

BN-NDICT MON02: Non-Domestic Monitors Government Standards Evidence Base 2009: Reference Scenario

Version 1.0

This Briefing Note and referenced information is a public consultation document and will be used to inform Government decisions. The information and analysis forms part of the Evidence Base created by Defra's Market Transformation Programme.

1 Introduction

- The Reference Scenario is a projection of what is likely to happen to energy consumption of each product if no new policies are implemented. All agreed and formally signed-off policies are included in the Reference Scenario.
- [Note that in this round of Government Standards, any EuP measures which were passed at Regulatory Committee by March 2009 are included in the Reference Scenario, although at the time of writing not all of these measures had been published in the Official Journal of the European Union].
- For cross-cutting policies such as CERT and Building Regulations, which are agreed but where the likely impact for specific products is unknown, assumptions are made about the impact per product, and detailed in the following sections. Where possible, separate projections of the Reference scenario are made with and without such policies.
- This Government Standard Briefing Note (GSBN) covers non-domestic monitors. The following definition of monitors is adapted from the EuP Preparatory study on PCs and monitors¹:

¹ European Commission DG TREN Preparatory studies for Eco-design Requirements of EuPs (Contract TREN/D1/40-2005/LOT3/S07.56313) Lot 3 Personal Computers (desktops and laptops) and Computer Monitors Final Report (Task 1-8)

- A commercially-available, electronic product with a display screen and its associated electronics encased in a single housing that is capable of displaying output information from a computer via one or more inputs, such as VGA, DVI, and/or IEEE 1394. The monitor usually relies upon a liquid crystal display (LCD) or less frequently cathode-ray tube (CRT) or other display devices such as plasma. This definition is intended primarily to cover standard monitors designed for use with personal computers.
- The computer monitors included in this definition must have a viewable diagonal screen size greater than 9 inches and must be capable of being powered by a separate AC wall outlet or a battery unit that is sold with an AC adapter.
- Computer monitors with a tuner/receiver may be covered by this study as long as they are marketed and sold to consumers as computer monitors (i.e. focusing on computer monitor as the primary function) or as dual-function computer monitors and televisions. However, products with a tuner/receiver and computer capability that are marketed and sold as televisions are not included in the scope of this definition.

2 Scenario outputs

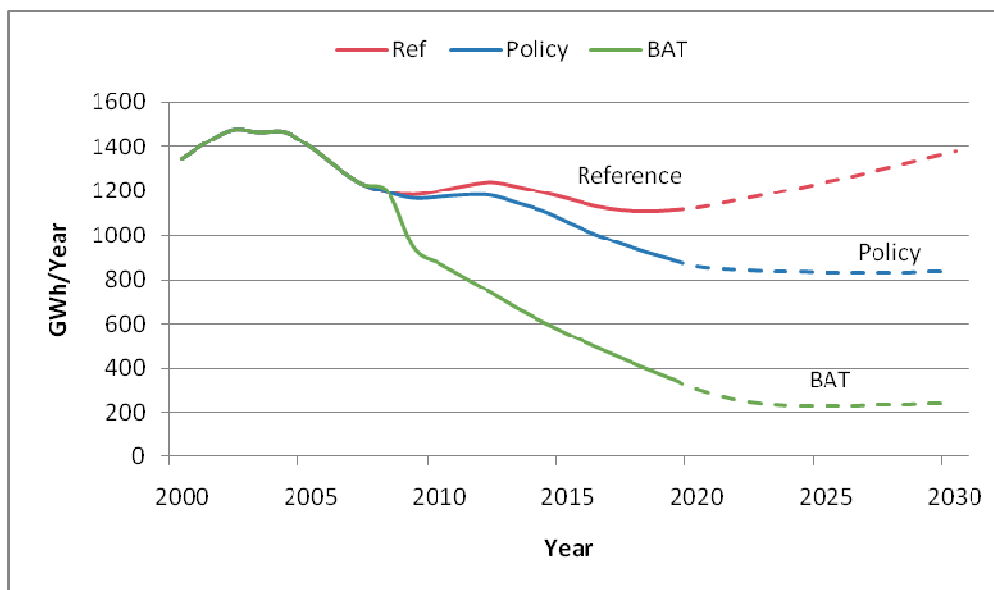
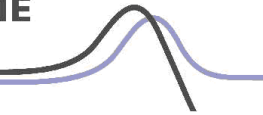


Figure 1 Total Non-Domestic Monitor Energy Consumption

- Total non-domestic reference scenario energy consumption for monitors is expected to increase until 2012 primarily due to an increase in stock. This increase occurs despite increasing efficiency in the dominant LCD monitor type. Total energy



consumption is expected to fall from 2013 due to increased efficiency but increase once again around 2018 due to continued growth in stock.

