Energy Consumption and GHG Emissions from Gas Consumption

This section deals with energy use and greenhouse gas emissions from natural gas supplied to homes, where it is used for cooking in natural gas-powered ranges and ovens, natural gas heated clothes dryers, water and central heating, and domestic boilers. It also includes energy use and greenhouse gas emissions from industrial (excluding gas-fired electricity generation/power stations), commercial (e.g., hotel and catering, warehouses, retail, sport and leisure, etc) and public services (e.g., education, Government, health, etc) gas use.

Summary

Gas consumption and CO_2 emissions for 2008 were estimated from Department for Energy and Climate Change (DECC) 2007 Middle Layer Super Output Area (MLSOA) level Electricity and Gas Consumption datasets and Department for Environment, Food and Rural Affairs (DEFRA) 2007 National Statistics on CO_2 Emissions at Local Authority and Regional Levels datasets.

After some key structural changes in the British gas distribution network in 2005, the National Grid were no longer able to provide gas sales data at the postcode sector level because they sold off some of the local distribution zones (LDZs) and were no longer responsible for the whole of the gas distribution network in Great Britain. However, through an agreement with Xoserve[1], DECC now obtains annualised gas consumption estimates (similar to those already collected from the electricity industry) from Xoserve. Xoserve is the company now responsible for the collation and aggregation of gas consumption, subject to permissions being provided by the owners of the LDZ network. Xoserve provides annualised estimates of gas consumption for all the MPRNs (meter point reference numbers or gas meters) based on an Annualised Quantity (an estimate of annualised gas 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 financial year 1 April to 31 March, rather than for a calendar year.

The data quality of the gas data from Xoserve is high; however, the problem previously noted for the National Grid dataset with regards to the allocation of gas meters to either the domestic or commercial sector is still relevant to the Xoserve dataset, as no reliable criteria exists on the dataset to identify the sector to which the meter belongs. However the reliability of the 2007 gas datasets are significantly higher than the previous National Grid datasets due to the improved geographical mapping of gas consumption from individual MPRNs using the National Statistics Post Code Directory.

The 2007 gas consumption and numbers of customers by region and local authority workbooks were obtained from the DECC's website[2]. DECC collects and compiles estimates

[1] In addition to the gas consumption estimates (from meters connected to the main distribution network)
obtained from Xoserve, BERR also obtains similar information from the independent gas transporters that are responsible for transporting gas to mainly new housing estates or connected system exit points (CSEPs).

[2] http://www.berr.gov.uk/energy/statistics/regional/regional-local-gas/page36200.html

of gas consumption at regional (NUTS1) and local authority levels NUTS4).Within each workbook, several worksheets provided details of electricity and gas consumption down to MLSOA level for each LA in the UK. The 2007 datasheets showed gas consumption data (given in kWh for the entire year) for the Greater London area regarding total consumption, number of meters points and average consumption levels for domestic and non-domestic users. Details about how the information on electricity and gas consumption has been collected and collated can be found in "DECC, Guidance Note for Regional Energy Data PUBLICATION URN 08/487c" at http://www.berr.gov.uk/files/file42994.pdf.

DECC's sub local authority gas consumption estimates at Middle Layer Super Output Area (MLSOA) level in England for 2007 was used for the 2008 energy estimates in the LEGGI 2008. However, due to data disclosure issues, gas 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.

For the analysis, the project team spatially analysed and aggregated the gas consumption data from MLSOA level to the 1-km^2 grid cells. However where a MLSOA covered more than one 1-km^2 grid cell area, the gas consumption was divided between the relevant grid cells based on the proportion of the area covered by the MLSOA. There were also some circumstances where for confidentiality or other reasons, DECC combined MLSOA data, and each MLSOA was given an equal share of the gas data when deriving statistics.

