



## Guidance Note for Regional Energy Data

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# Guidance note to assist local authorities to interpret the DECC sub national energy consumption statistics.

## Background

Over the last seven years, extensive developmental work has taken place as part of the regional energy project to produce new sub-national energy datasets. This work has led to an increase in the number of DECC<sup>1</sup> local authority (LAU1<sup>2</sup>) and regional (NUTS1) data series. This note provides further information on the different methodologies used to collect and compile the sub national estimates for the datasets and also on the comparability of the datasets. It also provides guidance on the interpretation of historical trends for the different fuel sources.

In November 2009 the local authority and MLSOA energy consumption datasets retained their National Statistics status following an assessment from the UK Statistics Authority (UKSA). This status applies to all datasets covering 2005 and onwards. Earlier datasets are classed as experimental National Statistics.

The information provided below relates to the five main local authority and regional fuel source datasets produced by DECC, which are electricity, gas, road transport, the remaining fuels (coal, manufactured solid fuels, non road transport petroleum and renewables) and total energy consumption. It provides details covering the following sections:

- Information available, which lists the datasets DECC has published and forthcoming datasets;
- Data collection and collation;
- Data coverage;
- Methodological changes improving the data quality;
- Advice for use of baselines for historical data series; and
- Links to Energy Trends articles.

Further information on the DECC sub national energy consumption estimates is available from the sources below.

The DECC regional energy consumption statistics web page:

<http://www.decc.gov.uk/en/content/cms/statistics/regional/regional.aspx>

The quarterly DECC publication 'Energy Trends':

<http://www.decc.gov.uk/en/content/cms/statistics/publications/trends/trends.aspx>

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<sup>1</sup> The Department of Energy and Climate Change was created on 3<sup>rd</sup> October 2008 and formed by Energy group from the Department for Business, Enterprise and Regulatory Reform (BERR) and Climate Change group from the Department of Environment, Food and Rural Affairs. Throughout this document DECC has been used to refer to both DECC and its former body, BERR.

<sup>2</sup> LAU (Local Administrative Units for Territorial Statistics) is a hierarchical classification of spatial units that provides a breakdown of the European Union's territory for producing regional statistics, which are comparable across the EU. LAU1 has replaced the previous term NUTS4 but covers the same level of administrative geography. LAU1 refers to the 354 individual London boroughs/metropolitan districts/unitary authorities/local authority districts in England, the 22 individual unitary authorities in Wales, the 41 individual or groups of whole/part unitary authorities and/or local enterprise company areas in Scotland, and the 26 individual district unitary authorities in Northern Ireland, totalling 443 UK LAU1 regions. The LAU1 areas in Scotland do not match exactly the Scottish Local Authority Areas. There are more areas in Scotland than Local Authorities. In the DECC datasets Scottish Local Authorities are used in place of LAU1 giving a total of 434 local areas in the United Kingdom. NUTS1 refers to the nine Government Office Regions in England and separately Wales, Scotland and Northern Ireland.

# 1. Electricity consumption

## Information available

Data released by DECC:

- Annualised local authority (LAU1) and government office region (NUTS1) level consumption estimates for 2003, 2004 (experimental); 2005, 2006, 2007, 2008 and 2009 (National Statistics).
- Annualised middle layer super output area (MLSOA<sup>3</sup>) level consumption estimates for 2004 (experimental).
- Annualised MLSOA and intermediate geography zone (IGZ<sup>3</sup>) level consumption estimates for 2005, 2006, 2007 and 2008 (National Statistics).
- Annualised lower layer super output area (LLSOA)<sup>4</sup> level consumption estimates for 2007 for 45 Local Authorities, and domestic consumption estimates for 2008 for all Local Authorities in England and Wales (experimental).

These datasets are available at:

<http://www.decc.gov.uk/en/content/cms/statistics/regional/electricity/electricity.aspx>

and

[http://www.decc.gov.uk/en/content/cms/statistics/regional/mlsoa\\_llsoa/mlsoa\\_llsoa.aspx](http://www.decc.gov.uk/en/content/cms/statistics/regional/mlsoa_llsoa/mlsoa_llsoa.aspx)

Forthcoming data to be released by DECC:

- Annualised MLSOA and IGZ level consumption estimates for 2009 (March 2011).
- Annualised LLSOA level consumption estimates (domestic only) in England and Wales for 2009 (March 2011).

## Data collection process and collation

The data are collected by obtaining the full co-operation of the electricity industry. Annualised consumption data are generated by the data aggregators, agents of the electricity suppliers, who collate/aggregate electricity consumption levels for each customer meter or MPAN (meter point administration number). In addition to this, information is obtained from the Gemserv meter postcode address file, which provides the geographical location of each MPAN, including the full address and postcode. For the 2003, 2004 and 2005 datasets the Gemserv data were from a quarterly produced extract file produced by the electricity distribution companies' meter point administration system (MPAS). In 2006 the MPAS data moved onto an on-line system named the Electricity Central Online Enquiry Service (ECOES). As part of the data collection since 2006, DECC obtained a downloaded extract file from ECOES, which provides similar, but more up-to-date information to the Gemserv file. The geographical and electricity

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<sup>3</sup> MLSOAs are a statistical geography developed as part of the 2001 census. There are 7,193 MLSOAs (plus the Isles of Scilly) in England and Wales which are areas containing a minimum population of 5,000 people or around 2,000 households. Scotland has 1,235 intermediate geography zones (IGZs) which are slightly smaller than MLSOAs with between 2,500 and 6,000 people.