- Total reference scenario energy consumption from CRT monitors is expected to fall as stock levels diminish. All three scenarios have the same line as CRT products are becoming obsolete.
- Total reference scenario energy consumption from LCD monitors is expected to increase until 2012 due to increasing stock levels. From 2013 energy consumption is expected to fall due to increased efficiencies until increasing stock levels offset efficiency gains again around 2018 and total energy consumption starts to climb.
- Total reference scenario energy consumption from plasma monitors is expected to fall as stock levels diminish.

Table 1 – Non-Domestic Summary energy consumption² and CO₂ emissions³

Energy Consumption (GWh)	2009	2020	2030
Plasma	10	0	0
CRT	80	0	0
LCD	1100	1130	1380
TOTAL	1180	1130	1380
CO ₂ Emissions (MtCO ₂)			
Plasma	0.01	0.00	0.00
CRT	0.03	0.00	0.00
LCD	0.39	0.40	0.49
TOTAL	0.42	0.40	0.49

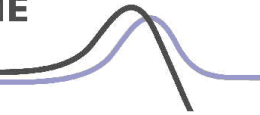
² Energy consumption figures for the non-domestic sector in the 2009/2010 Consultation Document 'Saving energy through better products and appliances' were scaled down to match DECC projections for overall energy demand (www.decc.gov.uk/en/content/cms/statistics/publications/dukes/dukes.aspx).

MTP data represents the best currently available information based on a bottom-up modelling approach. MTP's data is the basis for detailed energy calculations in the 2009/2010 Consultation Document. However, DECC projections indicate that overall energy demand in the non-domestic sector is lower than projected by MTP's detailed models. MTP has assumed that the differences between the DECC overall projections and its detailed bottom-up projections are due to incomplete data on the following inputs for some of its non-domestic products:

- existing product stock;
- existing product efficiency;
- product usage.

The energy consumption figures in these GSBNs have **not** been scaled down, in order to enable constructive stakeholder comment on the MTP input data, and therefore differ from the ones presented in the 2009/2010 Consultation Document.

³ Refer to BNXS01 Carbon Dioxide Emission Factors for UK Energy Use for details on factors used.



3 Current policy & measures

- ENERGY STAR is the dominant energy efficiency policy covering ICT products. The ENERGY STAR label is led by the US Environmental Protection Agency (EPA) but the European Commission has an agreement with the US Government to coordinate the energy labelling of office equipment through an EU ENERGY STAR programme. ENERGY STAR aims to qualify around the top performing 25 per cent of products at the time of specification (usually around nine months to one year prior to a specification coming into effect). Due to the complexity of the programme, it is not possible to revise the criteria as frequently as ICT product development moves. This means that compliance rates to ENERGY STAR can be high at the end of a specification cycle.
- The ENERGY STAR Version 4.1 monitor tier II specification (covering CRT, LCD and Plasma monitors as defined in this briefing note) was implemented on the 1st January 2006⁴. Version 5.0 of the ENERGY STAR Display specification was finalised in March 2009 with tier I requirements to be implemented in October 2009 and tier II requirements implemented in October 2011.
- The European Commission has published a set of mandatory implementing measures covering the standby and off-modes of electrical and electronic household and office equipment (although office equipment needs to be intended for use in the domestic premises). The Energy Using Products (EuP) Standby Implementing Measures are due to come into force January 2010 with a second tier of requirements due to be enforced January 2013. It is assumed that the Standby Implementing measures will apply to the off-mode of monitors.
- The EU Eco-label voluntary scheme designed to encourage businesses to market products and services with reduced overall lifecycle environmental impacts. The EU Eco-label serves as a communication system to identify whether products are deemed to have reduced environmental impacts compared to average products on the market. Energy efficiency criteria included in the label are expected to refer to ENERGY STAR. Few ICT products currently hold the EU Eco-label. A modest increase in EU Eco-label coverage is expected into the future.
- Government procurement includes a mandate that all monitors procured by central Government should meet ENERGY STAR specifications. This follows the 2007 revised ENERGY STAR agreement which requires central government procurement to ENERGY STAR efficiency levels or equivalent (without prejudice to Community and national law and economic criteria). Government procurement specifications are assumed to be implemented through the “Quick Wins” programme.

