo (*.tab) file from Windows Explorer in a MapInfo® Professional application you can double-click only the desired MapInfo (*.tab) file with the **.tab** extension. However, to display an ArcGIS® Shapefile from Windows Explorer you must locate the required shapefile via the "ArcGIS (*.shp) Format" command button and Windows Explorer and open it via the Add Data dialog box of ArcMap or via ArcCatalog functionality in ArcGIS.

Note:

MapInfo® TAB file (MapInfo® Tables) refers to the set of files for a MapInfo® table in binary form. MapInfo® TAB files are the native format of MapInfo® and they may consist of four to five separate files that share the same name, but have different extensions - **.dat**, **.id**, **.ind**, **.map**, and **.tab**. All of these files need to be present and kept together for the table to work. MapInfo® Native Table consists of files with the following extensions:

- .tab:** table structure in ASCII format (required)
- .dat:** table data storage in binary format (required)
- .map:** storage of map objects in binary format (optional)
- .id:** links to the .map file (optional, but required if .map file exists)
- .ind:** data of indexed fields in binary format (optional)

ArcGIS Shapefile defines the geometry and attributes of geographically referenced features in as many as five files that share the same name, but have different file extensions (**.shp**, **.shx**, **.dbf**, **.prj**, **.sbn**, **.ain** etc) that should be stored in the same folder or project workspace. They are:

- .shp:** the file that stores the feature geometry.
 - .shx:** the file that stores the index of the feature geometry.
 - .dbf:** the dBase file that stores the attribute information of features.
- When a shapefile is added as a theme to a view, this file is displayed as a feature table.
- .prj:** projection definition file.
 - .sbn** and **.sbx:** the files that store the spatial index of the features. These two files may not exist until you perform theme on theme selection, spatial join, or create an index on a theme's Shape field.

-
- ❑ The "**Adobe (*.pdf) Format**" command button provides a direct or indirect link to methodology and/or other emissions documents in an Adobe Acrobat®

¹² For example, a Windows registry problem with the GIS application or incompatibility of GIS application versions, etc.

Reader file format (.pdf). Where there is an indirect link to an Adobe Acrobat® Reader file, a specially designed pop-up form (see Figure 34) opens and displays various buttons for opening the relevant document in an Adobe Acrobat® Reader application. The contents and layout of the pop-up form that provides direct link to an Adobe Acrobat® document vary depending on the parameters selected from the selection boxes on the main form.

Figure 34: Pop-up form that directly links to Acrobat® Reader file (.pdf)

- The "MS Excel (*.xls) Format" command button provides a direct or indirect link to emissions calculations and/or other emissions workbooks in an Excel file format (.xls). Where there is an indirect link to an Excel file, a specially designed pop-up form (see Figure 35) opens and displays various buttons for opening the relevant file in a Microsoft® Excel application. The contents and layout of the pop-up form that provides direct link to Excel workbooks vary depending on the parameters selected from the selection boxes on the active form.

Figure 35: Pop-up form that directly links to Microsoft® Excel files

Some LEGGI 2008 forms have special command buttons that are self-explanatory from their text captions, which allow users to access other special LEGGI 2008 forms.

Labels, captions and control tips on all the LEGGI 2008 forms have been provided with dynamic and self-explanatory text (texts change depending on the parameters selected in the selection boxes on the active form) to provide user with useful information.

4.4. Selection Boxes and Parameters (filter criteria)

All LEGGI 2008 forms provide an opportunity to filter the underlying LEGGI 2008 emission datasets by choosing one or more **selection parameters (filter criteria)** from any or all **selection boxes** on an active form. Filtering enables users to focus on just the LEGGI 2008 emission dataset they want. Each selection box has a drop-down pick list of predefined parameter options that are dependent on other parameters already selected on the active form. Thus, you cannot choose a combination of parameters on a form that result in no records. In fact, the selection box is a convenient way to see how the parameters are related. For each selection box, the user can pick a parameter from the options available in a drop-down list of the selection box. The selected parameter(s) are combined to filter the underlying LEGGI 2008 emission datasets down to an interesting set of desired records, e.g., [Electricity] in [2008|2011|2015]. The selected parameters stay in effect until the user changes them.

