The Dudley Lighting Showcase Project

or

Not so much More Bang For Your Buck but

More Light For Your Lucre

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The story so far…….

- Lighting technology has improved vastly in the last 60 years
- Street lighting in Dudley represents almost every single development in the intervening period
- Result in some areas is a patchwork quilt of differing lighting standards and types – even within the same road
- Opportunity – funding is available for major replacement programmes
- Time to look at where we are now and where we want to be
- And…….

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The Climate Change Act 2008

- Requires bodies (that's us) to reduce our carbon emissions by 34% by 2020
- And by 80% by 2050
- **CRC Energy Efficiency Scheme**
- Carbon trading commences April 2011
- Street lighting and traffic signs account for approximately 18% of the Council's energy consumption and 40% of electricity consumption
- The carbon credit bill for street lighting in the first year (2011-12) will be approximately £110,000

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The CRC Energy Efficiency Scheme

- We get a proportion back in October 2011 according to our position in a league table
- But this depends on how well we have reduced our energy consumption against a benchmark set in April 2010
- In other words, we do nothing about it = we get taxed

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So what are we doing about it?

- New technology would appear to be the answer
- White light = good light (scientifically proven, Purkinje effect, etc)
- The cost of white light installations has come down appreciably in recent years (MH ☞ CDM ☞ CPO)
- And…….
- Light Emitting Diodes (LEDs) are outperforming some lower powered traditional street lighting
- Will become even better in the next couple of years
- And…….

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Lighting Control Improvements

- Street lights traditionally switched on/off by photo electric cells
- Alterations to switching times (e.g. part night) expensive to implement

– until…….

- Central Management System – each light gets its own control unit, to which commands are sent either over the mains or by radio (GSM) by a computer controlled transmitter
- Together with improvements in light operating gear, this gives opportunities to dim or even switch street lights off in the ‘wee small hours’
- Costs more than photocells – but with the opportunity to both switch units and monitor energy usage as well as to eliminate the need to scout
- Other means of control are available – but CMS offers greater flexibility

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60w CPO fitting with CMS radio telecell

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Mel talking to a street light.

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The Lighting Showcase Project - Principles

- Using existing spacings/lighting positions
- Utilising existing columns – replacing current 70w SON-T installations
- Designed to applicable present standards (mostly S4)
- White light installations – with SON and SOX installations in adjacent streets retained by way of comparison
- Most units monitored by CMS to establish performance against manufacturers' claimed figures

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But in the end, who's it for?

Trek.VOB

- We needed to ask the end users – the residents – what they thought as well.
- So, a consultation exercise was called for both before and after the relighting exercise.

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The Lighting Showcase Project – Timeline

- Autumn 2008 – a range of new equipment types are identified and designs carried out for roads in the Priory area of Dudley
- January 2009 – the Telensa CMS is installed – transmitter on top of 4 Ednam Road
- May 2009 – a ‘before’ survey is taken of the area’s residents
- End May 2009 – showcase installation commences
- June 2009 – showcase installation is complete and the CMS starts to acquire data
- January 2010 – with the new installation in place for 6 months, a resurvey of residents is taken

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Survey Results

- Nearly 86% of respondents thought the new lighting was better or about the same as the installation it replaced (mostly SON-T)
- 88% gave the new installations scores of between ‘average’ and ‘very good’ in relation to visibility of their surroundings
- 89% thought it would make them either more likely to go out at night or would not affect their decision
- Only 18% thought the lights were too dim – these were largely concentrated in two roads, one installation of which has since been replaced
- On the whole, reactions were favourable

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52w LED installation, Priory Close

