

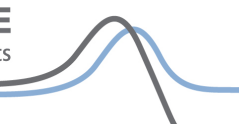
BNSTL01: Street & Traffic Lighting Government Standards Evidence Base 2009: Key Inputs

Version 1.1

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 aim of this Briefing Note is to provide details and reference sources of the underlying data in the model, along with the key assumptions used in the model.
- There are three main sections to this Briefing Note, corresponding to the main variables of the MTP modelling approach:
 - Ownership & stock
 - Sales
 - Usage
- Each section also includes an indication of the overall confidence in the dataset, to provide a sense of the robustness of the model.
- This GSN covers lamps, ballasts and luminaires used for street & traffic lighting.
- Street lighting refers to all public street lighting and signage. Lamps used for street lighting are CFLs (for signage), High-Pressure Mercury, Metal Halide, High-Pressure Sodium (HPS) and Low-Pressure Sodium (LPS).
- Traffic lighting refers to traffic signals. General Lighting Service (GLS) – mostly tungsten halogen - and Light Emitting Diodes (LEDs) lamps are used for traffic signals.



2 Ownership & stock

2.1 Summary

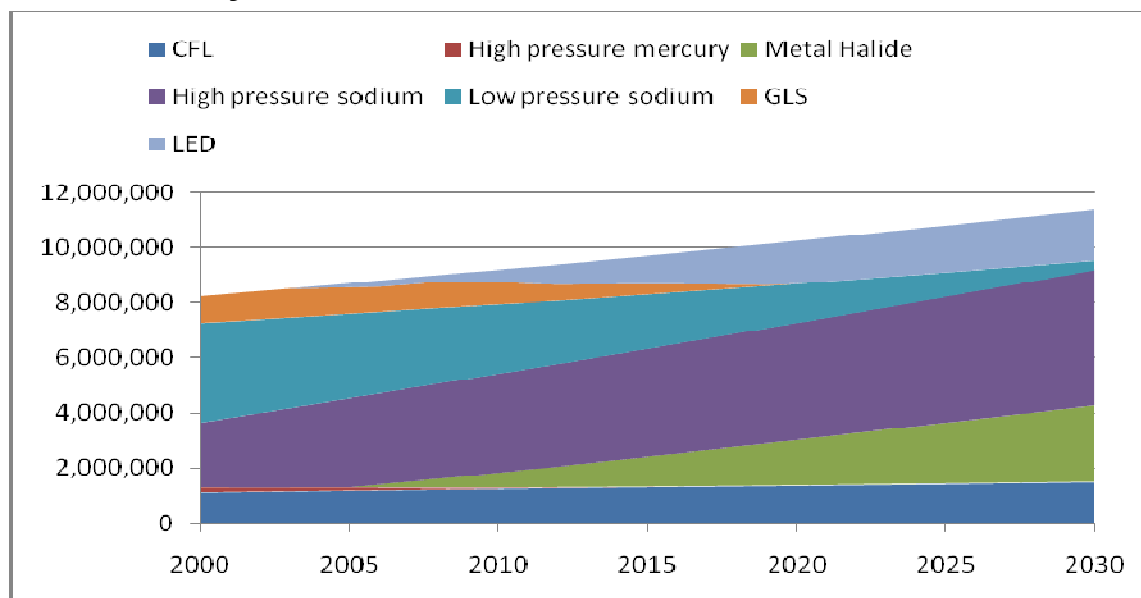


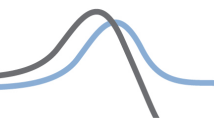
Figure 1: Street & Traffic lighting lamp stock

Table 1 Summary stock data (Street Lighting)

	Stock ('000)					
	TOTAL	CFL	High Pressure Mercury	Metal Halide	High Pressure Sodium	Low Pressure Sodium
2007	7,751	1,199	72	218	3,393	2,869
2010	7,951	1,240	31	546	3,600	2,534
2020	8,706	1,353	-	1,655	4,260	1,438
2030	9,553	1,484	-	2,787	4,934	348

Table 2 Summary stock data (Traffic Lighting)

	Stock ('000)		
	TOTAL	GLS (Tungsten halogen)	LED
2007	1,174	931	243
2010	1,262	814	448
2020	1,553	3	1,550
2030	1,844	-	1,844