The following are the available selection boxes on the various LEGGI 2008 forms:

1) Domestic Sector Form (see [Figure 15](#))

- The **Select a Fuel/Energy Use Category** selection box: - enables users to choose a category (i.e., Electricity, Gas, Coal, Oil or All) from the Domestic Sector.
- The **Select a Year** selection box: - enables users to choose an inventory year (i.e., 2008, 2011 and 2015) for the Domestic Sector.

2) Industrial and Commercial Sector Form (see [Figure 16](#))

- The **Select a Fuel/Energy Use Category** selection box: - enables users to choose a category (i.e., Electricity, Gas, Coal, Oil, Wastes & Renewables or All) from the Industrial and Commercial Sector.
- The **Select a Year** selection box: - enables users to choose an inventory year (i.e., 2008, 2011 and 2015) for the Industrial and Commercial Sector

3) The Transport Sector Form (see [Figure 17](#))

- The **Select a Fuel/Energy Use Category** selection box: - enables users to choose a category (i.e., Road Transport, Domestic Aviation, Domestic Shipping, Railways or All) from the Transport Sector.
- The **Select a Year** selection box: - enables users to choose an inventory year (i.e., 2008, 2011 and 2015) for the Transport Sector

Two sub-forms (**Energy Use and Greenhouse Gas Emissions from Domestic Aviation** and **Energy Use and Greenhouse Gas Emissions from Road Transport**) are accessible from the **Transport Sector Form** when it is open and active.

Energy Consumption and Greenhouse Gas from Domestic Aviation Form (see [Figure 18](#))

The number and type of selection boxes displayed on this form depends on the airport chosen in the **Select an Airport** selection box. Where a selection box, button or text label does not pertain to the chosen airport, it is invisible.

- The **Select an Airport** selection box: - enables users to choose a particular airport (e.g., *Heathrow*, *City Airport*, *Northolt*, etc) of interest to you.
- The **Select a Year** selection box: - enables users to choose an inventory year (i.e., *2008*, *2011* and *2015*) for the airport already chosen in the **Select an Airport** selection box.
- The **Select an Airport Emission Source** selection box (**visible only when Heathrow Airport is selected**): - enables users to choose a source sub-category (i.e., *Airside Vehicles*, *Landside Vehicles*, *Ground Level Exhausts*, *Elevated Level Exhaust*, *Stationary Sources* or *All*) for the airport already chosen in the **Select an Airport** selection box. The types of emission source sub-category options available in this selection box depend on the airport already chosen in the **Select an Airport** selection box and the year already chosen in the **Select a Year** selection box.

Detailed Road Transport Energy Use and Greenhouse Gas Emissions (see [Figure 19](#)).

The number and type of selection boxes displayed on this form depends on the parameter option chosen in the **Select a Road Transport Emission Source** selection box. Where a selection box, button or text label does not pertain to the chosen parameter option, it is invisible.

- The **Select a Road Transport Source** selection box: - enables users to choose a sub-category (i.e., *Minor Roads*, *Major Roads* and *Minor & Major Roads*) from the Road Transport sub-category.
- The **Select a Year** selection box: - enables users to choose an inventory year (i.e., *2008*, *2011* and *2015*) for the Road Transport sub-category. A similar selection box applies to the Fuel Usage section.
- The **Select a Greenhouse Gas** selection box: - enables users to choose a greenhouse gas (i.e., *CO₂*, *CH₄*, *N₂O*, *HFC*, *PFC* and *SF₆*) for the Road Transport sub-category already chosen in the **Select a Road Transport Source** selection box. The types of pollutants options available in this selection box depend on the type of parameter option already selected in the **Select a Road Transport Source** selection box.

4) Totals of Energy Use and Greenhouse Gas Emissions in Greater London Form (see [Figure 20](#))

- The **Select a Year:** - enables users to choose an inventory year (i.e., 2008, 2011 and 2015).

Just below the MS Excel button is the “**Click for Interactive Totals and Trend Analysis...**” button. This button opens the “**Interactive Data Analysis of Total Energy Use and Greenhouse gas Emissions**”, which allows the user to analyse the underlying LEGGI datasets using MS Excel PivotTable and PivotChart reports.

