Mapping Document

Country:	UK
Technology:	Televisions
Sub Category:	All Televisions

Introduction

The first stage in the Mapping and Benchmarking process is the definition of the products, i.e. clearly setting the boundaries that define the products for use in data collection and analysis. Doing this ensures that comparison between the participating countries is done against a specific and consistent set of products.

The summary definition for this product is:

Television sets, defined as:
'A commercially available and mains electricity powered product consisting of a display and one or more tuner(s)/receiver(s) combined in a single housing. It is designed to receive, decode and display audiovisual signals and reproduce sound from analogue sources and/or digital sources that are decoded directly broadcast via satellite, cable or antenna signals. In the case of digital sources, decoding may be via any external adaptor or receiver.'

Data will be analysed based upon actual screen size, but may be presented if necessary in three size 'bins':

Additional later analysis may be planned using data requested on:
- Screen technology (carried out for benchmarking report)
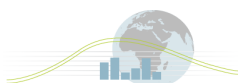- Analogue or integrated digital
- HD or not

Exclude:
- Combination products (i.e. with integrated DVD player, VCR player / recorder, hard drive).
- Screen sizes under 28cm
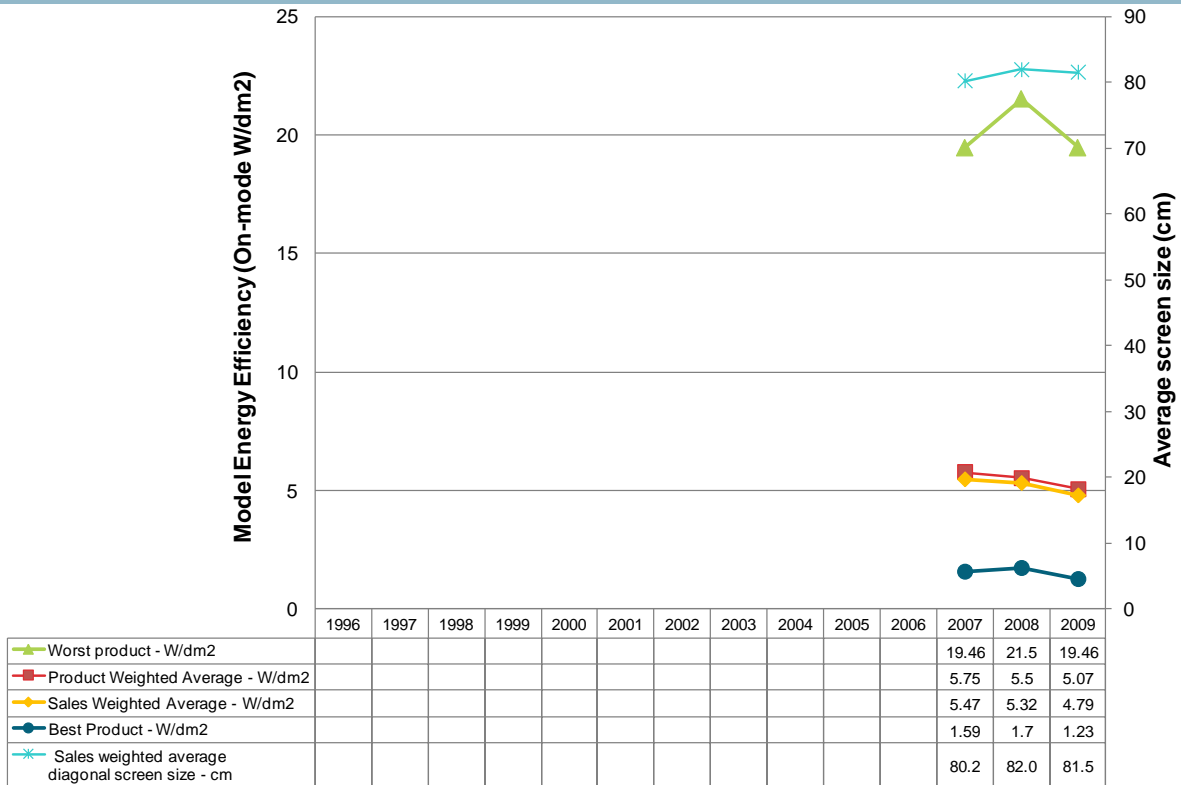- Television monitors and computer displays