⁴ ENERGY STAR® Program Requirements for Computer Monitors Eligibility Criteria (Version 4.1) available from <http://www.energystar.org/en/254.shtml#20041222>

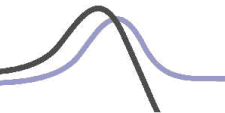


Table 2 Current policies & measures, Reference Scenario

Policy name	Period in force	Description	Impact																												
ENERGY STAR	2006 – 2009 (Version 4.1 Tier II) 2009-2013 (Version 5.0 Tier I)	<p>Applies energy efficiency criteria for all monitor types covered in this GSBN:</p> <p>ENERGY STAR Version 4.1 Tier II</p> <table border="1"> <thead> <tr> <th>On-Mode</th> <th>Sleep (W)</th> <th>Off (W)</th> </tr> </thead> <tbody> <tr> <td>X < 1 megapixel, then Y = 23; if X > 1 megapixel, then Y = 28X (X = number of megapixels and Y = Wattage limit)</td> <td>2.00</td> <td>1.00</td> </tr> </tbody> </table> <p>ENERGY STAR Version 5.0 Tier I</p> <table border="1"> <thead> <tr> <th>Display Category</th> <th>Maximum On Mode Power Consumption (W)</th> <th>Sleep (W)</th> <th>Off (W)</th> </tr> </thead> <tbody> <tr> <td>Diagonal Screen Size < 30 inches Screen Resolution ≤ 1.1 MP</td> <td>$PO = 6*(MP) + 0.05*(A) + 3$</td> <td rowspan="2">2.00</td> <td rowspan="2">1.00</td> </tr> <tr> <td>Diagonal Screen Size < 30 inches Screen Resolution ≥ 1.1 MP</td> <td>$PO = 9*(MP) + 0.05*(A) + 3$</td> </tr> </tbody> </table> <p>MP = Display Resolution (megapixels) A = Viewable Screen Area (square inches)</p>	On-Mode	Sleep (W)	Off (W)	X < 1 megapixel, then Y = 23; if X > 1 megapixel, then Y = 28X (X = number of megapixels and Y = Wattage limit)	2.00	1.00	Display Category	Maximum On Mode Power Consumption (W)	Sleep (W)	Off (W)	Diagonal Screen Size < 30 inches Screen Resolution ≤ 1.1 MP	$PO = 6*(MP) + 0.05*(A) + 3$	2.00	1.00	Diagonal Screen Size < 30 inches Screen Resolution ≥ 1.1 MP	$PO = 9*(MP) + 0.05*(A) + 3$	<p>The ENERGY STAR specifications are set to represent approximately the top 25% of energy performing products on the market. MTP assumed ENERGY STAR specifications for 2009 (averaged across all monitor sizes):</p> <table border="1"> <thead> <tr> <th></th> <th>On-Mode (W)</th> <th>Sleep (W)</th> <th>Off (W)</th> </tr> </thead> <tbody> <tr> <td>CRT</td> <td>19.98</td> <td>2.00</td> <td>1.00</td> </tr> <tr> <td>LCD</td> <td>26.35</td> <td>2.00</td> <td>1.00</td> </tr> </tbody> </table> <p>The CRT on-mode (W) value is lower than the LCD on-mode (W) value due to the small screen size of CRT monitors on the market.</p> <p>LCD monitor compliance is assumed to increase over time to 71% by 2013. It is further assumed that less than 1% of CRT monitors will be able to meet the ENERGY STAR specifications.</p>		On-Mode (W)	Sleep (W)	Off (W)	CRT	19.98	2.00	1.00	LCD	26.35	2.00	1.00
On-Mode	Sleep (W)	Off (W)																													
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	On-Mode (W)	Sleep (W)	Off (W)																												
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LCD	26.35	2.00	1.00																												
EuP Standby Implementing Measures	2010 and 2013	Applies maximum power consumption figures for off-mode of all monitors.	EuP levels of 1W off-mode by 2010 moving to 0.5W off-mode by 2013. Will remove worst performing products in off-mode from the EU market.																												
Government Procurement	2009	Applies ENERGY STAR criteria to all central Government procurement	Expected to have a relatively small impact due to use of ENERGY STAR specifications																												

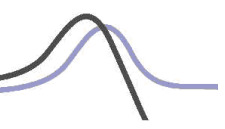


Table 3 Test Standards

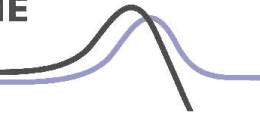
Test Standard name	Date in force	Description	Comments
ENERGY STAR® Program Requirements for Monitors Version 4.1	2006	Provides methodology for identifying the on-mode, sleep mode and off-mode of monitors	
ENERGY STAR® Program Requirements for Displays Version 5.0	2009	Provides methodology for identifying the on-mode, sleep mode and off-mode of monitors	Includes reference to other test methodologies
IEC 62301	2005	Household electrical appliances – Measurement of standby power	Used for measurement of standby and other low power modes (network and off-mode). In the process of being revised.