A PivotTable report is an interactive table that you can use to quickly summarise large amounts of data. You can rotate its rows and columns to see different summaries of the source data, filter the data by displaying different pages, or display the details for areas of interest. A PivotChart report is an interactive chart that you can use to view and rearrange data graphically, in a similar manner to a PivotTable report. A PivotChart report always has an associated PivotTable report in the same workbook, and includes all of the source data from the associated report.

Displayed at the bottom of the **Totals of Energy Use and Greenhouse Gas Emissions in Greater London** Form are three mutually exclusive check boxes to select from. Selecting any one of these options and clicking the **View Selection** button opens the appropriate form.

Relative Contributions of Energy Use Sources and Sectors in Greater London Form (see [Figure 21](#)), which displays the emission totals and other pertinent information for each emission source category and sub-category for the entire 2,466 km² are covered by the LEGGI 2008.

Relative Contributions of Energy Use Sources and Sectors by London Area Form (see [Figure 22](#)), which displays the emission totals and other pertinent information for each emission source category and sub-category for Central, Inner and Outer London.

Relative Contributions of Energy Use Sources and Sectors by London Borough Form (see [Figure 23](#)), which displays the emission totals and other pertinent information for each emission source category and sub-category for each London borough.

The layout of information on the four sub-forms mentioned above is very similar. There are two summary tables on each form – the upper summary table is based only on the parameters chosen for the **Fuel/energy Use Category** (e.g., Domestic Electricity, Domestic Oil, etc) section while the lower summary table is based only on the parameters chose for the **Fuel/energy Use Sector** (e.g., Domestic, Transport, Industrial and Commercial). The layout of the summary tables on the three **Relative Contribution of Energy Use Sources and Sectors...** forms is also very similar.

Top Summary Table

The table heading for the top Summary Table changes depending on the parameter options chosen in the **Select an Energy/Fuel Use Category** selection

box and the **Select a Year** selection box. There are four columns in the summary table, namely:

Greenhouse Gases: Displays the six greenhouse gases.

GHG Emissions (CO₂eq tonnes/yr): - Displays the total GHG emissions for ONLY the energy/fuel use category chosen in the **Select an Energy/Fuel Use Category** selection box and the Year chosen in the **Select a Year** selection box. Both the energy/fuel use category and the year chosen are displayed in the column heading.

Total GHG Emissions (CO₂eq tonnes/yr): - Displays the total greenhouse gas emissions for ALL the energy/fuel use categories in ALL sectors for the Year chosen in the **Select a Year** selection box.

Proportion of GHG Emissions: - Displays the proportion of total GHG emissions for ONLY the energy/fuel use category chosen in the **Select an Energy/Fuel Use Category** selection box and the Year chosen in the **Select a Year** selection box as a percentage (%) of the total GHG emissions from ALL sectors in the LEGGI 2008. Both the energy/fuel use category and the year chosen are displayed in the column heading.

Bottom Summary Table

The table heading for the bottom Summary Table changes depending on the parameter options chosen in the **Select a Sector** selection box and the **Select a Year** selection box. There are four columns in the summary table, namely:

Greenhouse Gases: Displays the six greenhouse gases.

GHG Emissions (CO₂eq tonnes/yr): - Displays the total GHG emissions for ONLY the Sector chosen in the **Select a Sector** selection box and the Year chosen in the **Select a Year** selection box. Both the sector and the year chosen are displayed in the column heading.

Total GHG Emissions (CO₂eq tonnes/yr): - Displays the total greenhouse gas emissions for ALL the Sectors in ALL sectors for the Year chosen in the **Select a Year** selection box.

Proportion of GHG Emissions: - Displays the proportion of total GHG emissions for ONLY the Sector chosen in the **Select a Sector** selection box and the Year chosen in the **Select a Year** selection box as a percentage (%) of the total GHG emissions from ALL sectors in the LEGGI 2008. Both the energy/fuel use category and the year chosen are displayed in the column heading.