Customer satisfaction: 82%

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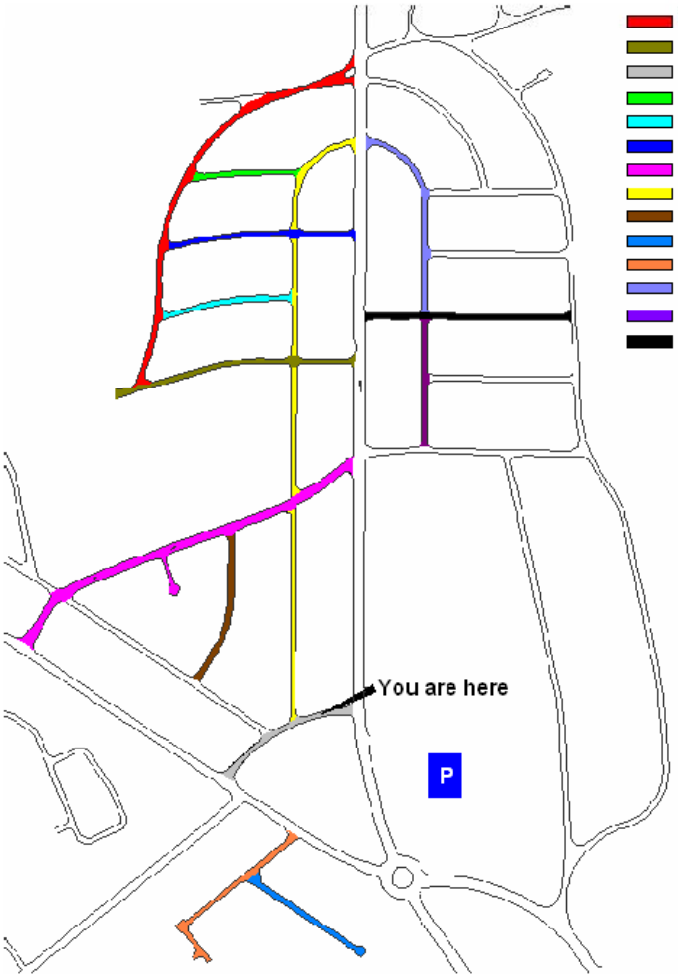

- Bluebell Road: Thorn Oracle 1C 60w Cosmopolis
- Cedar Road: Holophane Syracuse 57w PL fluorescent
- Hazel Road: WRTL Stela Wide 70w 52 LED
- Laburnum Road: Thorn Civic 1 Residential 57w PL fluorescent
- Lavender Road: Philips Iridium SGS252 45w Cosmopolis
- Lilac Road: WRTL Arc 70w CDO-TT
- Limes Road: Holophane Syracuse 60w Cosmopolis
- Maple Road: Urbis Evolo 45w Cosmopolis
- Poplar Crescent: DW Windsor Monaro 57w LED
- Priory Close (points 9 to 13): WRTL Stela Wide 52w 36 LED
- Priory Close (points 1 to 8): Kingfisher Kaos 60w Cosmopolis
- Chestnut Avenue (points 6 to 13): Philips CitySoul 55w 42 LED
- Chestnut Avenue (points 1 to 5): Kingfisher LEDin 36w LED
- Oak Road: E-On/Applied LEDs Marlin 66w LED

All schemes designed to EN13201, standard S4 except for Laburnum Road (S5) and Hazel Road (S3)

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Lighting Showcase
Priory Estate

Energy efficiency – Dimming

- May be undertaken on discharge luminaires with electronic gear or LEDs with appropriate drivers
- Dimming signal applied to the operating gear to reduce the power consumed (by wave chopping)
- Two protocols – 0-10V (analogue) and Digital Addressable Lighting Interface – DALI (digital)
- May require additional dimming module connected between the control device (photocell or CMS) and gear
- Dimming stages may be preset or, using DALI and/or a CMS, programmable
- Some parts of EN13201 allow reduction in lighting class when traffic levels drop, allowing installations to be dimmed and still meet the code of practice

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Case study – LED installation, Hazel Road