2.2 Data sources – ownership & stock

Table 3 Ownership & stock data sources (Street Lighting)

Year	Lamp Type	Reference	Reference date	Author	Justification	Confidence in sources (High/Low)
1960-2008	All	ASLEC Survey 2001	2001	Association of Street Lighting Electrical contractors (ASLEC)	Survey results covered about one third of all street lighting installations in UK.	High confidence for years to 2001
1960-2008	All	Data Build report 'Analysis of street lighting in the UK'	1997	Data Build for BRECSU	Detailed analysis derived from survey of local authorities	Medium
2002-2008	All	Small survey of local authorities (unpublished data)	2009	Compiled by BRE	Confirmed that previous MTP stock mix predictions were reasonable	Medium

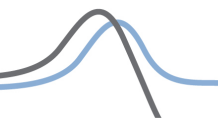
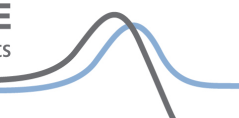


Table 4 Ownership & stock data sources (Traffic Lighting)

Year	Lamp Type	Reference	Reference date	Author	Justification	Confidence in sources (High/Low)
1960 – 2030	All	Quick Hits – Traffic Signals	2006	UK Energy Research Centre (UKERC)	Reliable source	Medium
1960-2008	All	Data Build report 'Analysis of street lighting in the UK'	1997	Data Build for BRECSU	Detailed analysis derived from survey of local authorities	Medium
1960-2008	GLS	Highways Electrical Handbook	2001	Association of Street Lighting Electrical contractors	Reliable source	Low
1960-2008	LED	Technical expert opinion	2008	MTP Technical Expert	Based on discussions at MTP consultation meeting and with Department for Transport	Low



2.3 Methodology & key assumptions – ownership & stock

2.3.1 Historic data

Table 5 Interpolation & background calculations – ownership & stock (Street Lighting)

Year	Lamp Type	Methodology & assumptions
1960-2000	All	Based on stock growth rates 1985 – 1994 indicated in Data Build report 'Analysis of street lighting in the UK'
2001-2008	All	0.93% annual stock growth is assumed for all lamp types. This figure was derived from the average growth rate of households over the same period. It has been assumed, in the absence of other data that street lighting will grow at the same rate of household growth. However it is recognised that a large number of these households may be flats in high-rise properties, which would not require more lighting per household. This growth rate is therefore recognised to potentially be a little high.

Table 6 Interpolation & background calculations – ownership & stock (Traffic Lighting)

Year	Lamp Type	Methodology & assumptions
1960-2000	All	Based on stock growth rates indicated in Data Build report 'Analysis of street lighting in the UK' and the figure of 421,000 traffic light signal heads given in the UKERC report.
2001-2008	Total traffic signals	Growth rate of 3% of 2000 traffic signal stock is assumed. This is based on the same assumption made by UKERC's "Quick Win's document"

2.3.2 Future analysis

Table 7 Extrapolation & background calculations – ownership & stock (Street Lighting)

Year	Lamp Type	Methodology & assumptions
2009 – 2030	All	0.93% annual stock growth is assumed for all lamp types. This figure was derived from the average growth rate of households over the same period. It has been assumed, in the absence of other data that street lighting will grow at the same rate of household growth. However it is recognised that a large number of these households may be flats in high-rise properties, which would not require more lighting per household. This growth rate is therefore recognised to potentially be a little high.

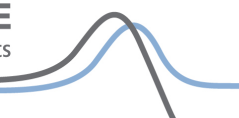


Table 8 Extrapolation & background calculations – ownership & stock (Traffic Lighting)

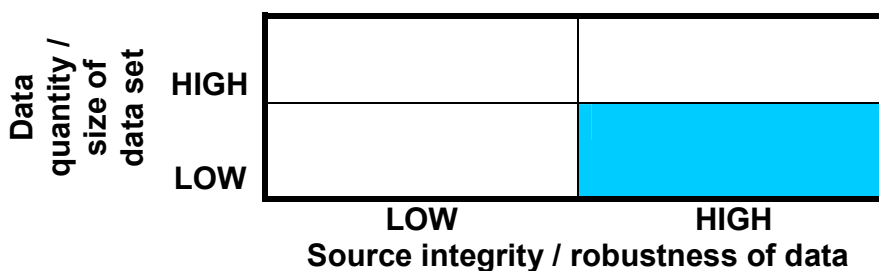
Year	Lamp Type	Methodology & assumptions
2009 - 2030	All	3% annual stock growth is assumed for all lamp types. This figure was based on the assumptions made in the UKERC report.

