Revisions to DECC domestic energy bill estimates

Background

DECC published a special feature article in Energy Trends December 2013 proposing to change the consumption levels used in bills.[1] This article requested user's views on the proposals. The feedback received was supportive of revising consumption levels in light of changes in recent years, whilst some also requested that DECC align consumption levels with Ofgem, who publish bills using both median and mean consumption.

Historically DECC have used mean household consumption levels of 3,300kWh/year for electricity, and 18,000kWh/year for gas. The exact source for these initial estimates is unclear, as they have been used by DECC and its predecessor Departments since at least the early 1990's, but until the past few years have been reasonable estimates of annual use.

Consumption levels

Average consumption levels by fuel are shown below in table 1. The data are taken from a variety of statistical sources: data on total domestic consumption are taken from Energy Trends (based on survey data of energy companies, grossed up to compensate for coverage), and the Digest of UK Energy Statistics (DUKES), which provides data on the Standard Electricity and Economy 7 split)[2]. Volume data are temperature and seasonally adjusted using the X12ARIMA program and the methodology described in earlier Energy Trends articles[3],[4].

The denominator of electricity and gas accounts is taken from National Statistics data on the number of households for electricity and from grossed up survey data from suppliers on their number of customer accounts for gas. This data is published in Energy Consumption in the UK (ECUK) table 3.07[5].

Table 1 – Estimated mean household energy consumption in kWh

	Electricity		Gas	
Year	Unadjusted	Temperature adjusted	Unadjusted	Temperature adjusted
2008	4,509	4,536	16,546	16,976
2009	4,443	4,480	15,217	15,608
2010	4,419	4,322	17,774	15,656
2011	4,126	4,231	13,282	14,948
2012	4,220	4,217	15,281	15,263
2013	4,136	4,119	15,656	14,952

Figures for 2013 are provisional at this stage and will be revised in July's edition of DUKES when more complete data becomes available, with new survey data from small gas suppliers and revised data likely to be received from some electricity suppliers. Data for earlier years are also subject to small revisions.

[1] Energy Trends-www.gov.uk/government/publications/energy-trends-december-2013-special-feature-articles
[2] Energy Trends – table 1.3c - www.gov.uk/government/publications/total-energy-section-1-energy-trends
DUKES – table 5.3 - www.gov.uk/government/publications/electricity-chapter-5-digest-of-united-kingdom-energy-statistics-dukes
[3] www.gov.uk/government/uploads/system/uploads/attachment_data/file/65732/2089-ons-paper-temp-correction-of-energy-stat.pdf
[4] http://webarchive.nationalarchives.gov.uk/20130109092117/http://decc.gov.uk/assets/decc/11/stats/publications/energy-trends/articles/2878-temperature-adjustment-articles.pdf
[5] ECUK table 3.07 - www.gov.uk/government/publications/energy-consumption-in-the-uk

However, in the electricity market and tariffs are split between consumers using standard tariffs and those using special off-peak tariffs (Economy 7), where electricity consumed at off-peak periods are priced differently to standard tariffs. Using round numbers, approximately 4 million consumers are on Economy 7 type tariffs with the majority of around 23 million on standard tariffs. Please note that all tariff types are generally available on all payment methods – direct debit, credit or pre-payment.

For headline comparison purposes DECC estimates bills for those on standard electricity tariffs rather than those on off-peak tariffs. Annual survey data is received from electricity suppliers that split out their total consumption between the two types of tariff styles. This breakdown is published by DECC in DUKES each July. The main DECC temperature adjustment is only performed for the total electricity series – a rough split has been produced splitting the temperature adjustment between the standard electricity and Economy 7 series. This estimated series of average electricity consumption is shown in table 2 below.

Table 2 – Estimated mean household electricity consumption in kWh by tariff type

	Standard Electricity		Economy 7	
Year	Unadjusted	Temperature adjusted	Unadjusted	Temperature adjusted
2008	4,133	4,158	6,429	6,468
2009	4,127	4,161	6,176	6,227
2010	4,092	4,002	6,229	6,092
2011	3,827	3,925	5,851	6,001
2012	3,886	3,883	6,088	6,083
2013	3,798	3,782	5,979	5,955

Based on the information available, in tables 1 and 2, there is a distinct trend that can be observed in the past six years of decreasing electricity and gas consumption. This can be understood in the context of increasing household thermal efficiency (better insulation, more efficient boilers) and appliance efficiency, but other factors will come into play including the effect of price increases.