CO_2 emission estimates

CO_2 emissions estimates from gas consumption in the LEGGI 2008 were obtained from DEFRA's 'Detailed Sector Split' Local and Regional CO_2 Emissions Estimates for 2007 spreadsheet, which was produced by AEA for DEFRA in December 2008. The spreadsheet was used with reference to the report 'Local and Regional CO_2 Emissions Estimates for 2008'[3] . The nationally consistent carbon dioxide emission estimates for "Domestic" and "Industrial & Commercial" sectors at local authority (London boroughs) and regional level (Greater London) that are contained within the spreadsheet were produced following the publication of local gas, electricity and road transport fuel consumption estimates by DECC. The 'Detailed Sector Split' worksheet shows the elements of data (such as the domestic gas and electricity estimates and the estimates for road transport) included within the CO_2 estimates are of reasonable certainty, as they are based on local readings and sales data.

The 2007 regional and local CO_2 emissions from gas consumption statistics were spatially analysed and apportioned to 1-km^2 grid cells to enable sub-borough areas such as electoral wards to be monitored and targeted. In order to produce CO_2 emissions at the 1-km^2 spatial resolution, the CO_2 emissions statistics for each London borough was first disaggregated (using the area of domestic and non-domestic buildings categories obtained from Department for Communities and Local Government (DCLG)'s Generalised Land Use Database Statistics for England 2005[4] as a weighting factor) to Census ward areas and then aggregated

[3] http://www.defra.gov.uk/environment/statistics/globatmos/galocalghg.htm

[4] The Generalised Land Use Database Statistics for England 2005 categorises land parcels into nine key themes: domestic buildings, gardens, non-domestic buildings, road, rail, path, greenspace, water and others and provides statistics for each local authority and also for each Census ward (as defined for 2005). The statistics are produced for DCLG (formerly, ODPM)

to the 1-km^2 grid cells using GIS functionality (i.e., spatial analysis by overlaying the Census wards' electricity consumption data with the 1,604 1-km^2 grid cells of the LEGGI area).

Emission estimates of methane and nitrous oxide in the LEGGI 2008 were calculated from the energy data, using emissions factors derived from the "2009 Guidance to DEFRA/DECC's GHG Conversion Factors for Company Reporting"[5] provided by AEA for DECC and DEFRA.

Projection Years: 2011 and 2015

Projections of atmospheric emissions from gas consumption were based on an analysis of historical trends in energy consumption. Electricity consumption trends have been used to estimate the projections of Methane and N_2O.

Gas

The % per annum growth/decay rates in gas consumption (2005-2008) from the domestic and industrial-commercial sectors in the Greater London area were calculated as follows (see **Error! Reference source not found.** and **Error! Reference source not found.**):

For Domestic gas projections to 2011 = -2.60%
For Industrial-Commercial gas projections to 2011 = -3.60%

For Domestic gas projections to 2015 = -2.47%
For Industrial-Commercial gas projections to 2015 = -3.35%

Table 1: Trends in Domestic gas consumption (GWh) in Greater London and projection factors

Years	Gas Sales (GWh)		
2005	52,635		
2006	50,943		
2007	49,921		
2008	48,528		
2011	**44,741**	% decrease between 2007-2011	-10.38%
2012			
2013			
2014			
2015	**40,148**	% decrease between 2007-2015	-19.58%

on behalf of the Office for National Statistics' Neighbourhood Statistics service. http://www.communities.gov.uk/publications/planningandbuilding/generalisedlanduse

[5] (http://www.defra.gov.uk/environment/business/reporting/conversion-factors.htm).

Table 2: Trends in Industrial and Commercial gas consumption (GWh) in Greater London and projection factors

Years	Gas Sales (GWh)		
2005	27,215		
2006	26,008		
2007	24,429		
2008	24,272		
2011	**21,647**	% decrease between 2007-2011	-19.58%
2012			
2013			
2014			
2015	**18,584**	% decrease between 2007-2015	-23.93%

As a result of these growth rates the following conversion factors were calculated. These conversion factors were applied to the values for 2008 (base year) to calculate the projections in gas consumption for 2011 and 2015.

Conversion factor for Domestic gas projections to 2011 = 0.8962
Conversion factor for Industrial-Commercial gas projections to 2011 = 0.8861

Conversion factor for Domestic gas projections to 2015 = 0.8042
Conversion factor for Industrial-Commercial gas projections to 2015 = 0.7607