3.1 Policy timeline

- The following policy timeline identifies when policies come into effect, including future revisions that are formally signed off:

Table 4 Current policies & measures, Reference Scenario

Policy name	Current specification in force	2009	2010	2011	2012	2013	2014	2015	2016-2020
ENERGY STAR	Jan 2006	V5.0 Tier I in force October		V5.0 Tier II in force October					
EuP Standby Implementing Measures	N/A		Jan (1W)				Jan (0.5W)		
Government Procurement	2009								



4 Efficiency

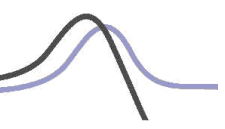
4.1 Summary

- This section provides details of the efficiency inputs assumed (for new sales i.e. not stock average).
- The main efficiency metric for monitors is on-active power (W). ENERGY STAR on-active specifications include a maximum power consumption value in watts expressed as formulae. The ENERGY STAR V4.0 on-active specifications are based on monitor resolution whereas the ENERGY STAR V5.0 on-active specifications are based on both resolution and screen size. ENERGY STAR V4.1 and V5.0 also include power (W) consumption specifications for the sleep and off modes of monitors.
- The EuP Standby Implementing Measures are also expressed in units of power (W).

Table 5 – Non-Domestic monitor product power consumption

Year	On-Active (W)		
	CRT	LCD	Plasma
2009	89.2	32.0	302.4
2010	89.0	31.6	306.8
2020	20.0	27.2	202.7
2030	20.0	29.4	202.7

- Table 5 shows the expected power consumption for CRT, LCD and plasma monitors in on-active mode.
- CRT on-active power is assumed to fall until 2016 when it reaches a minimum of 20W. It is assumed that any CRT monitors left on the market will be small screened devices used for niche applications.
- LCD on-active power is assumed to fall until 2019. These reductions are due to assumed increased efficiency resulting from product changes such as the inclusion of LED backlights. LCD on-active power is assumed to increase after 2019 due primarily to a continued increase in screen size.
- Plasma monitor figures are taken from the consumer electronics reference scenario but with a small amount of power removed to account for the assumed lack of tv tuner in plasma display monitors.



4.2 Data sources – efficiency

Table 6 CRT Monitor Efficiency data sources

Year	Reference	Reference date	Author	Justification	Confidence in sources (High/Low)
2007, 2008	Energy Star FTP ⁵ download 13.10.06	2006	ENERGY STAR	Best Data	High
2007, 2008	Energy Star FTP download 20.07.06	2006	ENERGY STAR	Best Data	High
2007, 2008	EU Energy Star Database 07-12-06	2006	ENERGY STAR	Best Data	High
2007, 2008	EU ENERGY STAR DATABASE 14/01/08	2008	ENERGY STAR	Best Data	High
2007, 2008	US ESTAR Monitor Draft Dataset V5.0 Dec 2008	2008	ENERGY STAR	Best Data	High
1993, 2000, 2007, 2008, 2010, 2012, 2013, 2016, 2020	Expert Assumptions	2009	MTP Technical Expert	Required expert assumptions to collate power	Medium

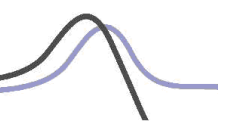
Table 7 LCD Monitor Efficiency data sources

Year	Reference	Reference date	Author	Justification	Confidence in sources (High/Low)
2007, 2008	Energy Star FTP download 13.10.06	2006	ENERGY STAR	Best Data Available	High
2007, 2008	Energy Star FTP Download 20-07-06	2006	ENERGY STAR	Best Data Available	High

⁵ FTP = file transfer protocol. Data is downloaded using FTP directly from the ENERGY STAR database.