<sup>4</sup> LLSOAs are a geographic hierarchy designed to improve the reporting of small area statistics. There are 32,482 LLSOAs in England and 1,896 in Wales. LLSOAs are used as the building block for MLSOAs and contain a minimum population of 1,000.

consumption data are then merged together to enable consumption data to be mapped to postcodes and aggregated to LLSOA, MLSOA, local authority and government office regions levels.

The electricity consumption data are generated for both non half hourly (NHH) meters (domestic and small/medium commercial/industrial customers) and for half hourly (HH) meters (larger commercial/industrial customers). There are around 29 million NHH meters and 113,000 HH meters in Great Britain. For the NHH data, annualised estimates are based on either an annualised advance (AA) or estimated annual consumption (EAC). The AA is an estimate of annualised consumption based on consumption recorded between two meter readings. In comparison an EAC is used where two meter readings are not available and an estimate of annualised consumption is produced by the energy company using historical information and the profile information relating to the meter. These data provide a good approximation of annualised consumption, but do not cover exactly the calendar year; for example the 2009 annualised consumption estimates cover the 365 days up to 30 January 2010. In contrast for the half hourly meter consumption estimates, data aggregators are asked to produce a simple report for each MPAN for the relevant calendar year.

From the data, DECC produce a domestic/non domestic split, with aggregate and average consumption figures provided for all local authorities and regions. The domestic consumption is based on NHH meters with profiles 1 and 2 (these are the standard domestic and Economy 7 type tariffs respectively). Non-domestic (i.e. industrial and commercial) consumption is based on NHH meters with profiles 3 to 8 and all HH meters. In addition some of the larger domestic consumers of electricity are reallocated to the industrial/commercial sector if annual consumption is greater than 100,000 kWh or following specific validation of those consuming over 50,000 kWh. Further information on this is provided below in the section on methodological changes over time below.

## **Data coverage**

The DECC local and regional statistics do not cover all the final consumption of electricity in the United Kingdom. At present data for Northern Ireland is not included. However, domestic electricity consumption data for Northern Ireland during 2008 has been sourced and can be found in the December edition of Energy Trends. Due to the differing methodology behind the two data collection methods, comparisons between Great Britain and Northern Ireland consumptions should be treated with caution. Non-domestic data for Northern Ireland will be published in the March 2011 edition of Energy Trends.

In addition, some electricity consumption relating to very large industrial consumers that are connected to the high voltage lines of the transmission system are not covered in the sub national dataset. These consumers are classified as CVA or Central Volume Allocation users, who have different arrangements with their electricity suppliers, compared to NHH and HH meter customers. CVA generally accounts for around 2% of electricity sales.

## **Methodological changes impacting on data quality and comparability over time**

Before attempting to make comparisons of the local and regional electricity consumption statistics over time, users should note that there have been a

number of methodological changes in the datasets released by DECC. It is important to recognise that differences in consumption between the 2003, 2004 and 2005 data are more likely to be due to data quality improvements rather than real changes in consumption between the two years. This is particularly relevant to industrial/commercial consumption and further details are provided below.

The first set of local and regional electricity consumption estimates were released for 2003 in the December 2004 edition of Energy Trends. A revised set of 2003 local and regional data was released in the March 2005 edition of Energy Trends, after further validation procedures identified a significant number of domestic consumers with very high electricity consumption who were reclassified as industrial/commercial consumers. When compiling the 2004 dataset a decision was taken to reallocate all domestic NHH meters (profile classes 1 and 2) with annualised consumption greater than 100,000 kWh to the commercial/industrial sector as it was found that there were a significant number of private addresses consuming between 50,000 and 100,000 kWh, but relatively few over 100,000 kWh. As well as this any domestic meters identified as either unmetered, street lighting, landlord supply, staircase lighting or temporary builders' supply, were transferred to the commercial/industrial sector. The 2005 estimates were produced using the same methodology as 2004 but in 2006 some additional meters were transferred from domestic to commercial if terms such as PLC, Ltd etc were identified in the address. This refinement resulted in a much smaller change in consumption figures than the previous methodological changes and the same method has been implemented in the data for subsequent years.

Users should also note that the quality of the Gemserv postcode address information has improved considerably, which has enabled DECC to substantially reduce the level of unallocated consumption between the 2003 and 2009 estimates. In the 2003 data around 6.5 percent of consumption within Great Britain could not be allocated to a local authority area compared to 0.9 per cent in 2009. This process has also been improved by the use of the National Statistics Postcode Directory (NSPD), formerly the All Field Postcode Directory (AFPD), which was first used for compiling the 2004 estimates. From the 2006 estimates onwards, the Postal Address File (PAF) was also used to try to reduce the number of unallocated meters. The NSPD and PAF have significantly improved the accuracy of the geographical mapping of electricity consumption from postcodes to LAU1 and NUTS1 areas.

The aggregate and average electricity consumption data are more reliable for the domestic sector than for the industrial/commercial sector as the postal address information held on the Gemserv extract file is more complete for the former i.e. domestic meters are more likely to have full and valid postcodes rather than incomplete, invalid or partial postcodes. However, over the past four years, the quality of the industrial/commercial Gemserv data has improved at a faster rate than the domestic data, inevitably leading to more variability in the annual consumption estimates for the industrial/commercial sector.