A number of other data sets are also available that could be used, which would provide different average consumption levels. DECC collect meter point data from the data aggregators on behalf of the energy companies which provides alternative estimates of both consumption and number of households using that fuel.

For electricity there are particular difficulties in using the data, as a number of households will have two rate (Economy 7) meters but are purchasing their electricity on standard tariffs. The energy company just adds together the two meter reads and applies one price (in general two rate tariffs are much cheaper for the off peak periods but are more expensive if the bulk of consumption is during the day). DECC estimate that there are around 4 million households on Economy 7 tariffs compared to around 5 million households with Economy 7 meters. For gas there are difficulties with the meter point data in deciding whether the meter belongs to a household or a lower consuming business. The headline results from the meter point data are published in December each year, with the 2012 data published in December 2013. These suggest average consumption levels of 4,014 kWh/year for electricity[6] (3,670 kWh/year for standard meters & 5,628 kWh/year for E7 meters) and 14,080 for gas[7].

[6] www.gov.uk/government/collections/sub-national-electricity-consumption-data

[7] www.gov.uk/government/statistical-data-sets/gas-sales-and-numbers-of-customers-by-region-and-local-authority

The data is then subsequently used in NEED (National Energy Efficiency Data-Framework), which combines the meter point data with data from other sources including the VOA (Valuations Office Agency), with extreme consumption values and non-household data removed from the dataset. NEED data is typically published in June, with 2012 analysis to be published in June 2014. The latest NEED[8] data is for 2011 and shows averages of 4,200 kWh/year for electricity and 14,100 kWh/year for gas. This publication also reports median consumption levels which fall to 3,400 kWh/year for electricity and 12,900 kWh/year for gas.

The meter point data are particularly useful for providing small area estimates, with NEED providing estimates for different type of households and properties, and assessing the uptake of insulation measures, so both are very important in their own right – but they are not considered the best source for national estimates.

Results

In light of the available data on consumption, table 3 shows the consumption levels that DECC will use in its bill estimates of Quarterly Energy Prices:

Table 3 – Revised mean household consumption levels to use in bill estimates, kWh

	Previous	Current
Standard Electricity	3,300	**3,800**
Economy 7	6,600	**6,000**
Gas	18,000	**15,000**

Despite electricity consumption going down in recent years, the average consumption figure has been revised upwards as comparing now and when it was set in the 1990's households on average own more appliances and use more electricity.

The Economy 7 split used previously was 3,600 kWh off peak and 3,000 kWh on peak. There is limited data available in this area, but data for more recent years suggest that the split has moved away from 55/45 off peak/on peak and closer to a 50/50 split, and this is what DECC will use going forwards.

The average gas consumption levels have likely fallen due to the improved standards for boilers and greater insulation levels as evidenced by the increase in average SAP ratings (a measure of the energy efficiency) for houses, which have increased from 45 in 1996 to 59 in 2012 for England[9], suggesting houses have become more energy efficient.

These chosen revisions to average consumption are broadly in line with revisions made by Ofgem for their Supply Market Indicators.[10] Following their consultation, Ofgem decided that they would change their mean consumption levels in September 2013 to 3,800 kWh for standard electricity, and to 15,300 kWh for gas.

DECC consumption levels differ to Ofgem's as provisional data is now available for 2013, whilst 2012 data was the latest data available at the time Ofgem revised the consumption levels used. It is anticipated that Ofgem's mean consumption levels will be updated annually with DECC's updated less frequently.

Tables 4 and 5 show the impact of changing the consumption levels used on the estimated average electricity and gas bills.

[8] www.gov.uk/government/publications/national-energy-efficiency-data-framework-need-report-summary-of-analysis-2013-part-1

[9] EHS - www.gov.uk/government/publications/english-housing-survey-2012-to-2013-headline-report

[10] www.ofgem.gov.uk/gas/retail-market/monitoring-data-and-statistics/electricity-and-gas-supply-market-indicators

Table 4 – Comparison of mean 2013 UK electricity bills by payment type, using previous and current consumption levels, £/year[11]

	Standard Credit	Direct Debit	Prepayment	Overall
Previous consumption (3,300 kWh)	532	491	534	510
Current consumption (3,800 kWh)	602	557	605	577
Change (%)	13%	13%	13%	13%

Table 5 – Comparison of mean 2013 GB gas bills by payment type, using previous and current consumption levels, £/year [14]