- Hazel Road is a link road between two secondary traffic routes, on a bus route and also a feeder for adjacent estate roads
- Before the showcase, it was lit with 7 no. 135w SOX at 8m
- Required standard for the road is S2, but by utilising white light it could be dropped to S3
- Calculations proved that S3 could be met by 74w LED luminaires, again at 8m – more than halving energy consumption
- As part of the trial, the installation was dimmed to 70% between 0100 and 0500, reducing consumption still further
- Resident satisfaction with the new installation was 100% in favour
- We chose Hazel Road as the base for the Lighting Showcase presentation

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The Showcase Evening

- On 2nd March 2010:

showcase video.VOB

Results – measured and assessed wattages

Source types:

- CDO-TT 70w nominal – measured wattage average 90.4w (UMSUG assessed 86w)
- PL 57w – 59.1w (65w)
- CPO 45w – 49.9w (48w)
- CPO 60w – 67.3w (68w)
- 52 LED – 47.2w (52w)
- 70 LED – 68.1w (74w)
- Electricity is paid for on assessed rather than measured wattage

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Results – measured and assessed wattages

- When set against the assessed wattage for the removed 70w SON-T unit (90w) these demonstrate a **saving on the installed load of between 4.4% and 46.6%**
- **Between £1.34 and £14.20 per column per year**
- **Amounts to between £26,800 and £284,000 per year**

(based on average unit cost of electricity and an inventory of 20,000 70w SON-T units)

- **When CMS metering is introduced the savings could be much larger**

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Energy efficiency – Trimming

- Reduction in burning hours by switching on later/off earlier
- Determine how switch on/off times should be modified
- For example:
- Scheme is S2, 10 lux average
- It takes 5 minutes for a lamp to run up to full working brightness
- Check the measured illuminance table to see how the typical ambient illuminance changes at dusk and dawn

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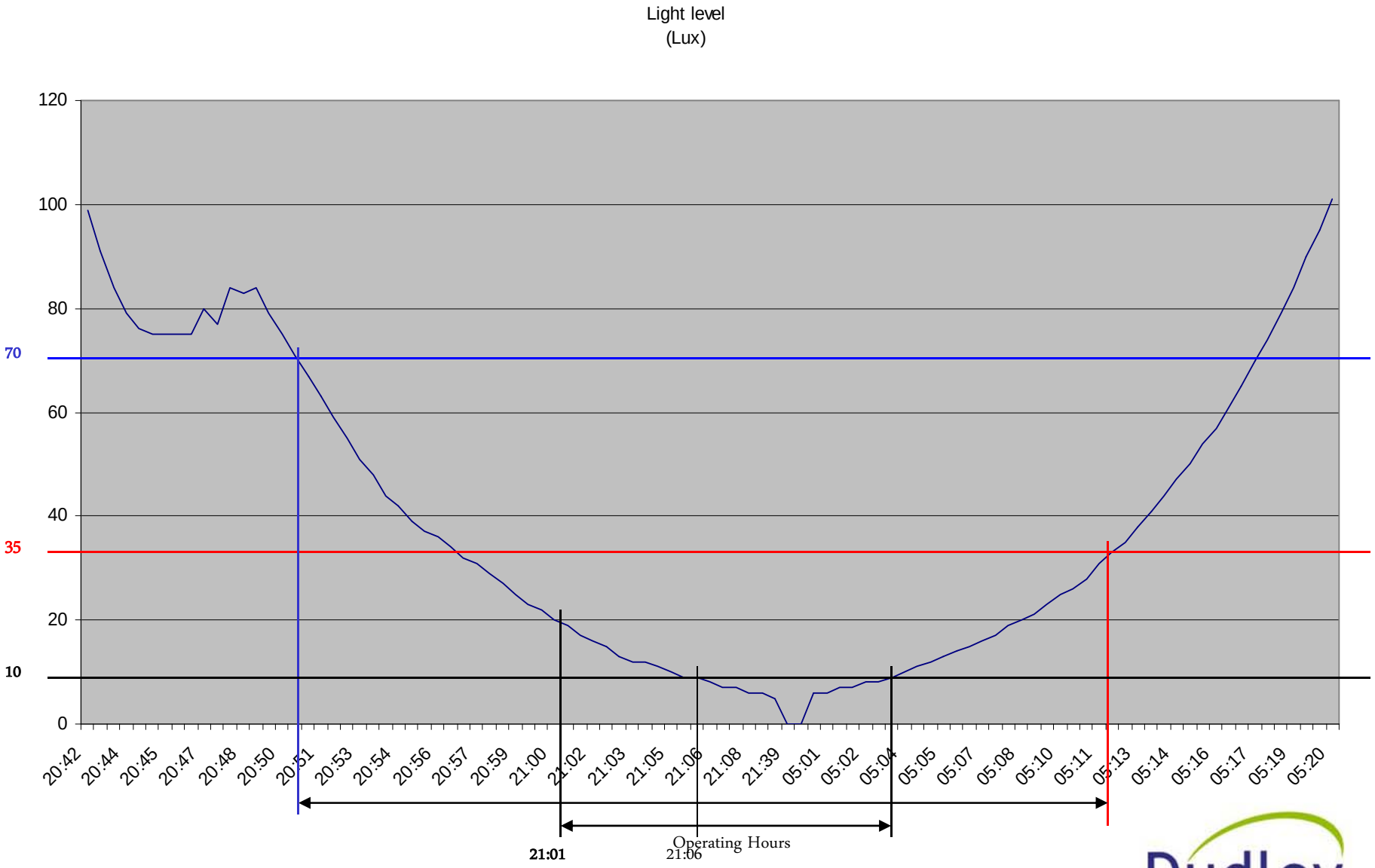