### **Advice for use of baselines for historical data series**

The 2005 data, which are classed as National Statistics should ideally be used as the baseline when making historical comparisons of the electricity and/or gas data. The 2005 data are significantly more robust than earlier year's data, reflecting the significant improvement in the quality of the postcode address file

from Gemserv for the electricity data for that year. Data for 2006, 2007, 2008 and 2009 have been collected on a similar basis to the 2005 data and all adjustments that have been made to the 2005, 2006, 2007 and 2008 data have also applied to 2009 data and will continue for the future data.

## **Release of electricity consumption estimates below local authority level**

DECC have released sub local authority electricity consumption estimates at MLSOA level in England and Wales for 2004 to 2008, and at Intermediate Geography Zone level in Scotland for 2005 to 2008. DECC have also completed two pilot releases of LLSOA level electricity consumption estimates for 45 local authorities in 2007, and 2008 LLSOA electricity consumption estimates (domestic only) for the whole of England and Wales.

Due to data disclosure issues, consumption relating to larger commercial/industrial consumers could not be disaggregated below local authority level, and in some cases data relating to a particular area have been merged with data for nearby areas.

The aim of these datasets is to provide information that will enable councils to monitor and target small areas for further interventions as part of their local energy strategies, and enhance implementation of energy efficiency programmes and reduction of CO<sub>2</sub> emissions.

The datasets and a guidance note to data users on interpreting the data are available at:

[http://www.decc.gov.uk/en/content/cms/statistics/regional/mlsoa\\_llsoa/mlsoa\\_llsoa.aspx](http://www.decc.gov.uk/en/content/cms/statistics/regional/mlsoa_llsoa/mlsoa_llsoa.aspx)

## **Links to Energy Trends:**

For further information on the DECC electricity consumption estimates for 2009 see the December 2010 edition of Energy Trends which is available using the web link provided below:

<http://www.decc.gov.uk/en/content/cms/statistics/publications/trends/trends.aspx>

For further details on the original and revised datasets for 2003 to 2008 data refer to the December 2004, March 2005, December 2005 to 2008 and March 2010 editions of Energy Trends using the above link.

The relevant datasets for 2003 to 2008 are available using the following link:

<http://www.decc.gov.uk/en/content/cms/statistics/regional/electricity/electricity.aspx>

## 2. Gas Consumption

In previous releases of this dataset it was understood that the administrative data supplied to us by the gas industry covered the financial year. It has recently been brought to our attention that the Annual Quantities (AQ) data used in the sub-national analysis actually cover the gas year – the period covering 1 October through to the following 30 September. We apologise to users for any inconvenience caused by this mis-understanding.

### Information available

Datasets released by DECC:

- Experimental weather corrected local authority (LAU1) and government office regional (NUTS1) level consumption estimates for 2001, 2002, 2003 and 2004 from National Grid.
- Revised 2004 (experimental), and 2005 to 2009 (National Statistics) weather corrected local authority and government office region level gas consumption estimates for the re-structured gas distribution network and independent gas transporters.
- Weather corrected MLSOA and IGZ level consumption estimates for 2005, 2006, 2007 and 2008 (National Statistics).
- Weather corrected LLSOA level consumption estimates for 2007 for 45 Local Authorities and estimates for 2008 (domestic only) for all Local Authorities in England and Wales (experimental).

These datasets are available at:

<http://www.decc.gov.uk/en/content/cms/statistics/regional/gas/gas.aspx> and  
[http://www.decc.gov.uk/en/content/cms/statistics/regional/mlsoa\\_llsoa/mlsoa\\_llsoa.aspx](http://www.decc.gov.uk/en/content/cms/statistics/regional/mlsoa_llsoa/mlsoa_llsoa.aspx)

Forthcoming datasets to be released by DECC:

- Annualised weather corrected MLSOA and IGZ level gas consumption estimates for 2009 (March 2011).
- Annualised weather corrected LLSOA level consumption estimates (domestic only) in England and Wales for 2009 (March 2011).

### Data collection process and collation

Data from 2001 to 2004 at local authority and government office regional level were published by DECC using base data from National Grid in 2004 and 2005. This dataset contains aggregate and average consumption for the domestic and the industrial/commercial sectors. The source of the data was the postcode sector (the postcode of the gas meter minus the last two characters e.g. LT50 6) gas sales figures made available by National Grid. For the analysis, DECC aggregated the consumption data from postcode sector to local authorities, however where a postcode sector covered more than one LAU1 area, the consumption was equally divided between the relevant LAU1 areas. There were also some circumstances where for confidentiality or other reasons, the National Grid dataset combined postcode sectors, and each sector was given an equal share of the data when deriving LAU1 area statistics.

The National Grid data were weather corrected to National Grid's standard 35 year trend. This standard weather condition was used for comparison purposes,

although this has subsequently been replaced with a new 17 year condition that reflects observed warming in recent years (this correction is used for the revised 2004 dataset, and the 2005 to 2009 datasets collected by DECC which are generated from the re-structured industry – see below for more information).

One of the major drawbacks of the data is the lack of a reliable domestic industrial/commercial sector split for consumers with low gas consumption. This is because the gas industry uses a crude 73,200 kWh level as the cut off point for defining customers as domestic or commercial/industrial. The implication of this is that only around half a million businesses are allocated to the industrial/commercial sector, with around 2 million small and medium businesses allocated incorrectly to the domestic sector. DECC is currently looking at improving the allocation of businesses to the industrial/commercial sector by using information from the Inter Departmental Business Register (IDBR).