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Year	Reference	Reference date	Author	Justification	Confidence in sources (High/Low)
2007, 2008	EU Energy Star Website Download 07-12-06	2006	ENERGY STAR	Best Data Available	High
2007, 2008	Energy Star Current 27-10-06	2006	ENERGY STAR	Best Data Available	High
2007, 2008	Energy Star FTP Download 13-10-06	2006	ENERGY STAR	Best Data Available	High
2007, 2008	MTP TESTS AUGUST 2007	2007	MTP	Best Data Available	High
2007, 2008	EU ENERGY STAR DATABASE 14/01/08	2008	ENERGY STAR	Best Data Available	High
2007, 2008	Danish Energy Saving Trust Download 30-01-08	2008	Danish Energy Saving Trust	Best Data Available	High
2007, 2008	US Energy Star Download 01-07-07 to 01-02-08	2008	ENERGY STAR	Best Data Available	High
2007, 2008	US ENERGY STAR FTP Oct 2008 ftp://ftp.powweb.com/	2008	ENERGY STAR	Best Data Available	High
2007, 2008	EU ENERGY STAR DOWNLOAD OCT-2008	2008	ENERGY STAR	Best Data Available	High
2007, 2008	US ESTAR Monitor Draft Dataset V5.0 Dec 2008	2008	ENERGY STAR	Best Data Available	High
2007, 2008	MTP Test September 2008	2008	MTP	Best Data Available	High
2007, 2008	Danish EST 02-2009 - http://application.sparel.dk/ItWebUI/index.aspx	2009	Danish Energy Saving Trust	Best Data Available	High
2000, 2007, 2008, 2010, 2012, 2013, 2016, 2020	Expert Assumptions	2009	MTP Technical Expert	Required expert assumptions to collate power	Medium

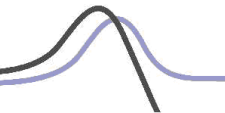
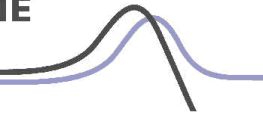


Table 8 - Plasma Monitor Efficiency data sources

Year	Reference	Reference date	Author	Justification	Confidence in sources (High/Low)
2008	MTP Television GSBN	2009	Various	Best Data Available	High
2008	Expert Assumption	2009	MTP Technical Expert	Required expert assumptions to reduce TV tuner allowance	Medium

4.3 Methodology & key assumptions – efficiency

- This section describes what has been done with the data listed in Table 6, Table 7 and Table 8 along with a rationale for any key assumptions (in particular any expert judgements listed in Table 6, Table 7 and Table 8) and detail of any background calculations behind the data points



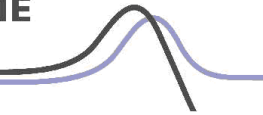
4.3.1 Historic data

Table 9 Interpolation & background calculations – efficiency

Year	Methodology & assumptions
	Active mode (CRT):
1960-1992	CRT on-active mode is kept the same as the 1993 figure in the absence of further information. MTP models start in 1960 and this year is used as the base year for power consumption. Not all products would have been available on the market at this time. MTP models start in 1960 and this year is used as the base year. MTP include some assumptions back to 1960 for completeness and flexibility in the models. Based on an expert assumption in light of no further information being available.
1993	CRT on-active mode of 60W is assumed. This value is an expert assumption as no other data was available for this time period.
1994-2006	CRT on-active mode power is based on a straight line interpolation between the 1993 and 2007 figures.
	Active mode (LCD):
1960-1999	LCD on-active mode is kept the same as the 2000 figure in the absence of further information.
2000	LCD on-active mode of 38W is assumed. This value is an expert assumption as no other data was available for this time period.
2001-2006	LCD on-active mode power is based on a straight line interpolation between the 2000 and 2007 figures.
	Sleep mode (CRT):
1960-1999	CRT sleep mode is kept the same as the 2000 figure in the absence of further information.
2000	CRT sleep mode of 3.5W is assumed. This value is an expert assumption as no other data was available for this time period.
2001-2006	CRT sleep mode power is based on a straight line interpolation between the 2000 and 2007 figures.
	Sleep mode (LCD):
1960-1999	LCD sleep mode is kept the same as the 2000 figure in the absence of further information.
2000	LCD sleep mode of 2.0W is assumed. This value is an expert assumption as no other data was available for this time period.
2001-2006	LCD sleep mode power is based on a straight line interpolation between the 2000 and 2007 figures.
	Off mode (CRT):
1960-1999	CRT off mode is kept the same as the 2000 figure in the absence of further information.
2000	CRT off mode of 2.5W is assumed. This value is an expert assumption as no other data was available for this time period.
2001-2006	CRT off mode power is based on a straight line interpolation between the 2000 and 2007 figures.
	Off mode (LCD):
1960-2003	LCD off mode is kept the same as the 2004 figure in the absence of further information.
2004	LCD off mode of 1.3W is assumed. This value is an expert assumption as no other data was available for this time period.
2005-2006	LCD off mode power is based on a straight line interpolation between the 2004 and 2007 figures.
	All power modes:

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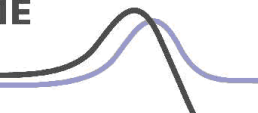


1960-2007	Plasma monitors: same approach as in 2008.
2007, 2008	CRT and LCD monitors (all power modes): Weighted power figures across all data sources (prior to 2008 for the 2007 average figure) listed in Table 6 and Table 7 above. Weighting based on confidence in data source, data year, data source, size of dataset, country of origin and relevance to domestic or non-domestic sector.
2008	Plasma monitor: power figures sourced from MTP plasma television model with 50% reduction on base load on-active mode power used for TV tuners. This reduction is based on an expert assumption in light of no further information being available.