5) GIS Base Maps and Road Traffic Datasets (see [Figure 24](#))

The **Select Road Traffic Data or GIS file** selection box – enables you to select a GIS file – MapInfo (*.tab) file and/or ArcGIS (*.shp) file format - from a useful selection of GIS base maps that could be used for spatial analyses and

mapping. Select a map from the options provided in the selection box and then click either the **MapInfo (*.tab) format** or **ArcGIS (*.shp) Format** button to open the selected GIS file in the appropriate GIS application. The following GIS files are available to all users:

- Administrative Boundaries of London Boroughs
- Mapped Road Network and 2008 Traffic Flow Data
- Mapped Road Network and 2011 Traffic Flow Data
- Mapped Road Network and 2015 Traffic Flow Data
- Generic 1,604 1km x 1km Grid Cells
- Central London Area
- Inner London Area
- Outer London Area.

5. Technical Support

The two technical issues most likely to be encountered in the LEGGI 2008 are:

6.1. Missing reference libraries

Reference libraries are stored as part of the LEGGI_2008.mdb file. Each time you copy the LEGGI_2008 database to a different PC, the new PC should automatically load the reference libraries for which the LEGGI_2008 database was configured. However, in some instances, when the LEGGI_2008 database is copied to a different PC, you may find that the new PC does not load all the reference libraries that were used in compiling the LEGGI_2008 database. If you attempt to run the LEGGI_2008 database on a PC that does not have all the reference libraries for which the LEGGI_2008 database is configured, you may find that your copy of the LEGGI_2008 database doesn't operate properly. For example, if you try to click the "**Click to Enter**" button on the **Main Switchboard** after successfully copying the LEGGI_2008 folder from the CD-ROM to your PC, you may get an error saying that this function is not available. This message is misleading; it is usually caused by missing reference libraries, which were not automatically loaded by your PC.

You can check for missing reference libraries in the LEGGI_2008 Access database by doing the following.

1. From the Windows Explorer view, locate the LEGGI_2008.mdb file (it should be within the LEGGI_2008 folder) and highlight it without clicking. Holding down the [Shift] key on your keyboard, press the [Enter] key or double-click the LEGGI_2008.mdb database. The LEGGI_2008 database should now open in the database design view, exposing all the LEGGI_2008 MS Access objects (i.e., tables, queries, forms, macros, reports and modules etc).
2. From the left-hand panel, click the Modules object and then select the *LEGGI_StartUpCode* module from the module list in the right-hand panel. With the *LEGGI_StartUpCode* module selected, click [Code] from the [View] menu; the LEGGI_2008 Password dialog box will open for you to a password¹³; input the correct password and the Visual Basic development window should now open exposing the VBA codes behind the modules in the LEGGI_2008 database.
3. With the Visual Basic development window open, select the [**Reference**] command from [**Tool**] on the menu bar. Microsoft Access opens the Reference dialog box similar to that shown in [Figure 36](#). Note that the list you see in [Figure 36](#) will vary with your PC system – various applications install different reference libraries. [Figure 36](#) shows exactly a list of the nine reference libraries for which the LEGGI_2008 database was configured.
4. Scroll down the list and make sure the following 13 reference libraries are checked in your Reference dialog box.

- Visual Basic for Applications

¹³ Contact the GLA Air Quality Team for the required password.