In 2005 there were some major structural changes in the gas distribution network in Great Britain, with some of the local distribution zones (LDZ's) being sold off by National Grid. As a result National Grid were no longer able to release postcode sector gas sales data, as they were no longer responsible for the whole of the gas distribution network in Great Britain.

In late 2005 DECC entered into discussions with the gas industry on how to obtain annualised gas consumption estimates similar to those already collected from the electricity industry. In November 2005, DECC met with xoserve, the company now responsible for the collation and aggregation of gas consumption. xoserve agreed to generate annualised consumption estimates for all MPRNs (meter point reference numbers or gas meters), subject to permissions being provided by the owners of the LDZ network (i.e. the four major gas transporters in Great Britain – National Grid, Scotia, Wales and West Utilities and Northern Gas Networks). xoserve provide annualised estimates of consumption for all the MPRN's based on an Annual Quantity (AQ). An AQ is an estimate of annualised consumption using consumption recorded between two meter readings at least six months apart. The estimate is then adjusted to reflect a 17 year weather correction factor. The AQ for each MPRN represents consumption relating to the gas year – the period covering 1 October through to the following 30 September - rather than for a calendar year. To distinguish between the original data released by National Grid and the consumption data from the re-structured gas network, the latter is referred to as the revised dataset. The user should note however that around 4 million MPRN's (approximately 18% of total MPRNs) have no new AQ value annually, because no new meter readings for these meters have been taken.

The latest data from xoserve and the independent gas transporters were received in October 2010. An important point to note is that the problem previously described for the National Grid dataset relating to the allocation of gas meters to either the domestic or commercial sector is still relevant to the revised dataset, as no reliable profile field exists on the data to identify the sector to which the meter belongs. However the reliability of revised 2004 to 2009 local authority and government office region level estimates are significantly higher than the previous National Grid datasets due to the improved geographical mapping of gas consumption from individual MPRN's to local authority areas, using the National Statistics Post Code Directory.

## **Data Coverage**

The two datasets do not cover all gas consumption within the United Kingdom. Data for Northern Ireland are not included in either dataset, due to the market structure. In addition, a considerable amount of consumption relating to power stations and some very large industrial consumers is not covered by the datasets, as this would be disclosive.

The data represent gas transported through the national distribution system that was previously wholly owned by National Grid. However, gas that passes through the National Transmission System and then into another independently owned local distribution system before reaching consumers is included. The data exclude any gas passing through other transmission and distribution systems such as those owned by North Sea producers. The data relate only to distribution and exclude large loads fed directly from the National Transmission System (such as certain power stations and large industrial consumers). The data do include the 2,500 gas consumers whose consumptions are recorded on a daily basis who are known as Daily Metered (DM) customers.

## **Methodological changes impacting on data quality and comparability over time**

Users should note that there are quality issues to consider before using the gas consumption data for the National Grid network between 2001 and 2004. An important issue is that National Grid used an algorithm to amalgamate gas consumption at postcode sector levels to maintain the confidentiality of some larger non domestic consumers. The impact of this has meant that the data are not always consistent from year-to-year. There are also some problems with the dataset in allocating consumption from postcode to postcode sector level, an example being the very high number of domestic gas consumers in the 2003 data for the City of London local authority area. Additionally the geographical mapping information used by DECC (Office for National Statistics postcode lookup file) has been shown to be not entirely reliable in the way postcode sectors are allocated to LAU1 areas.

In addition there are significant differences in the way the revised 2004 to 2009 datasets are collected from the re-structured gas distribution network to the earlier National Grid datasets. The most significant of these being the improvement in the geographical allocation process for the consumption data. For the revised datasets, consumption for individual meters is assigned to local authority areas, MLSOAs and LLSOAs from postcode information. In addition the revised data from xoserve is based on the current 17 year trend weather correction, reflecting the milder temperatures of more recent years.

## **Advice for use of baselines for historical data series**

In terms of making historical comparisons for the gas consumption data, 2005 data, which are classed as National Statistics, should ideally be used as the baseline year. The main advantage of using the 2005 data is the improved comparability with the 2005 electricity consumption data, which are also collected at meter point level. The combined electricity and gas provide a good indication of overall household energy consumption at local authority, MLSOA and LLSOA level, based on mapped consumption from postcode information. Data for 2009 have been collected on a similar basis to the 2005, 2006, 2007 and 2008 data,

and the data for subsequent years will be produced with a consistent methodology.

As guidance to users DECC is not advising that the pre-2005 gas consumption datasets are used for time series analysis, as changes in consumption recorded in the figures, are mainly caused by data quality improvements rather than real changes in consumption. Users should also recognise that the National Grid and revised gas industry datasets are two distinct series and therefore they should not be combined to make annual comparisons from 2001 to 2009.

### **Release of gas consumption estimates below local authority level**

DECC have released sub local authority gas consumption estimates at MLSOA level in England and Wales, and at Intermediate Geography Zone level in Scotland for 2005 data onwards. DECC have also completed two pilot releases of LLSOA gas consumption estimates for 45 local authorities in 2007, and published 2008 LLSOA gas consumption estimates (domestic only) for the whole of England and Wales in March 2010 .