4.3.2 Future analysis

Table 10 Extrapolation & background calculations – efficiency

Year	Methodology & assumptions
2009-2011	CRT and LCD monitor (all power modes): based on a straight line interpolation between adjacent years figures.
	Active mode (CRT / LCD):
2012	CRT and LCD monitor: values for on-active mode are based on a weighted percentage of products which meet the ENERGY STAR specification with the remaining percentage of products meeting the average 2009 Reference scenario value. ENERGY STAR coverage rates are considered to be lower in the Reference scenario than in the policy line for monitors to account for slower uptake of ENERGY STAR within the reference scenario.
2013-2015	CRT and LCD on-active - straight line interpolation between 2012 and 2016
2016	CRT and LCD on-active - assumed all products meet 2009 ENERGY STAR spec level. Based on an expert assumption in light of no further information being available.
2017-2030	CRT monitors on-active power assumed to remain at the 2016 level. Assumed that no further efficiency improvements will occur in this mature technology without further policy intervention. Based on expert assumption in light of no further
2020	LCD on-active power: uses the 2016 value plus an increase based on changes in the distribution of monitor screen sizes in the ENERGY STAR database (2008) and the effect on the average power requirements of monitors meeting the 2009 ENERGY STAR specification over time.
2024, 2028, 2032	LCD on-active power: uses the same approach as in 2020 but uses 2020, 2024 and 2028 as the base year.
2017-2019 2021-2023 2025-2027 2029-2031	LCD on-active power: based on a straight line interpolation between the adjacent years' figures.
	Sleep mode (CRT / LCD):
2012	CRT and LCD sleep mode – assumed to be the same as 2008. Based on an expert assumption.
2013-2015	CRT and LCD sleep mode - straight line interpolation between 2012 and 2016
2016	CRT and LCD sleep mode values are based on a weighted percentage of products which meet the 2009 ENERGY STAR specification with the remaining percentage of products meeting the average 2009 Reference scenario value. The percentage of products assumed to comply with the 2009 ENERGY STAR specification is listed in the policy GSN for monitors.
2017-2030	CRT – sleep mode uses the 2016 value as no further data available.



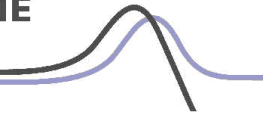
Year	Methodology & assumptions
2020	LCD sleep mode power is assumed to match the 2012 published ENERGY STAR specification value. Based on an expert assumption as no further data available.
2021-2030	LCD sleep mode power is assumed to be the same as in 2020. Based on an expert assumption that no further changes will occur without additional policy measures in place.
	Off mode (CRT / LCD):
2010	CRT and LCD off mode - EuP standby implementing measures applied at 1W.
2011-2012	CRT and LCD off mode - straight line interpolation between 2010 - 2013
2013	CRT and LCD off mode - EuP standby implementing measures applied at 0.5W.
2014-2030	CRT and LCD off mode assumed to be the same as in 2013. Based on an expert assumption that no further changes will occur without additional policy measures in place.
	All modes (Plasma):
2009 - 2030	Plasma monitor – figures adopted from MTP consumer electronics plasma monitor GSBN. Reduction of 50% applied to intercept to account for reduced likelihood of TV tuner.

4.4 Data issues – efficiency

- This section flags any areas of uncertainty, both in general and for specific data points, along with a description of how this has been dealt with in the model

