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BS5489-1: 2013 (and EN13201)

Energy Reduction Strategy

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Lighting Design standards

- Why they are essential?
- Energy reducing strategies supported by BS5489-1:2013
- BS5489 key changes
- Implications for LED & CMS

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BS5489-1:2013

BS 5489-1:2013

BSI Standards Publication

Code of practice for the design of road lighting

Part 1: Lighting of roads and public amenity areas

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raising standards worldwide™

BSi

- Guidance on using EN13201

- No conflicts allowed with EN13201

- EN13201 takes precedence

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BS 5489-1:2013 Themes for change

Recommendations for Road Lighting Design for
all types of highway & public thoroughfare

1. Energy
2. Competency
3. Risk Assessments
4. Environment
5. Health & Safety

BS 5489-1:2013

5 Key Drivers for Energy Reduction:

1. New minima for "P" classes
   - Potential for increased spacing or lower wattage
2. New Selection Process for Lighting Classes
   - lower target light levels
3. Revised Maintenance Factors
   - higher spacing or lower wattage
4. S/P ratio for white light sources
   - lower target illuminance on subsidiary roads
5. Variable Lighting
   - Reduction in consumed kWh

Energy Management Options

- Selection of Lighting Class
- Efficient White light source
- Electronic Gear
- Efficient luminaire
- Efficient design
- Variable Lighting
- Profiling
- Trimming
- Constant light output
- CMS

Energy Reduction Strategy #1

Class	Illuminance Values (E)	
	Average	Min
P1	15	3
P2	10	2
P3	7.5	1.5
P4	5	1
P5	3	0.6
P6	2	0.4
P7	Performance not determined	

Proposed P classes for subsidiary roads in EN13201-2

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Energy Reduction Strategy #2
Selection of Lighting Class

BS EN 13201-2 – Performance Requirements

Class	Luminance of the road surface				Disability glare	Lighting of surround
	Dry condition			Wet	Dry condition	
	$\overline{L}$ cd/m^2	U_o [min]	U_l [a] [min]	U_o [b] [min]	TI in % [c] [max]	EIR [d] [min]
M1	2,00	0,40	0,70	0,15	10	0,35
M2	1,50	0,40	0,70	0,15	10	0,35
M3	1,00	0,40	0,60	0,15	15	0,30
M4	0,75	0,40	0,60	0,15	15	0,30
M5	0,50	0,35	0,40	0,15	15	0,30
M6	0,30	0,35	0,35	0,15	20	0,30

Energy Reduction Strategy #2
Selection of Lighting Class

Table A.2 – Lighting classes for very high speed (v≥ 60mph) and high speed traffic routes (v > 40mph)			
Traffic volume	**Lighting class**		
	Dual carriageway		**Single carriageway**
	Junction density: high	**Junction density: low**	
High to very high	M2	M3	M2
Low to moderate	M3	M4	M3
Very low	M4	M5	M4

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Energy Reduction Strategy #2
Selection of Lighting Class

Table A.5 – Lighting classes for subsidiary roads with low speed traffic (v ≤ 30 mph) –				
Traffic flow	**Ambient luminance: very low (E1)**	**Ambient luminance: low (E2)**	**Ambient luminance: moderate (E3)**	**Ambient luminance: high (E4)**
Busy	P3	P3	P2	P2
Normal	P4	P4	P3	P3
Quiet	P5	P5	P4	P4

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BS5489-1
Selection of lighting classes for City & Town Centres

Energy Reduction Strategy #2
Selection of Lighting Class

Table A.8 – Lighting classes for city and town centres				
Type of Traffic	**Normal Traffic Flow**		**High Traffic Flow**	
	E3	**E4**	**E3**	**E4**
Pedestrian Thoroughfare	P2	P1	P2	P1
Pedestrian only	C4	C3	C3	C2
Mixed vehicle and pedestrian with separate footways	C3	C2	C2	C1
Mixed vehicle and pedestrian on same surface	C2	C1	C1	C1

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Energy Reduction Strategy #3
Luminaire Maintenance Factors