Due to disclosure issues, in some cases data relating to a particular area have been merged with those for nearby areas.

The aim of these datasets is to provide information that will enable councils to monitor and target small areas for further interventions as part of their local energy strategies, and enhance implementation of energy efficiency programmes and reduction of CO<sub>2</sub> emissions.

The datasets and a guidance note to data users on interpreting the data are available at:

[http://www.decc.gov.uk/en/content/cms/statistics/regional/mlsoa\\_llsoa/mlsoa\\_llsoa.aspx](http://www.decc.gov.uk/en/content/cms/statistics/regional/mlsoa_llsoa/mlsoa_llsoa.aspx)

### **Links to Energy Trends**

For further information on how the datasets were collected and compiled, please use the web link provided below for the March 2007 and December editions 2007 to 2010 of Energy Trends:

<http://www.decc.gov.uk/en/content/cms/statistics/publications/trends/trends.aspx>

Older editions providing further detail on the 2001 to 2004 National Grid datasets are hosted on the BERR website and are available using the following links:

<http://www.berr.gov.uk/files/file18558.pdf>

<http://www.berr.gov.uk/files/file11879.pdf>

<http://www.berr.gov.uk/files/file11873.pdf>

The National Grid datasets covering the period 2001 to 2004, and the revised 2004, 2005, 2006, 2007, 2008 and 2009 gas consumption estimates are available using the following web link:

<http://www.decc.gov.uk/en/content/cms/statistics/regional/gas/gas.aspx>

## 3. Road Transport

### Information available

Datasets released by DECC:

- Annualised local authority (LAU1) and government office region (NUTS1) level consumption estimates for 2002, 2003, 2004 (all experimental), 2005, 2006, 2007 and 2008 (National Statistics).

These datasets are available at:

[http://www.decc.gov.uk/en/content/cms/statistics/regional/road\\_transport/road\\_transport.aspx](http://www.decc.gov.uk/en/content/cms/statistics/regional/road_transport/road_transport.aspx)

Forthcoming datasets to be released by DECC:

- Annualised local authority and government office region level consumption estimates for 2009 (June 2011).

### Calculation of estimates

DECC has published estimates of local authority and government office regional road transport consumption from 2002 to 2008. The estimates were produced for DECC by AEA Energy and Environment as part of contract work for the regional energy project. The dataset estimates fuel consumption by type of vehicle (bus, motorcycle, petrol car, diesel car, HGV, petrol LGV and diesel LGV) and local authority. The starting point for the work is information available from the National Atmospheric Emissions Inventory (NAEI) programme for Defra, the Scottish Executive, the National Assembly of Wales and the Department of the Environment in Northern Ireland. As part of the work for NAEI, AEA produce 1 x 1 kilometre emission maps for a number of different sources and fuels.

The estimates are produced using CO<sub>2</sub> emissions data from NAEI, road consumption factors and traffic flow data from the Department for Transport. The later are based on traffic flows from census count points, located on major roads including motorways and A roads and B roads where available. Here average daily traffic patterns are recorded and simply multiplied by a factor of 365 to provide an annualised estimate. For more minor roads including B (where count point data is unavailable), C and unclassified roads, this information is not available and therefore aggregated regional traffic flow data produced by DfT are used as an alternative source of information. Fuel consumption factors are expressed in grams fuel per kilometre taken for each detailed vehicle class which are taken from two distinct data sources: first, vehicle emissions test data provided by the Transport Research Laboratory (TRL) over different drive cycles from measurements on a limited sample of vehicles; and secondly, car manufacturers data on CO<sub>2</sub> emissions and surveys with freight haulage companies on fuel efficiency of HGVs.

The road transport estimates are modelled rather than real consumption estimates, and are based on the use of a number of different information sources. As a result the estimates are subject to potential modelling inaccuracies.

## Data coverage

The estimates are based on where the fuel was consumed rather than where it was purchased in order to make the dataset more comparable with both the electricity and gas datasets based on consumption from individual meters. Therefore the dataset includes all road fuel purchased abroad and consumed in the UK, though excludes road fuel purchased in the UK and consumed abroad. This was thought to be the main reason for the difference between the aggregated consumption levels from the local and regional dataset and the total annual estimates provided in the Digest of UK Energy Statistics (DUKES), which are based on sales volume data recorded by UK energy suppliers. However, the reduction of the gap from 2005 onwards suggests that these differences were more likely to be caused by model uncertainty.

Table 1 Comparison of aggregate road transport fuel consumption between the local and regional data and DUKES between 2002 and 2008.

Year	Total UK consumption from local and regional estimates (thousands of tonnes of fuel consumed)	Total UK consumption from DUKES <sup>4</sup> (thousands of tonnes of fuel consumed)
2002	40,492	37,735 <sup>5</sup>
2003	40,695	37,631 <sup>6</sup>
2004	40,814	37,998 <sup>7</sup>
2005	37,550	38,288 <sup>7</sup>
2006	37,753	38,416 <sup>8</sup>
2007	37,911	38,779 <sup>8</sup>
2008	36,591	37,416 <sup>8</sup>