Saving: 10 min PM, 9 min AM

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An example – Bluebell Road

- Measured consumption over a 30 day period
- 15 units, 60w CPO, all same equipment
- Measured first burning full night; 70 lux on/35 off
- Then profile changed:
  - 5 units made dimming only – 70% between 0100-0500
  - 5 units made trimming only – 20 lux on/8 off
  - 5 units made dim and trim

- The results were as follows:

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Bluebell Road Results

- On 70 lux/off 35 – 30 day average consumption 19,843w per unit
- Trimmed only – 18,978w (95.6% of above)
- Dimmed only – 17,172w (86.5%)
- Trimmed and dimmed – 16,571w (83.5%)

Given an average unit cost for electricity:

- Saving of between 86p and £3.26 per year per 60w unit
- *Or, if extended to the entire inventory:*
- **Between £56,000 and £210,000 per year in energy cost alone**
- **Carbon credit purchase savings between £4,350 and £16,300**
  (based on an inventory of total load 15.34Gw)

- Requires an UMSUG profile for each option – at least until metering by CMS is allowable

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Capital costs/revenue savings

- There would be a capital cost for the alterations to be made – the amount depending on local arrangements
- Depending on the maintenance arrangements in place, there could also be a maintenance saving which could set against the cost of implementation
- For example, LED units don’t need bulk lamp changing – and fail less often

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Determining the payback period

Capital Costs

Luminaires
Installation
CMS System (or other control method)

Annual Savings

Electricity
Carbon Credits
Routine maintenance
Scouting (if CMS used)

Set the group of costs against the annual savings to determine the payback period

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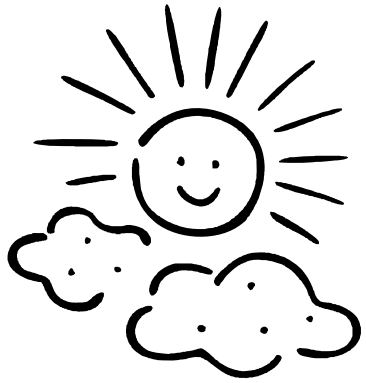
Where do we go from here?

- Using the information obtained, an Invest to Save report will be prepared and presented to Members of the Council in the summer
- The report will have recommendations based on the data presented and calculated payback periods
- When agreed, Council policy for future installations will be changed and contracts for supplies and works let as necessary

Complainer.VOB

Thank you



Questions at the appropriate time!

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