2.4 Data issues – ownership & stock

Table 9 Data issues – ownership & stock

Issue/risk	Approach taken/rationale
Disagreement between Data Build and Aslec survey estimates of street lamp numbers	Aslec survey thought to be more representative. Data Build figure of 6.0 million street lights in 1997 is not used. Aslec figure of 6.9 million is used in preference.

2.5 Confidence level – ownership & stock



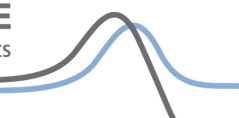


Figure 2 Confidence indicator for ownership data

- Aslec survey 2000-2001 is considered a reliable data source.
- Survey is almost 10 years old so historical projections to 2008 are more uncertain, and future projections are even more uncertain.

3 Sales

3.1 Summary

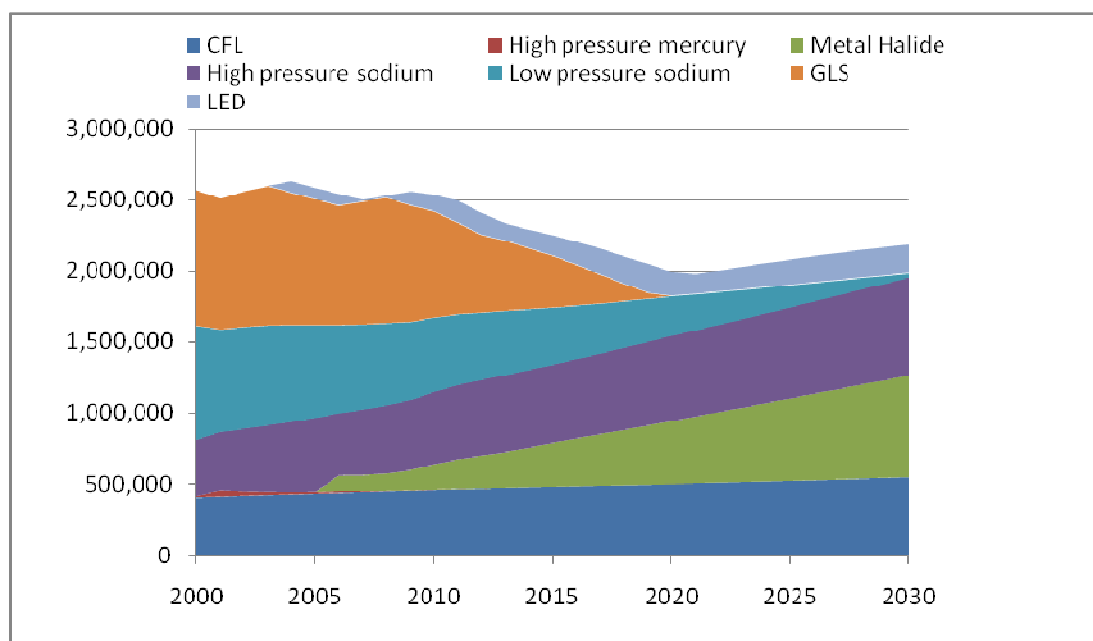


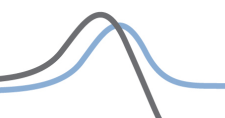
Figure 3: Street & Traffic lighting lamp sales (outputs)

This model is a stock-based model, which calculates sales using the stock projection and the product lifetime. Real sales data is put in as a check only, to help evaluate the output sales calculated from the model. This data series is usually incomplete. The sales shown in the previous graph was to illustrate the full generated (rather than input) sales data series. For full details of sales outputs, please see BNSTL05 – Key Outputs.

3.2 Data sources - sales

Table 10 Sales data sources (Street & Traffic Lighting)

Year	Lamp Type	Reference	Justification	Confidence in sources (High/Low)
1960-2010	All	No input sales data	No sales data available.	NA



3.3 Methodology & key assumptions - sales

- The MTP model is a stock-based model, which calculates sales using a stock projection, the product lifetime and a stock churn calculation to account for products purchased in previous years gradually leaving stock. Real sales data is put in as a check only, to help evaluate the output sales from the model. This data series is usually incomplete.