## Methodological changes impacting on data quality and comparability over time

Users should note that there have been methodological improvements in the datasets impacting on the comparability of the historical data series. The 2002 and 2003 datasets were produced for DECC using the same methodology, however for the 2004 and 2005 datasets there were changes applied to improve the accuracy of the estimates. Improvements made for the 2008 datasets were also applied retrospectively to the 2005, 2006 and 2007 datasets in order to provide comparability between the four years. However, this resulted in major revisions of the 2005, 2006 and 2007 data. More information on these methodological changes can be found within a briefing note produced by AEA at: [http://www.decc.gov.uk/en/content/cms/statistics/regional/road\\_transport/road\\_transport.aspx](http://www.decc.gov.uk/en/content/cms/statistics/regional/road_transport/road_transport.aspx)

Changes between the datasets are mainly caused by real world changes in traffic flow data at each count point within the local authorities; however the data will also be sensitive to other factors summarised below. It is important to note that the influence of the factors listed below will be additive and although their

<sup>4</sup> This includes some LPG use, whereas the local and regional estimates do not

<sup>5</sup> Based on figures from the 2005 edition of DUKES

<sup>6</sup> Based on figures from the 2006 edition of DUKES

<sup>7</sup> Based on figures from the 2007 edition of DUKES

<sup>7</sup> Based on figures from the 2008 edition of DUKES

<sup>8</sup> Based on figures from the 2009 edition of DUKES

influence may be small, cumulatively the influences may be larger. The main changes between the datasets are:

- The methodology used to estimate the annual average daily flow of traffic at individual census points in the rolling traffic survey for major roads provides only approximate values, subject to sampling errors. These errors arise because the counts are only made over 12 hours on a single day in the year, and traffic levels are subject to random or other influences on that particular day.
- Since 2004 the local authority road transport fuel-use statistics utilise the latest traffic flow data provided by the rolling traffic surveys for major roads from the DfT and the Northern Ireland Traffic Service.
- Redundant or obsolete count points within these surveys will have been replaced and/or new census points generated where needed. As a result, vehicle kilometres estimates and subsequently fuel consumption estimates will be affected. At least a third of local authorities in the UK contain at least one road-link which has been affected by census point changes.
- The Northern Ireland traffic flow dataset saw significant improvements in 2004 relative to previous years with an increase in the number of actual survey count points and better vehicle fleet characterisation. An important implication of this is that there are many more buses included in the 2004 and subsequent datasets.
- Before 2004, vehicle flows on the M6(T) toll road were assumed. Vehicle counts were collected for the first time in 2004 and these have now replaced the surrogate data from the M6 motorway used in 2003. Measured counts on the M6(T) were observed to be significantly lower than the surrogate data used previously. Local authorities affected by this update are Birmingham, Cannock Chase, Lichfield, North Warwickshire, South Staffordshire and Walsall.
- Fuel use on minor roads has been estimated by scaling estimates for 2003 with the change in petrol and diesel consumption totals from the Digest of United Kingdom Energy Statistics (DUKES). The spatial pattern of minor road traffic fuel used since 2003 remains unchanged.
- Since 2004 an updated petrol/diesel LGV split has been used to better characterise present day vehicle fleets. For the 2002 and 2003 data the split was approximately 12 per cent petrol and 88 per cent diesel, whilst for 2004, the split was changed to 10 per cent petrol and 90 per cent diesel.
- The underlying road traffic count data collected and compiled by the DfT and the Northern Ireland Traffic Service are subject to a degree of uncertainty. Observed variability may not arise just from sampling errors and real world changes in traffic flows but also from assumptions made to interpolate traffic flows for intermediate years from a set of automatic traffic counters. Flows were compared for all vehicular traffic for all count points existing in both 2003 and 2004. On average, the 2004 flows are slightly higher than in 2003 by approximately 2 per cent. However, whilst it is noticeable that although the majority of counts for the 2 years are within  $\pm 10$  per cent of each other, there are some count points for local authorities with much larger differences in the traffic flow.
- The 2005, 2006, 2007 and 2008 datasets used fuel consumption factors that have been updated from those used previously. The revised factors take into account new data (including more detailed speed data) and a more accurate fuel split between petrol and diesel cars.

### **Advice for use of baselines for historical data series**

The user should note that there have been some significant improvements in the reliability of the road transport consumption estimates in 2005, 2006, 2007 and 2008, compared to the earlier datasets, mainly because of the use of improved fuel consumption factors and more detailed speed data. Therefore DECC are advising that the 2005 dataset, which has National Statistics status, should be used as a baseline year when making historical comparisons.

### **Links to Energy Trends**

The latest special article on local and regional estimates of road transport fuel consumption was published in the June 2010 edition of Energy Trends:

<http://www.decc.gov.uk/en/content/cms/statistics/publications/trends/trends.aspx>

Further information on how the original and revised 2002, 2003, 2004, 2005, 2006 and 2007 estimates were compiled is available in the June 2005, December 2005, June 2006, June 2007, June 2008 and June 2009 editions of Energy Trends using the above link.

In addition the datasets for 2002 to 2008 are available using the below web link:

[http://www.decc.gov.uk/en/content/cms/statistics/regional/road\\_transport/road\\_transport.aspx](http://www.decc.gov.uk/en/content/cms/statistics/regional/road_transport/road_transport.aspx)

## 4. Remaining Fuels

### Information available

Datasets released by DECC:

- Annualised estimates of local authority (LAU1) and government office region (NUTS1) level consumption of remaining fuels for 2003, 2004 (experimental), 2005, 2006, 2007 and 2008 (National Statistics).