The detailed product definitions can be found at the Annex website:
http://mappingandbenchmarking.iea-4e.org/

Energy Efficiency of New Televisions
UK

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Worst product - W/dm2												19.46	21.5	19.46
Product Weighted Average - W/dm2												5.75	5.5	5.07
Sales Weighted Average - W/dm2												5.47	5.32	4.79
Best Product - W/dm2												1.59	1.7	1.23
Sales weighted average diagonal screen size - cm												80.2	82.0	81.5

Key notes on Graph (see notes section 1)

- Graph is based upon on mode consumption only per unit screen area (W/dm^2) – not including standby consumption.

- Sales weighted data is from a very detailed GfK dataset. The usable data within that accounts for between 50% and 60% of UK sales. See important notes on this data in section *Proportion of data set included, and assimilating the GfK data.*

- In 2009, the most efficient product (per unit screen area) in this data set has a 107cm diagonal plasma screen, achieving 1.23 W/dm^2. The least efficient is a 51cm LCD screen television with 19.5 W/dm^2.

- For comparison, testing of 85 mainstream UK televisions in 2009[1] showed the best one to achieve 1.37 W/dm^2 for a 117cm LCD, and the worst one 5.11 W/dm^2 for a 127cm plasma screen. The product-weighted average from this data set was 3.07 W/dm^2.

- The screen technology distribution (sales weighted) for 2009:
  CRT: (not known)   LCD: 92%   Plasma: 8%   Other (incl. OLED): 0%.

- *Note: The accompanying benchmarking report (comparing different countries) is based upon an Energy Efficiency Index (EEI), in preference to W/dm^2 as EEI better accounts for differences in average screen size between countries.*

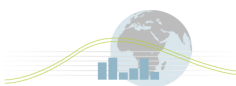[1] Data from UK Government Market Transformation Programme.
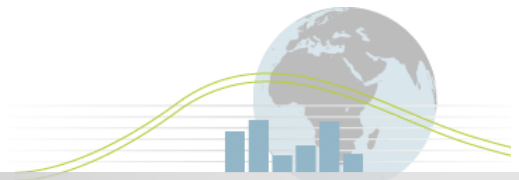
Energy Consumption of New Televisions
UK