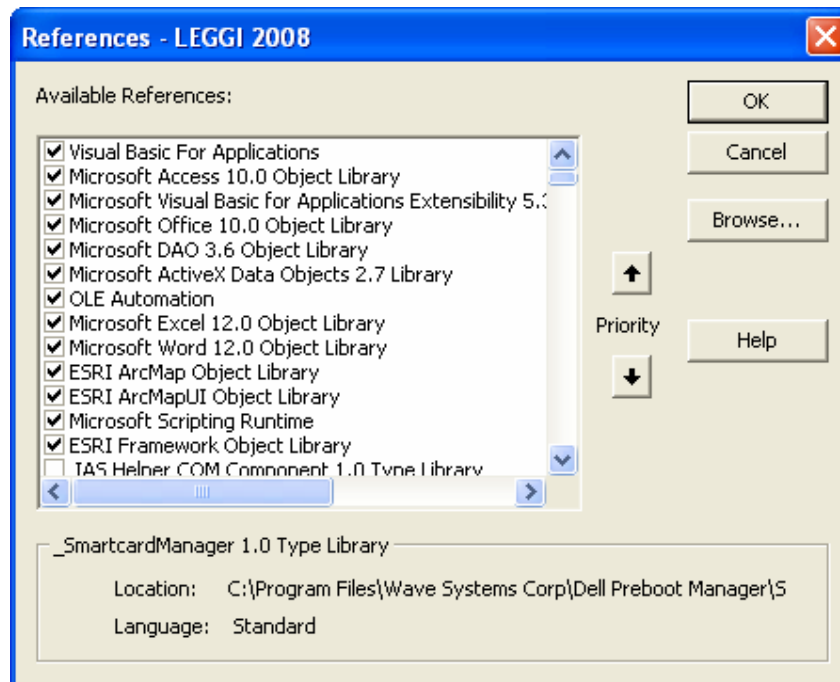
- Microsoft Access [10.0] Object Library
- Microsoft Visual Basic for Applications Extensibility [5.3]
- Microsoft Office [10.0] Object Library
- Microsoft DAO [3.6] Object Library
- Microsoft ActiveX Data Objects [2.7] Library
- OLE Automation
- Microsoft Excel [12.0] Object Library
- Microsoft Word [12.0] Object Library
- ESRI ArcMapUI Object Library
- ESRI Framework Object Library
- Microsoft Scripting Runtime
- Microsoft Forms 2.0 Object Library

Note that the numbers in the squared the brackets (e.g., Microsoft Office [9.0] Object Library) will vary depending on the version of the MS Office applications installed on your PC system. This is not an error but an application version difference.

A checked box represents a currently loaded object library on your system. You can check for missing references from the References dialog box (in [Figure 36](#)). If a reference library is missing, it appears on the list as checked but with the word **MISSING** in front of the name. Often, a missing reference library keeps MS Access from working with the other valid reference libraries such as Visual Basic.

For your copy of the LEGGI_2008 to function correctly, you must make sure that all the 13 libraries (as shown below in [Figure 36](#)) are ticked in your Reference dialog box, if they are not already checked.

Figure 36: References dialog box



5. To fix the problem, uncheck the MISSING references and ensure that you've checked all the 13 libraries shown above in your Reference dialog box, if they are not already checked.
6. Click OK to close the References dialog box.
7. Click Save in the Visual Basic Editor. Your copy of the LEGGI_2008 should now function correctly.

6.2. "Segmentation Violation" error

A "Segmentation Violation" error sometimes occurs when a user tries to open an LEGGI 2008 shapefile in an ESRI ArcView 3.x application from the LEGGI 2008 user interface. The causes of the segmentation violation error in ArcView are varied. ESRI's technical notes cite problems with hardware and software compatibility. There are also instances where data can cause this problem. This error has been around a long time, however, and occurs on all platforms with many configurations. The segmentation violation often occurs when adding a theme to a view. The most likely cause of this error is that a data file has become corrupted.

After a Segmentation Violation occurs, ArcView is in an unstable state, so you should quit ArcView 3.x and then restart it. We were fully aware of the problems involved in opening ESRI ArcView 3.x's shapefiles through the LEGGI 2008's GUI and we had concerns about its compatibility with the LEGGI 2008 data structure on different PCs. Unfortunately, there was very little we could do hence we provided the option of exposing the pertinent shapefiles in Windows Explorer so that users can access the shapefiles as they did with the previous versions of the LEGGI.

Using ArcGIS 9.x does not lead to segmentation violations. With ArcView 3.x, you will need to manually open a LEGGI 2008 shapefile via the ArcView 3.x interface if clicking on the ArcView button from the LEGGI 2008 interface starts the ArcGIS application but does not automatically load the shapefile. Unfortunately, we cannot work out why both ArcView 3.x does not automatically load and open the LEGGI 2008 shapefiles. MapInfo® Professional has no problems in opening the LEGGI 2008 GIS files by clicking on the appropriate buttons from the LEGGI 2008 interfaces. So if possible, try using MapInfo® Professional and/or ArcGIS 9.x to access the LEGGI 2008 GIS files.

Use the details below for LEGGI 2008 **technical support**:

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