These datasets are available at:

<http://www.decc.gov.uk/en/content/cms/statistics/regional/other/other.aspx>

Forthcoming datasets to be released by DECC:

- Annualised consumption estimates of local authority and government office regional level of remaining fuels for 2009 (December 2011).

### Calculation of estimates

The local and regional estimates for the remaining fuels are produced by DECC's contractor AEA Energy and Environment and are calculated from a number of different information sources. DECC advises users to recognise that the information contained in the datasets are based on modelled rather than real data, and as such are subject to potential modelling error.

The main source of information used to calculate the remaining fuels are CO<sub>2</sub> estimates taken from the National Atmospheric Emissions Inventory (NAEI) database. The NAEI uses a combination of point and area source data at a 1km by 1km level to model estimates for a number of different sources and fuels. In addition to this other spatial data sources including the pollutions inventory for large industrial users (which is used for some of the CO<sub>2</sub> point source data), energy survey data produced by Experion, Scottish Environmental Protection Agency (SEPA) inventory of regulated sources, population and employment data, regional energy statistics, Department for Transport (DfT) traffic flow data, Ordnance Survey and land cover satellite data are also used.

### Data coverage

The AEA dataset for the remaining fuels essentially covers all final consumption of fuels, other than electricity, gas and road transport petroleum. The remaining fuels include domestic and industrial coal and manufactured solid fuels, petroleum consumed for non road transport purposes and combined renewables and wastes in the UK. The dataset does not cover fuel combusted by the aviation and national navigation sectors, as this information cannot be allocated to regions and local authorities and also data for heat sold which is already modelled at a UK level and accounts for a very small percentage of total fuel energy use. The energy used by transformation industries is also excluded from the estimates.

The breakdowns provided by DECC only provide total consumption figures for the different energy sources at local authority and government office regional levels. This is because in the domestic sector average consumption figures for coal, manufactured solid fuels and oil consumption could be misleading given that few domestic properties use either solid fuel or oil fired central heating systems in their homes (with the exception of Northern Ireland which has limited access to mainline gas supplies). Consumption levels are given in thousands of

tonnes of oil equivalent (ktoe). More information about energy conversion factors can be found in Annex A of the Digest of UK Energy Statistics 2008 from the following links below:

<http://www.decc.gov.uk/en/content/cms/statistics/publications/dukes/dukes.aspx>

Aggregated consumption from the local and regional dataset differs from the UK energy statistics produced in the Digest of UK Energy Statistics (DUKES), because the statistics for DUKES are based on information from UK energy suppliers, whilst AEA have used a variety of data sources to produce their estimates (see above).

The total energy consumption estimates in 2008 for the local authority based remaining fuels were slightly different from the figures for these sectors published at a national level in DUKES. The underlying factors for the differences between the two data sources in 2008 are as follows:

- Energy consumption data taken from the EU-ETS trading scheme for 2008 has been used to apportion energy combusted for the AEA dataset for some of the industrial/commercial consumption estimates.
- Differences between the two data sources for commercial petroleum consumption are mainly due to definitional differences which regard to businesses included in the sector.
- The AEA estimates for industrial petroleum for example include some petroleum coke, motor spirit and other petroleum gases, which are classified under non energy uses under DUKES.
- AEA's consumption of motor spirit includes industrial off road machinery, which would be classified under transportation in DUKES.
- AEA's figures may also reflect both the reselling and reprocessing of petroleum products, including lubricants and fuel oils.
- AEA's estimates of petroleum consumption in the agricultural sector are significantly higher than those in DUKES because AEA use different sources of information for diesel consumption by off road machinery. Agricultural off-road data are distributed using a combination of arable, pasture and forestry land use and re-weighted according to the level of usage by off road agricultural machinery and by the land type.
- AEA's estimates for manufactured solid fuels are lower than DUKES and exclude data on the consumption of derived gases such as coke oven gas.

### **Methodological changes impacting on data quality and comparability over time**

There were significant improvements in the accuracy of domestic solid and liquid fuel use (coal, manufactured solid fuels and oil) for the local and regional estimates for 2004. This was due to the provision of additional sources, including 1km square estimates of domestic gas consumers and middle layer super output area level (MLSOA) estimates of economy 7 electricity customers. This information has enabled AEA to apportion more reliably all the non gas domestic consumption across all local authorities. The user should note that at present DECC does not release any energy consumption statistics below MLSOA, due to the need to maintain the confidentiality of individual energy consumers and suppliers. Also new data from the EU-ETS trading scheme were used to allocate

some of the energy consumption data at local authority level for the industrial/commercial sector.

For the 2008 data AEA implemented some changes to their modelling methodology; including a different approach to domestic energy consumption and the energy use by large industries. The methodological changes were also applied retrospectively to the 2005 and 2007 data which have been revised so that 2005 to 2008 estimates were produced using the same methodology.

Since the data are estimated using modelling techniques, the user should recognise the limitations of the dataset and is encouraged to read the AEA reports before interpreting the consumption estimates provided. A web link to the reports from 2003 to 2008 is provided below:

<http://www.decc.gov.uk/en/content/cms/statistics/regional/other/other.aspx>

### **Advice for use of baselines for historical data series**

As a result of the methodology changes in 2008 data, the 2005 and 2007 data were revised so that 2005, 2006, 2007 and 2008 estimates were produced using the same approach. Therefore DECC advise that the 2005 dataset should be used as a baseline year for historical comparisons. This is consistent with other local authority datasets and reflects the fact that the data from 2005 onwards are classed as National Statistics.