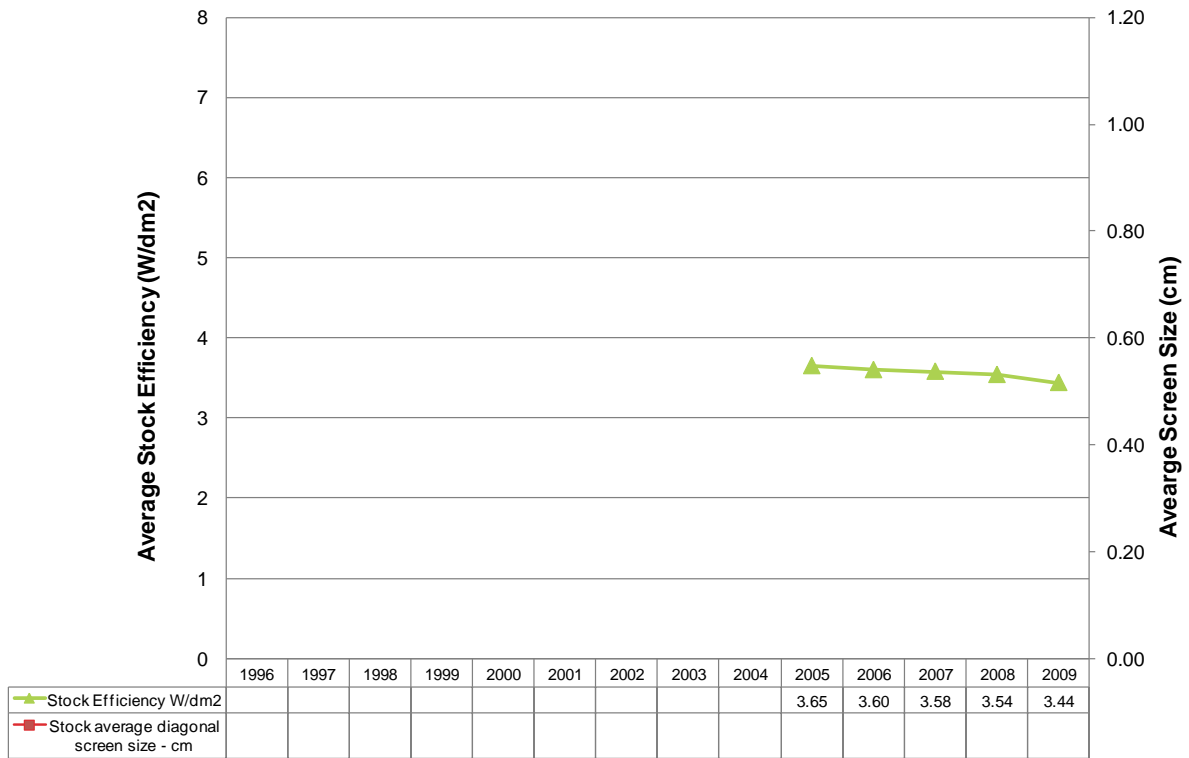|	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Worst Product												1551	1369	1369
Product Weighted Average												358	369	350
Sales Weighted Average												286	292	258
Best Product												29	29	29
Sales weighted average diagonal screen size - cm												80.2	82.0	81.5

Key notes on Graph (See notes section 2)

- Annual consumption is calculated assuming five hours per day[2] in on mode. No standby consumption could be added to this as the data did not allow determination of the standby consumption correlating to any individual on mode consumption.

- See important notes on this data in section *Proportion of data set included, and assimilating the GfK data.*

- In 2009, the product consuming the least energy is a 36cm LCD screen television (29 kWh per year). The product consuming the most is a 160cm plasma screen (1,370 kWh per year).

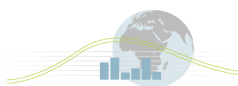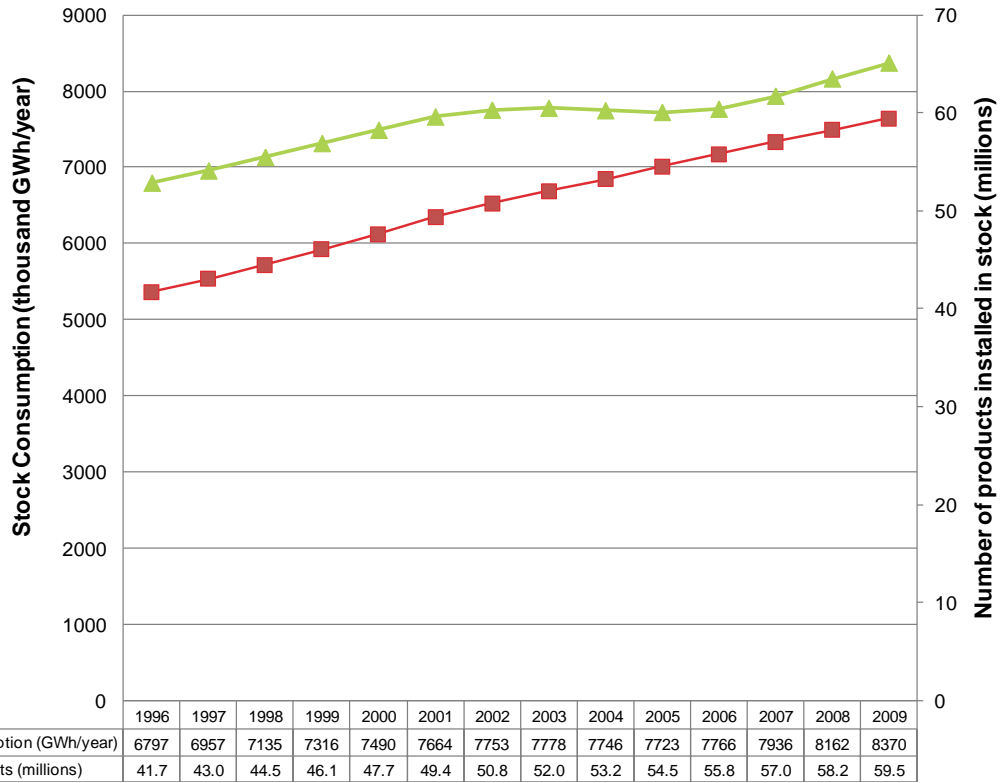[2] Derived from UK Government assumptions.