Table B.1 Luminaire Maintenance Factors							
Environmental zone	**Mounting height**	**Cleaning frequency**					
		12 months	**24 months**	**36 months**	**48 months**	**60 months**	**72 months**
E1/E2	≤6 m	0.96	0.96	0.95	0.94	0.93	0.92
E1/E2	>6 m	0.96	0.96	0.95	0.94	0.93	0.92
E3/E4	≤6 m	0.94	0.92	0.90	0.88	0.86	0.84
E3/E4	>6 m	0.96	0.96	0.95	0.94	0.93	0.92

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Energy Reduction Strategy #4
S/P ratios & white light
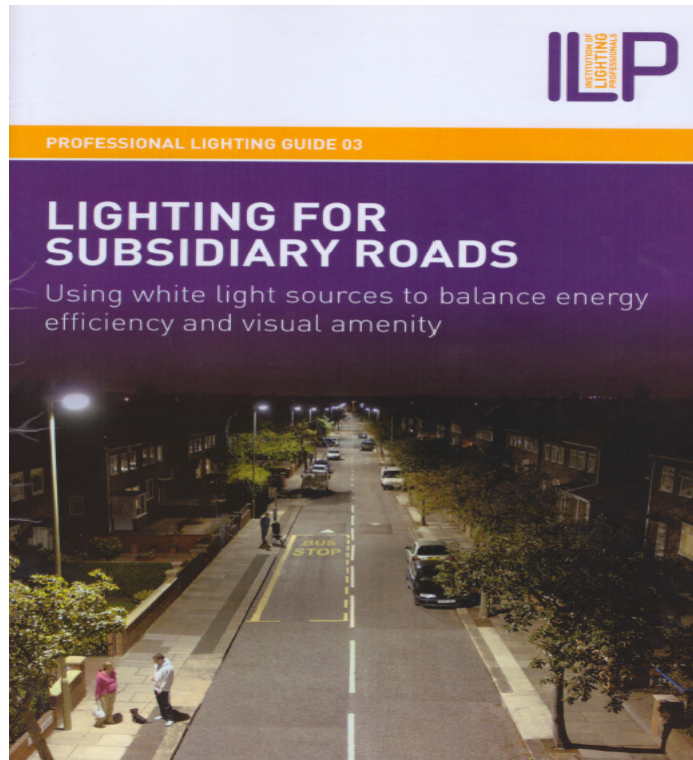
- ILP Research PLG 03

- reduction in target illuminance

- Based on S/P ratio of light source

Energy reduction Strategy #5
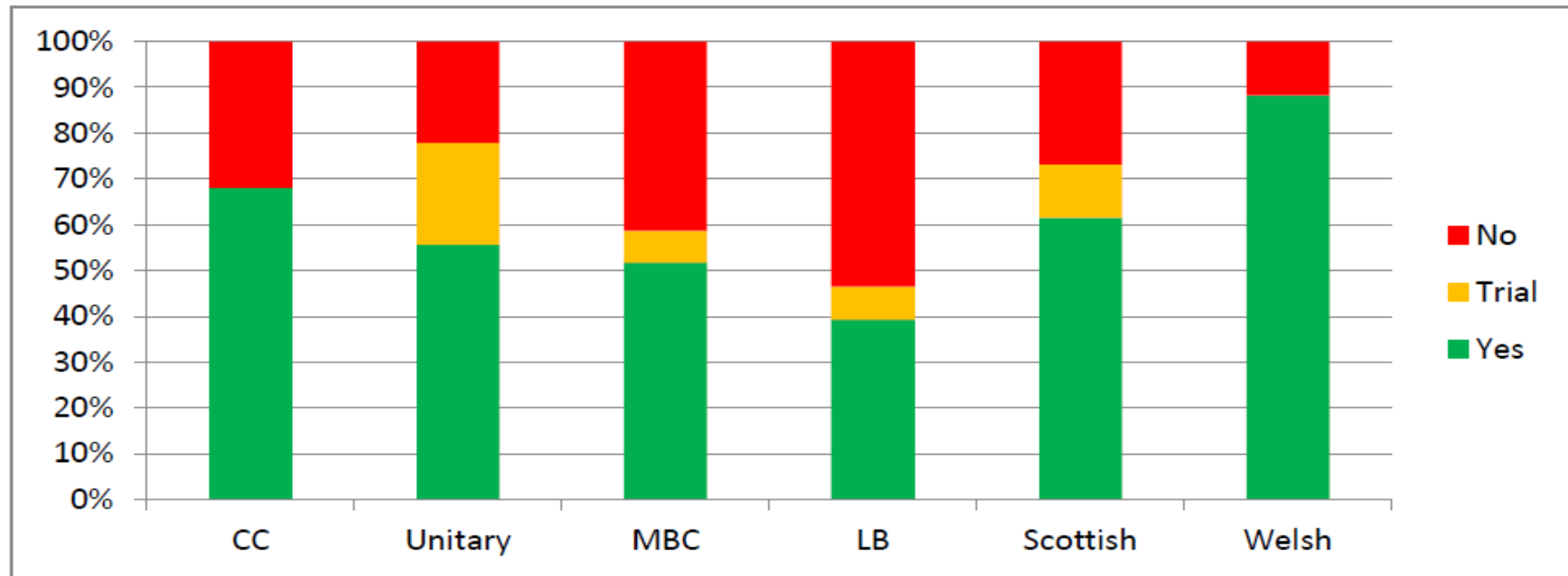## Variable Lighting