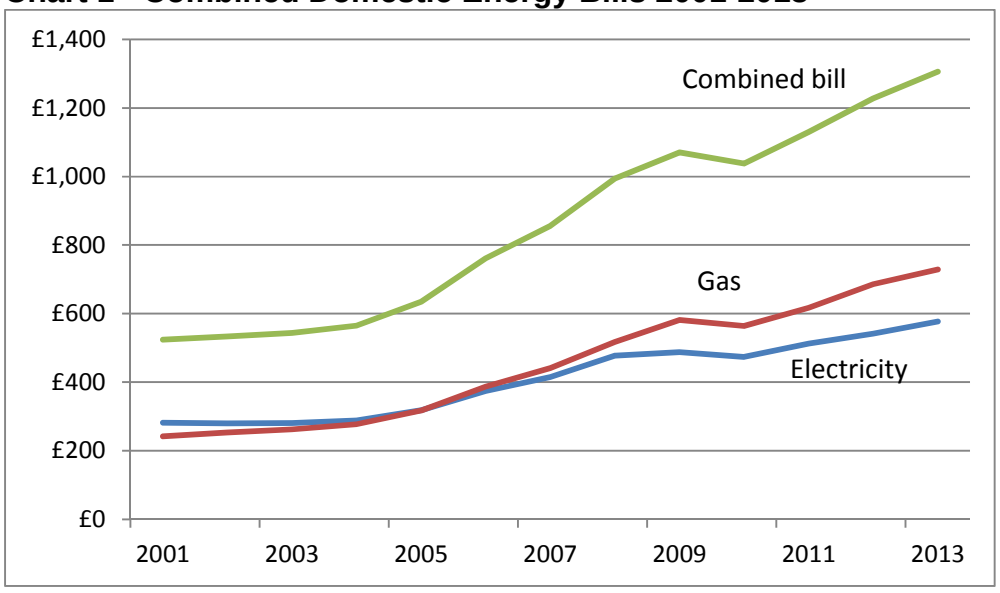
	Standard Credit	Direct Debit	Prepayment	Overall
Previous consumption (18,000 kWh)	900	823	890	854
Current consumption (15,000 kWh)	767	701	758	729
Change (%)	-15%	-15%	-15%	-15%

The overall average combined bill has thus fallen slightly by 4 per cent, from £1,364 per annum to £1,306 per annum as a consequence of this change.

Time series of bills

A time series of bill estimates based on the latest consumption estimates are published for electricity in table 2.2.1 by payment type, in table 2.2.2 for the UK countries, and in table 2.2.3 for regions. Similarly data for gas is presented in tables 2.3.1, 2.3.2 and 2.3.3. All back data have been revised based on the 3,800 kWh/year consumption level for electricity and the 15,000 kWh/year consumption level for gas. Chart 1 below shows the time series of electricity and gas bills back to 2001. The benefit of this approach is that these bill tables provide an estimate of changes in the price levels without the potentially distorting effects of weather on the annual bills. Each year an article is published in the March edition of Energy Trends that considers the actual estimated energy spend in the previous and preceding years.

Chart 1 - Combined Domestic Energy Bills 2001-2013



The time series of bill estimates based on the previous consumption estimates were published in the table series 2.2 for electricity and 2.3 for gas as previously mentioned. These estimates will remain available on the DECC web site – though "hidden" in the Excel workbooks that contain the data. To access these data open the latest Excel workbook and follow the instruction on the highlights page to unhide these series.

[11] www.gov.uk/government/statistical-data-sets/annual-domestic-energy-price-statistics

Future publications

Energy bill estimates using both sets of consumption levels will be available in the March 2013 version of Quarterly Energy Prices.[12] Going forwards bills will only be published on the new consumption basis.

DECC plan to conduct a full scale review of the consumption levels used every five years, with an expectation that changes will be made at this stage. DECC will however, review the levels on an annual basis, but with an expectation that changes at this still stage will not be made – unless there is significant evidence that the current levels are no longer appropriate.

User views

DECC is interested in users' views on these changes, and in particular comments on welcome on how frequently DECC should update these estimates and whether users wish to see the complete time series revised in line with the latest consumption levels. Please contact either of the articles authors using the contact details below.

Iain MacLeay
Energy Statistics
Tel : 0300 068 5048
E-mail: Iain.MacLeay@decc.gsi.gov.uk

Sam Trewin
Energy Statistics
Tel: 0300 068 5162
E-mail: Sam.Trewin@decc.gsi.gov.uk

[12] www.gov.uk/government/statistical-data-sets/annual-domestic-energy-price-statistics