Energy Efficiency in the Installed Television Stock UK

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Stock Efficiency W/dm2										3.65	3.60	3.58	3.54	3.44
Stock average diagonal screen size - cm														

- Data are derived from the UK government modelling that has separate source data to those used to derive product efficiency data presented in this report.

Energy Consumption in the Installed Television Stock
UK

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Stock Consumption (GWh/year)	6797	6957	7135	7316	7490	7664	7753	7778	7746	7723	7766	7936	8162	8370
Num. of products (millions)	41.7	43.0	44.5	46.1	47.7	49.4	50.8	52.0	53.2	54.5	55.8	57.0	58.2	59.5

Key notes on Graph (see Notes Section 4)

- Data comes from UK Government market modelling.

- It is estimated that the average number of television sets per household in 2009 is 2.24.
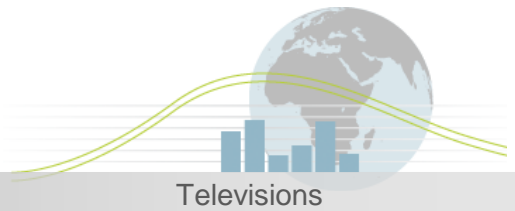
Major Policy Interventions (See notes Section 5)

The UK Energy Saving Trust has had a category within its Energy Saving Trust Recommended Scheme[3] for integrated digital televisions since January 2006. This voluntary registration scheme provides an endorsement label for efficient products. The criteria since November 2010 require power less than 150W in on mode (regardless of screen size), EEI of better than or equal to 0.4 and less than 1W in standby.

A European Eco-design directive regulation regarding televisions (EC 642/2009)[4] came into force in August 2009 and sets Minimum Energy Performance Standards (MEPS) in two tiers, from August 2010 and April 2012. It also requires standby consumption to be less than 1W from January 2010, (2W if the standby state provides information or status display), reducing to 0.5W and 1W respectively from August 2011. It also requires an auto power down feature to automatically switch to standby after four hours from August 2011.

Tier 1 (2010 to March 2012), removes from the market HD ready televisions of EEI 1.0 and above, and full HD televisions with EEI at above 1.07 to 1.11 (depending upon screen size). The Tier 2 MEPS from April 2012 will cover all televisions and will remove all televisions with EEI 0.8 or higher.
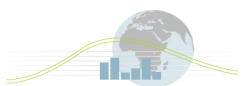
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[3] See http://www.energysavingtrust.org.uk/business/Business/Energy-Saving-Trust-Recommended/Product-criteria/Home-entertainment-consumer-electronics/Digital-Televisions.
[4] See http://ec.europa.eu/energy/efficiency/ecodesign/legislation_en.htm.

Issue date: October 10 (minor update June 11)

Cultural Issues (See Notes Section 6)

- No data available.

Notes on data

Section 1: Notes on Product Efficiency

1.1   Test methodologies, Performance Standards and Labelling Requirements

The UK, in line with proposed European labels and regulations, has adopted IEC 62087: edition 2.