### **Links to Energy Trends**

To view the articles produced on local and regional estimates of the remaining fuel consumption from 2003 to 2008 please use the link provided below for the December 2005, March 2007 and December editions 2007 to 2010 of Energy Trends:

[http://www.decc.gov.uk/en/content/cms/statistics/publications/trends/articles\\_issue/articles\\_issue.aspx](http://www.decc.gov.uk/en/content/cms/statistics/publications/trends/articles_issue/articles_issue.aspx)

The remaining fuels datasets for 2003 to 2008 are accessible using the following link:

<http://www.decc.gov.uk/en/content/cms/statistics/regional/other/other.aspx>

## 5. Total energy estimates

### Information available

Datasets released by DECC:

- Annualised estimates of local authority (LAU1) and government office region (NUTS1) level total energy consumption for 2003, 2004 (experimental), 2005, 2006, 2007 and 2008 (National Statistics).

These datasets are available at:

[http://www.decc.gov.uk/en/content/cms/statistics/regional/total\\_final/total\\_final.aspx](http://www.decc.gov.uk/en/content/cms/statistics/regional/total_final/total_final.aspx)

Forthcoming datasets to be released by DECC:

- Annualised estimates of local authority and government office regional level total energy consumption for 2009 (December 2011).

### Data collection and collation

In addition to publishing local and regional estimates for the four main datasets for gas, electricity, road transport and remaining fuels, DECC has produced a dataset for total energy consumption by aggregating all the datasets together.

### Data coverage

In reading this note, users will have realised that there are some problems with parts of the individual fuel source estimates and these impact on the reliability of total energy consumption estimates. It is important to note that the estimates here do not provide complete coverage of final energy consumption in all local authorities and regions in the UK. For example only around three fifths of total UK gas consumption is covered in the local and regional gas dataset, due to the exclusion of consumption within Northern Ireland (due to the market structure) and some very large industrial users and power stations within 71 local authority areas for disclosure reasons. It is also important to recognise that the gas consumption data is weather corrected, whereas all other fuel sources are unadjusted. The local and regional dataset for electricity also does not cover all consumption within the UK. Northern Ireland again is not covered for reasons highlighted above, whilst some very large industrial consumer receiving electricity via the high voltage system central volume allocation users (CVA) are not covered in the local and regional statistics.

### Data interpretation

Users should note that the local and regional fuel source datasets used for the compilation of these estimates is based on the aggregation of data from widely different sources of information. For example the electricity and gas data is based on real consumption recorded from meters, in contrast to the modelled information for the road transport and residual fuels, using CO<sub>2</sub> and other spatial data. It is also important to note significant differences in the methodology applied to produce the local and regional gas and remaining fuels estimates in 2004, when compared to the previous year. Revised gas estimates for 2004 for example were collected for the first time at meter point level, whilst for the remaining fuels additional spatial datasets including the data collected from the EU-ETS were also used to apportion consumption to local authority areas.

### **Advice for use of baselines for historical data series**

Users should note that methodological improvements were made to the reliability of several of the local authority datasets in 2005, when compared to previous years. Given these improvements and the reclassification of the 2005 local authority datasets to National Statistics, DECC are advising that 2005 should be used as the baseline year for any historical comparisons. However the user should note the variability of the data quality of the different datasets and that they do not provide comprehensive coverage of all final energy consumption.

### **Links to Energy Trends**

To view the latest special article on the local and regional estimates of total energy consumption from 2003 to 2007 please see the December 2005, March 2007 and December editions 2007 to 2010 of Energy Trends:

[http://www.decc.gov.uk/en/content/cms/statistics/publications/trends/articles\\_issue/articles\\_issue.aspx](http://www.decc.gov.uk/en/content/cms/statistics/publications/trends/articles_issue/articles_issue.aspx)

## 6. Additional sub national energy data

In addition to the main energy consumption datasets, two further areas of work have been produced by DECC to complement this work. The quality indicators for the 2007 gas and electricity consumption statistics, investigate the reliability of the electricity estimates at local authority level. In addition the high levels indicators work for 2003 to 2007 uses a combination of energy and socio-economic data to compare sub national areas within Great Britain at local authority, NUTS3 and NUTS1 levels. Further information relating to these datasets including an article in the March 2009 edition of Energy Trends, guidance notes to aid interpretation and the datasets are available using the following links:

March 2009 edition of Energy Trends:

[http://www.decc.gov.uk/en/content/cms/statistics/publications/trends/articles\\_issue/articles\\_issue.aspx](http://www.decc.gov.uk/en/content/cms/statistics/publications/trends/articles_issue/articles_issue.aspx)

Guidance Note for Quality Indicators, Dataset for 2004 and 2007 Quality Indicators:

<http://www.decc.gov.uk/en/content/cms/statistics/regional/quality/quality.aspx>

Guidance Note for High Level Energy Indicators and Dataset for 2003 to 2006 High Level Energy Indicators:

[http://www.decc.gov.uk/en/content/cms/statistics/regional/high\\_level/high\\_level.aspx](http://www.decc.gov.uk/en/content/cms/statistics/regional/high_level/high_level.aspx)

DECC sub national energy statistics contact:

Will Rose

Energy consumption statistics

Tel: 0300 068 6909

E-mail: [Will.Rose@decc.gsi.gov.uk](mailto:Will.Rose@decc.gsi.gov.uk)