4 Usage

4.1 Summary

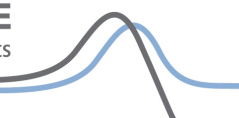
- Usage for all lamps used for street lighting is assumed to be 4,085 hours per year.
- Usage for all lamps used for traffic lighting is assumed to be 2,920 hours per year.

Table 11 Usage data sources (Street Lighting)

Year	Lamp Type	Reference	Reference date	Author	Justification	Confidence in sources (High/Low)
1960-2008	CFL	Analysis of Street Lighting in the UK	1997	Data Build Ltd	Based on a survey of local authorities by Data Build	Medium
1960-2008	All, except CFL	Analysis of Street Lighting in the UK	1997	Data Build Ltd	Based on a survey of local authorities by Data Build	High

Table 12 Usage data sources (Traffic Lighting)

Year	Lamp Type	Reference	Reference date	Author	Justification	Confidence in sources (High/Low)
1960-2008	GLS, LED	Technical expert opinion	2001	MTP Technical Expert	In absence of other information, assumption made that lamps used one third of the time	High



4.2 Methodology & key assumptions – usage

4.2.1 Historic data

Table 13 Interpolation & background calculations – usage data

Year	Methodology & assumptions
1960 - 2008	Usage is assumed not to change from Data Build estimate.

4.2.2 Future analysis

Table 14 Extrapolation & background calculations – usage data

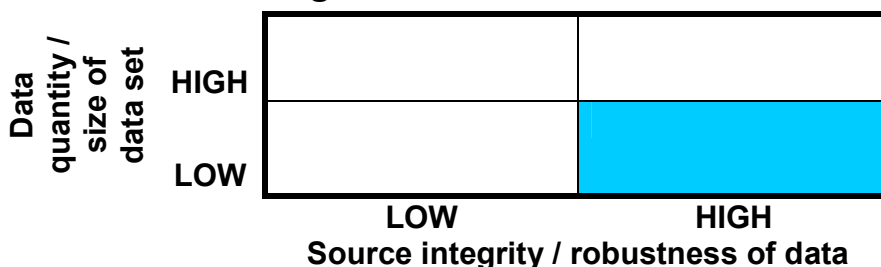
Year	Methodology & assumptions
2009-2030	Usage is assumed not to change from Data Build estimate. It is assumed that if usage changes, lamps will either be switched off altogether and hence are removed from stock numbers, or they are dimmed, which affects the average wattage. No assumption has been made specifically regarding switching lighting off outside peak hours.

4.3 Data issues – usage

Table 15 Data issues – usage

Issue/risk	Approach taken/rationale
Some signage (CFLs) may be used 24 hours a day and others may have been changed to reflective signs with no lighting.	MTP has no specific data on how many signs may be permanently on or how many have been changed from lit to reflective signs. As lighting the signs 24 hours a day increases usage and changing to reflective signs reduces usage, MTP currently assumes that the two factors are likely to balance each other out.
Traffic signal average usage has been assumed to be one third of a year per lamp. However many pedestrian crossings have lamps that are lit for 50% of time on average.	Usage of traffic signals may be slightly underestimated.

4.4 Confidence level – usage



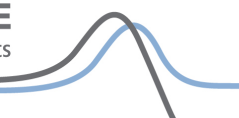


Figure 4 Confidence indicator for usage data

- Data Build estimates of street lighting use were derived from a survey of Local Authorities in 1997 and are considered sensible estimates of usage.
- Estimate of traffic signal usage less confident as the usage of pedestrian crossings is not fully taken into account.

Related MTP information

- Briefing Note BNCL12: Light-emitting Diodes - Innovation Briefing Note
- BNSTL02: Street & Traffic Lighting Government Standards Evidence Base 2009: Reference Scenario
- BNSTL03: Street & Traffic Lighting Government Standards Evidence Base 2009: Policy Scenario
- BNSTL04: Street & Traffic Lighting Government Standards Evidence Base 2009: Best Available Technology Scenario
- BNSTL KO01: Street & Traffic Lighting Government Standards Evidence Base 2009: Key Outputs

Changes from Version 1.0

- Minor changes to GSBN template.

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 <http://efficient-products.defra.gov.uk>