1.2   Product Efficiency Graphic

Data sources:

The data in the graphics for efficiency of new sales come from a GfK dataset with sufficient detail to yield both average performance data (sales weighted and product weighted), and best / worst performers (sales weighted and product weighted). It was broken down into some 60 'buckets' of screen size and over 200 'buckets' of on mode power (giving over 12,000 cells in each analysis matrix) for both LCD and plasma screens. The usable data covers around 50% to 60% of all UK sales, for 2007, 2008 and 2009. Two outlying data points (specific size and power consumptions) were removed that lacked credibility: Those giving an EEI of 0.098 and 0.195 for plasma televisions. For further important information on this data set see the later section *Proportion of data set included, and assimilating the GfK data.*

Whilst other data sets were provided (see below), the GfK data set is the most representative of the market and also the most comparable to data from other countries. It is, however, manufacturers claimed data that is likely to overstate power demand in the same way as other data declared by manufacturers based upon older test methods (ie energy consumption will appear to be higher than would be achieved with the Edition 2 IEC62087 methodology).

Two other sources were also provided:

a. Modelling carried out by the UK government's Market Transformation Programme (MTP, www.mtprog.com) which is based upon a wide range of market data and expert opinion. This was used to plot the stock, stock efficiency and consumption graphs. The average efficiency data derived from the GfK data set in this report shows different results to that adopted by UK government from MTP. MTP data shows efficiency levels around one third better than the GfK data. As stated above, the GfK data is more compatible and comparable with data analysed for other countries in the benchmarking process and was adopted in preference. The average screen sizes for new sales estimated from the modelling work showed some difference compared with the GfK average screen sizes and so the model screen size data was not plotted. MTP models suggested a sales weighted average of 67cm in 2007 compared to 80cm from the GfK data, with 71cm and 81cm respectively in 2009. The GfK data was not available to the UK team at the time of compiling their

model, and MTP modelling takes into account factors outside the scope of this benchmarking analysis.

b. Data from laboratory test results carried out between 2000 and 2009 on several hundred mainstream UK market televisions, with between 15 and 90 test results for several intervening years. Results were filtered by the UK Government team to leave only those data that were considered to be reasonably comparable with IEC 62087 results (leaving between 15 and 86 models in each year). This latter dataset is not representative of the whole UK market but consists of robust lab test results and are not directly comparable with the sales weighted data. This data set is known to lack representation from 'own-brand' televisions. Some issues and figures from this data are quoted for context in the text beneath some graphs. The entire data set provided was analysed, but this represents a relatively small sample of the market. The following should also be noted: The 2002 data point is actually a dataset for all the years from 1999-2001; the 2005 data point is a dataset for 2004-2005 and the 2007 data point is a dataset for all the years from 2006-2008.

Key calculations undertaken:

Proportion of data set included, and assimilating the GfK data:

The granularity of the GfK data was such that errors were very small indeed from assuming an average on mode consumption figures for sales within a range. Typically sales were divided into single Watt steps (eg sales consuming 60W, then sales consuming 61W etc). Similarly the steps for screen size were mostly one inch (25mm) steps, and some as small as 0.1 inches (2.5mm). An assumed average was taken at the mid point for all of these. For each combination of screen diagonal and wattage, a corresponding screen area in dm^2 and EEI was calculated, and sales weighted to give overall averages for LCD and plasma in 2007, 2008 and 2009. Due to the small step sizes, this was considered of high enough resolution to yield best and worst products on the market.

For a proportion of the GfK data set, the on mode consumption was "unknown" or "n/a" and products showing this were deleted from the analysis. The proportion of data included in the analysis was 52%, 58% and 59% for 2007, 2008 and 2009 respectively. It is estimated that the data used represents between 49% and 56% of the UK market. So products with no energy data were ignored in the energy analysis and due to those being predominantly in the smaller screen sizes, removing these data has almost certainly introduced a skew to energy performance – this is further assessed in the following section.