Table 11 Data issues – efficiency

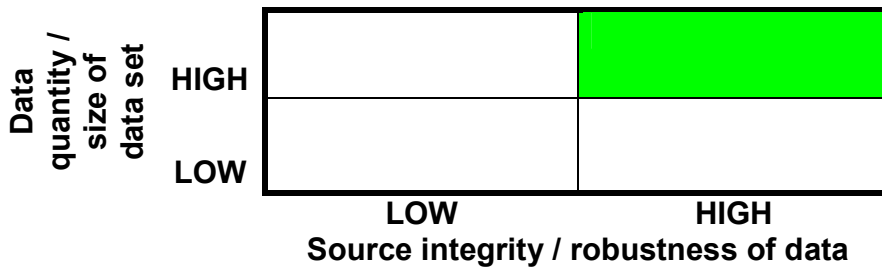
Issue/risk	Approach taken/rationale
Much of the power data sourced for monitors comes from products compliant to ENERGY STAR. There is a risk that the average figures could be too low in relation to the “true” market average.	MTP have commissioned their own testing and power figures are included in the datasets. More testing in future of non-ENERGY STAR compliant products could be considered.
Product development in the ICT industry is rapid. The Reference scenario assumptions could change with a sudden uptake of an extremely efficient /inefficient product or with a stronger than expected move towards large screen size.	MTP review the Reference scenario figures on an annual basis. This annual review will ensure that MTP Reference scenario figures reflect current product performance as closely as possible.
Alternative screen types such as organic light emitting diodes (OLEDs) are beginning to break into the television market. Rapid uptake of OLED monitors could cause a large change in Reference scenario figures.	MTP does not currently model OLED screen monitors due to uncertainties around when they will arrive on the market in significant numbers. MTP expects OLED displays to first enter the television market in significant numbers and then transfer into the monitor market. These assumptions are reviewed on an annual basis.
There is little efficiency data available for CRT monitors due to their very small market share. Those CRT monitors that are left on the market tend to have small	MTP will continue to evaluate the energy efficiency of the small number of CRT monitors on the market. MTP will also evaluate whether continued detailed modelling of CRT monitors is warranted given the



Issue/risk	Approach taken/rationale
screen areas and are primarily used in specialist applications.	very low sales figures.
There is little evidence to suggest whether future efficiency in sleep mode will increase or decrease.	Sleep mode power figures largely constant into future. MTP to re-evaluate during next modelling phase.

4.5 Confidence level – efficiency

- Efficiency data for LCD monitors is available from a number of different sources including government programmes and industry declarations. There are some risks that the datasets may be too heavily dependent on data sourced from ENERGY STAR as this programme offers the most comprehensive source of ICT product data. Placing too high a weighting on ENERGY STAR data could result in MTP Reference scenario figures underestimating the average power requirement of ICT products on the market. MTP have taken some steps to minimise any excessive weighting assigned to ENERGY STAR specifications by including figures for non-ENERGY STAR compliant products in average power requirements calculations.
- ICT products can change rapidly therefore confidence in efficiency figures decreases with time.



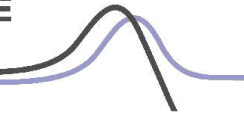


Figure 2 Confidence indicator for efficiency data

5 Usage

5.1 Summary

- Two sets of use profiles are developed for CRT and LCD monitors. The first use profile is based on a situation where no power management is enabled and the second where power management is enabled (see Key Inputs GSN for profiles). An “enabling rate” is used as a weighting factor between these two use profiles to arrive at overall use profile for each product. No enabling rates are developed for plasma monitors as it is assumed that these types of monitors do not have a sleep mode.
- The table below shows average usage profiles, derived from the Reference scenario enabling rate and the power managed and non power managed profiles discussed in the Key Inputs briefing note.

Table 12 - Average Usage CRT, LCD and Plasma monitors


CRT and LCD Monitor					
Reference scenario (Use Hours/Year)					Power Management Enabling Rates
Year	On-Active	Sleep	Off	Off-Unplugged	%
2008	1,630	410	6,431	289	60
2010	1,630	410	6,431	289	60
2020	1,630	410	6,431	289	60
2030	1,630	410	6,431	289	60

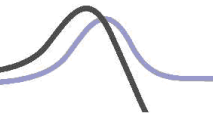
Table 13 – Average Usage Plasma monitors

Plasma Monitor				
Reference scenario (Use Hours/Year)				
Year	On-Active	Sleep	Off	Off-Unplugged
2008	1,920	-	6,840	-
2010	1,920	-	6,840	-
2020	1,920	-	6,840	-
2030	1,920	-	6,840	-

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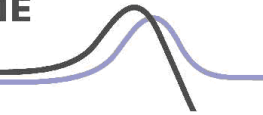
- 
- Non-domestic CRT and LCD monitor on-active use time is expected to remain constant in the reference scenario due to limitations on office hours dictating maximum use times and no improvement in power management enabling.
 - On-active time for plasma monitors is assumed to remain constant into the future for all scenarios as it is assumed that no power management functionality is available for these products.



5.2 Data sources – usage

Table 14 Usage data sources (enabling rates)

Year	Reference	Reference date	Author	Justification	Confidence in sources (High/Low)
2008	TIAX: US Residential IT Energy Consumption in 2005 and 2010	2006	TIAX	Includes estimated power management enabling rates	Medium
2008	Expert Assumptions	2009	MTP Technical Expert	Required expert assumptions to develop power management enabling rates	Medium



5.3 Methodology & key assumptions – usage

- This section describes what has been done with the data listed in Table 14 along with a rationale for any key assumptions (in particular any expert judgements listed in Table 14) and detail of any background calculations behind the data points.