Figure 4 Variable lighting % uptake by authority type

EN 13201

- Part 1   Selection of lighting classes

- Part 2   Performance requirements

- Part 3   Calculation of performance

- Part 4   Methods of Measuring light performance

- Part 5   Energy performance indicators

  - Part 1 is technical report (not normative)
  - Part 5 is new

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BS EN 13201-5
Energy Performance Indicators

New part on energy efficiency requirements

2 metrics; 1 for Engineers; 1 for politicians!

Power Density Calculation
Watts / lux / m^2

ECI – Energy Consumption Indicator
kWh/m^2

BS 5489-1:2013 & EN 13201

Strengths

- Comprehensive Guidance
- Flexibility on lighting classes
- Variable Light Levels
- White Light benefits
- Risk Assessment

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Intelligent Management of Public Lighting

the right light in the right place at the right time   consuming the minimum amount of electrical energy

Save Money & Keep Lights On

- Strategy & Policy

- Interpretation of Lighting Standards: BS5489 – EN13201 – CIE 115

- Asset Management & Energy Procurement & Reporting Protocol

- Management & Maintenance Processes

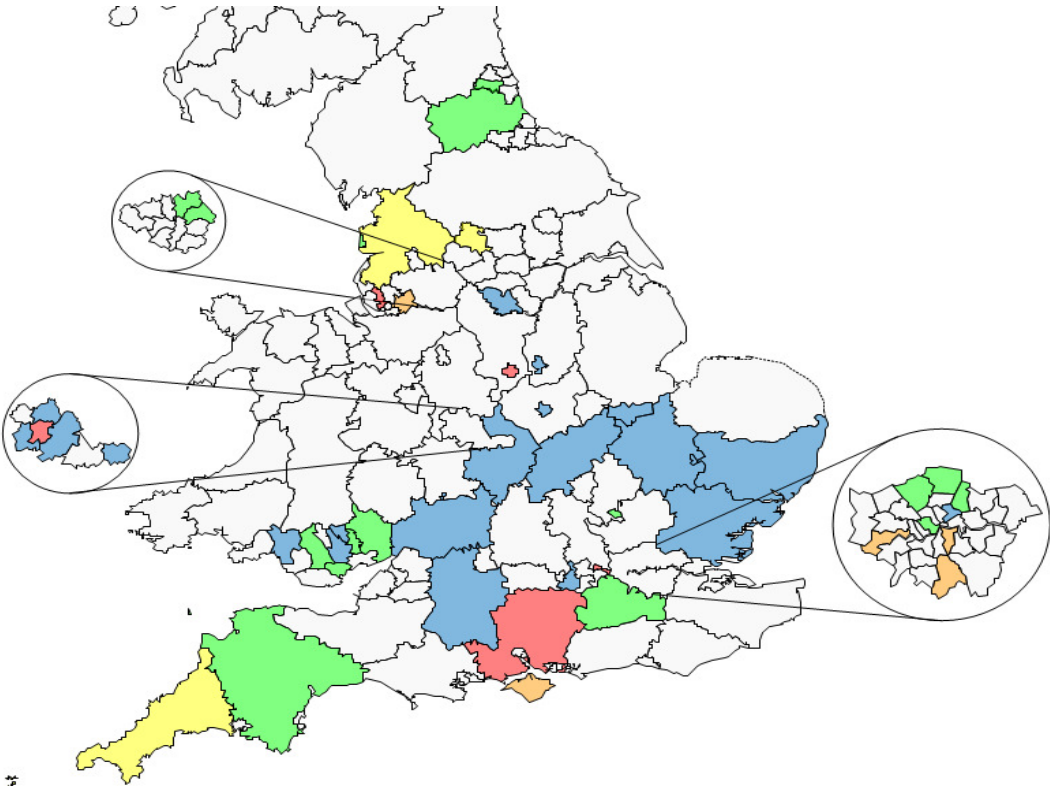- Review & Application of New & Emerging Technology

LED lighting revolution

LEDs are helping to deliver significant energy reductions in UK

Current UK CMS Deployments

Total UK CMS Market 1.35m units –

(19.5% of total UK street lighting)