Note on uncertainties in results, based on UK team supporting analysis:

The significant proportion of products with no associated energy data could introduce distortions in the results: If the products with no data are randomly and uniformly distributed across the whole data set, then distortions should be minimal. But there appear to be significantly more products lacking energy data at the smaller end of the screen size

spectrum[5], which could give distorted results. An alternative approach (which was not carried out in the 4E process, but tested by the UK team for 2009 LCD screen products) would be to calculate a mean efficiency / EEI for each screen size data 'bucket', and then associate that average with all products in that bucket, whether they had energy data or not. In this way, the overall sales weighting would then better reflect the distribution of products in the market. The accuracy of the average would of course depend heavily on how well the calculated averages reflected all products in the bucket. This is in turn is dependent upon the proportion of sales with energy data within any data bucket, which varies from 0% to 100% so accuracy of the average will be highly variable. This adjustment was carried out by the UK team on the 2009 LCD data set, resulting in an average EEI that was 0.78, compared to 0.9 calculated for only products with energy data – an improvement of 13% in EEI.

A second factor pointed out by the UK team was that very few, if any, LCD televisions tested according to IEC62087 achieve EEI of worse than than 1.0. This is due to the inherent efficiency of the display technology in these products. It could be argued therefore to eliminate products with reported EEI over 1.0 from the analysis. Whilst data showing EEI over 1.3 for LCD screens were deleted (being certainly in error), the evidence was considered insufficient to justify a threshold closer to acceptable data, especially given other known flaws in the data.

Note: The risk of this type of skew being introduced through deleting subsets of data is not unique to the UK situation and should be borne in mind for any similar data sets.

Calculating screen areas: Firstly, convert diagonal screen size cm to dm (divide by 10), square the number, then multiply by the factor below. If no aspect ratio, an assumed ratio is used (based on statistical profile of TVs at 2008)

Aspect Ratio	Factor
16:9	0.427299703
16:10	0.449438202
4:3	0.48
Unknown	0.427299703

Usage assumptions: Hours spent in each mode are assumed for all sets (given below). Each value of consumption (W) is multiplied by hours per day x 365 to get Wh per year, divided by 1000 to get kWh per year.

Hours per day in on mode	5
Hours per day in standby mode	19

Efficiency (W/dm^2): is Watts in on mode, divided by screen area in square dm (1dm = 10 cm). Note that for the (subsequent) benchmarking analysis, Energy Efficiency Index is used.

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[5] For 2009 LCD data for example, energy data is available for 47% of sales for up to 24" screens; for 59% of 25" to 32" screens and for 92% of 33" and above.

Sales Weighted Energy Efficiency of New Models (W/dm^2): Is calculated from GfK data as above.

Product Weighted Energy Efficiency of New Models (W/dm^2) is an approximate figure calculated from the GfK data. This calculation assumed that each cell of the matrix (each combination of screen size and on mode consumption) represented one product on the market. In fact the sales in each of these cells could be from more than one different product, but this is the closest approximation deemed possible.

Section 2: Notes on Product Consumption

2.1 Test methodologies, Performance Standards and Labelling Requirements

Refer to section 1.2

2.2 Product Consumption Graphic

Refer to section 1.2

Section 3: Notes on Efficiency of Stock

Average stock efficiency is calculated by dividing estimated total consumption by UK stock and dividing by the average screen area from sales over the preceding 10 years.[6]

Section 4: Notes on Consumption of Stock

Quoted directly from UK government modelling by the Market Transformation Programme (www.mtprog.com).

Section 5: Notes on Policy Interventions

For details of the Energy Saving Recommended scheme - See http://www.energysavingtrust.org.uk/esr/Energy-Saving-Recommended/Product-criteria/Home-entertainment-consumer-electronics/

Full details of the eco-design directive regarding televisions – see http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:191:0042:0052:EN:PDF

Section 6: Notes on Cultural Issues

None.

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[6] An average from sales over 10 years is taken as an estimate of stock screen area, assuming that televisions will not stay in use for more than 10 years and in the absence of actual survey data.