5.3.1 Historic data

Table 15 Interpolation & background calculations – usage data

Year	Methodology & assumptions
1960 - 2008	CRT and LCD monitors - two sets of use profiles are developed for each product type one based on a situation where no power management is enabled and the second where power management is enabled. An “enabling rate” is used as a weighting factor between these two use profiles to arrive at overall use profile for each product. Details about the use profiles can be found in the Key Inputs GSBN.
1960 - 2008	Plasma monitors – one use profile is developed as it is assumed these products do not have a sleep mode. No enabling rates are therefore developed for these types of monitors. Details about the use profiles can be found in the key inputs GSBN.
2008	CRT and LCD monitors – power management enabling rate at 60% based on data included in TIAX report.
1960-2007	CRT and LCD monitors – power management enabling rate at the 2008 value. Based on an expert assumption as no further data available. Power management rates could have been lower in earlier years but these products would have already left stock and so the assumption has little or no impact on product group energy consumption.

5.3.2 Future analysis

Table 16 Extrapolation & background calculations – usage data

Year	Methodology & assumptions
2009-2030	CRT and LCD monitor power management enabling rates assumed to be the same as in 2008 as no further improvement is expected to occur without additional policy measures.
2009 - 2030	CRT, LCD and plasma monitor use profiles (all power modes) based on same approach as in 2008.

5.4 Data issues – usage

- This section flags any areas of uncertainty, both in general and for specific data points, along with a description of how this has been dealt with in the model.

Table 17 Data issues – usage

Issue/risk	Approach taken/rationale
Power management enabling rates can have a large impact of overall use	MTP has included a number of expert assumptions which estimate power management enabling rates.

profiles. Over or under-estimation of power management enabling rates could have a consequentially large impact on overall use hours	MTP will continue to evaluate new use profile data.
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5.5 Confidence level – usage

- This section provides an indication of overall confidence in the data set (i.e. data points, interpolation and projections)
- Confidence levels about actual base use profiles are included in the key inputs GSBN's. Confidence levels in the power management enabling rates are relatively low, especially for future years, due to the large potential for users to disable functionality.

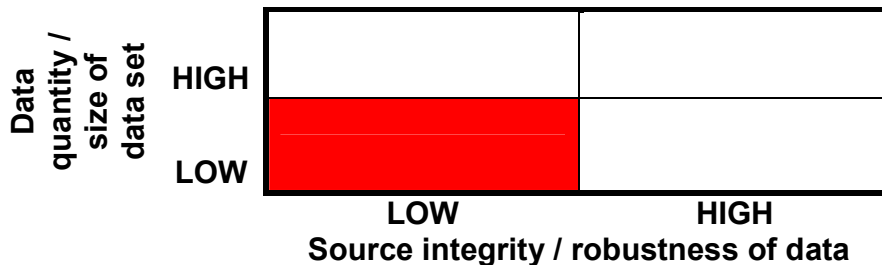


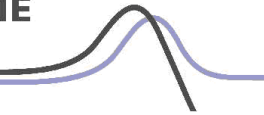
Figure 3 Confidence indicator for usage data

6 Other issues

- None addressed

Related MTP information

- BN-NDICT MON01: Government Standards Evidence Base 2009 – Key Inputs, Non Domestic Monitors
- BN-NDICT MON03: Government Standards Evidence Base 2009 – Policy Scenario, Non Domestic Monitors
- BN-NDICT MON04: Government Standards Evidence Base 2009 – Best Available Technology (BAT) Scenario, Non Domestic Monitors
- BN-DICT MON01: Government Standards Evidence Base 2009 – Key Inputs, Domestic Monitors
- BN-DICT MON02: Government Standards Evidence Base 2009 – Reference Scenario, Domestic Monitors
- BN-DICT MON03: Government Standards Evidence Base 2009 – Policy Scenario, Domestic Monitors
- BN-DICT MON04: Government Standards Evidence Base 2009 – Best



Available Technology (BAT) Scenario, Domestic Monitors

- BN-NDICT KO01: Government Standards Evidence Base 2009 – Key Outputs, Non Domestic ICT
- BN-DICT KO01: Government Standards Evidence Base 2009 – Key Outputs, Domestic ICT

Changes from previous version

- No changes. This is the first published version.

Consultation and further information

Stakeholders are encouraged to review this document and provide suggestions that may improve the quality of information provided, email info@mtprog.com quoting the document reference, or call the MTP enquiry line on +44 (0) 845 600 8951.

For further information on related issues visit www.mtprog.com