(source: Telensa industry estimates)
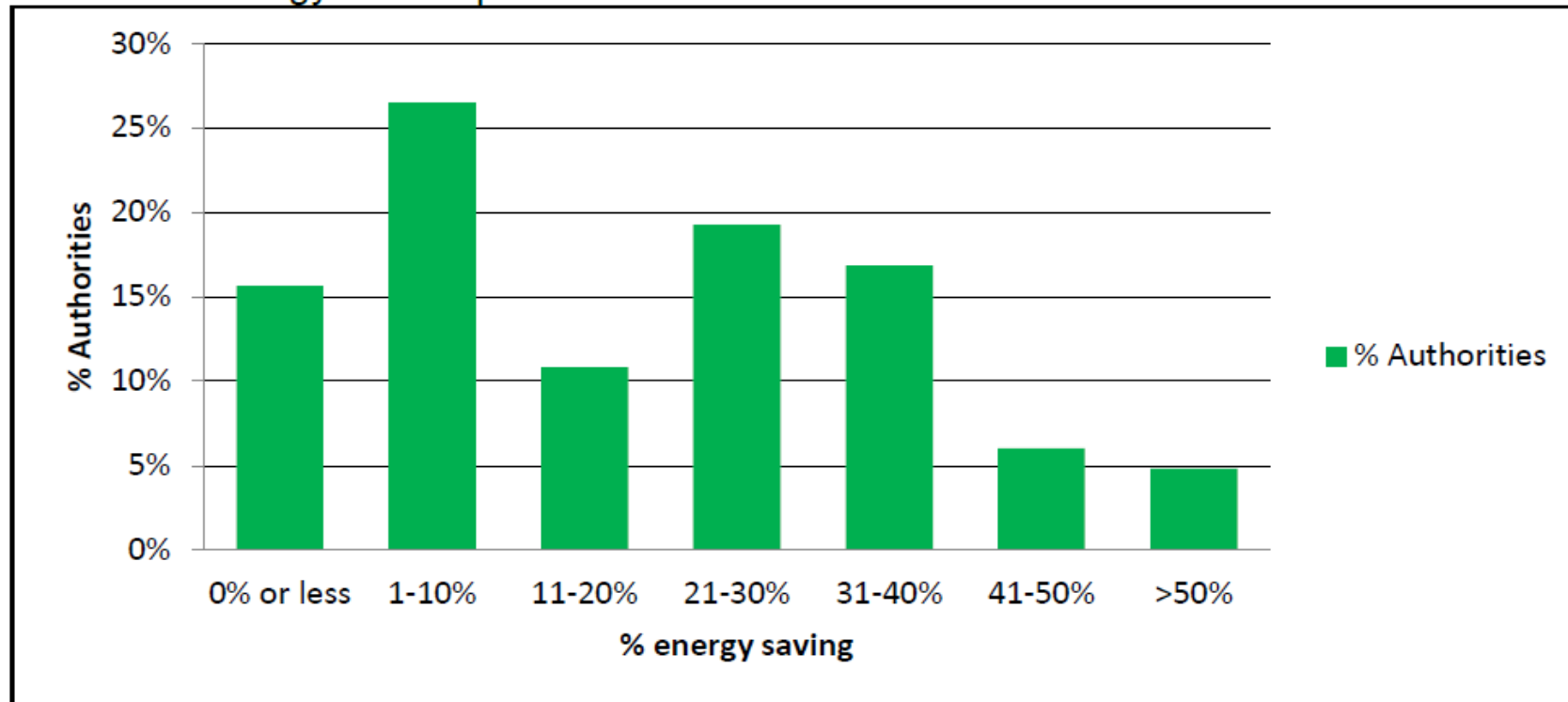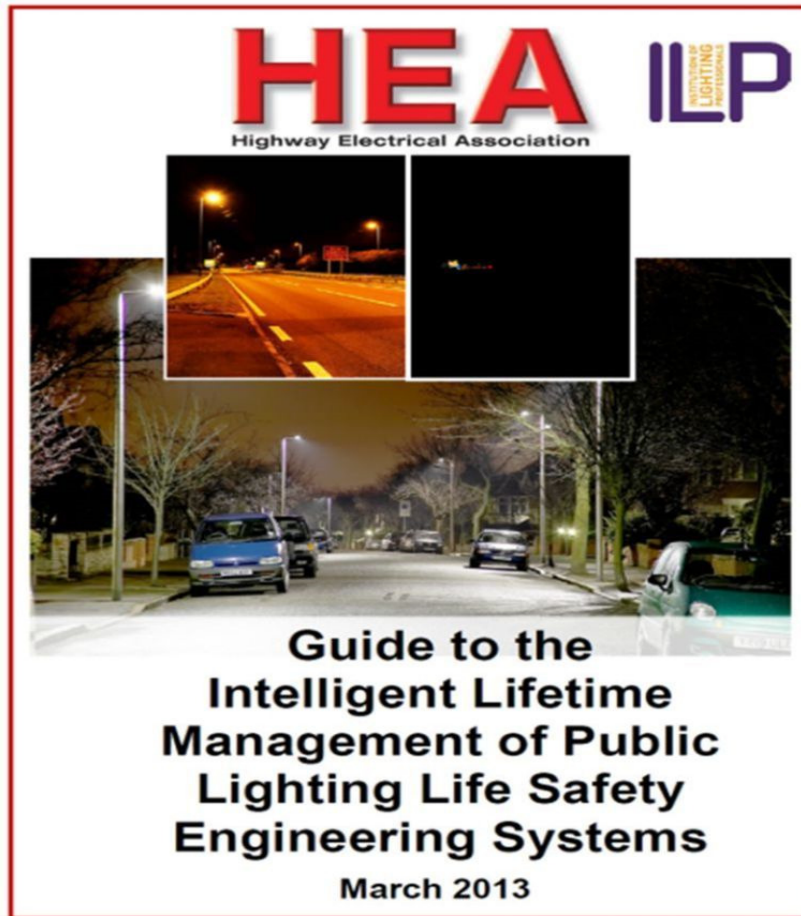
Results – Energy Saving

Figure 6   % of authorities reporting energy savings shown as a % of total energy

Lighting Standards & Best Practice

- Use available lighting standards & guides
- Use competent designers
- Create lighting policy
- Get policy agreed by LA
- Consult with stakeholders
- Do risk assessment for each design
- Record design decisions

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Thank-you