



Investing in street lighting; Investing in community infrastructure

Nick Smith MILE IEng

Chairman

Institution of Lighting Engineers (Midlands Region)

Managing Director

Nick Smith Associates Ltd



Investing in Street Lighting

- Modern street lighting provides many benefits
 - reduced road accidents
 - reductions in street crime and the fear of crime.
 - resultant enforcement when used with CCTV
- Switch off street lighting or alter the burning hours
- The direct and indirect costs need to be taken into account when making such decisions.



Street lighting provides many community benefits

- preventing night time personal injury accidents
- reducing street crime
- reducing the fear of street crime
- promoting sustainable transport, promoting public transport, cycling and walking
- facilitating social inclusion by providing the freedom to walk along and use our streets after dark
- promoting economic development by supporting 24 hour leisure economy and distribution
- facilitate lifelong learning by providing after dark access to educational facilities
- assisting the emergency services to identify locations and carry out their duties. Without modern street lighting the time taken to attend an incident could be increased.



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Lighting to the end of the tunnel

Reducing the use of electrical energy

- Photo electric cells
- Reduced residential lighting
- Reduced traffic route lighting
- “White Light”
- Conversions



Photocells

- Are a low cost and reliable way of controlling street lighting
- These switches are 70lux on and 35 lux off.
- This is established to mimic those of time switches, to allow for the wide tolerances and inaccuracies of early photo cells and to take account of the time required for discharge lamps to reach their maximum output.
- Modern discharge lamps run up to output faster
- 35 Lux on and 16 Lux off offers a 50 hours/Annum saving
- Older technology should still be switched using the old regime



Cost Benefits due to Trimming

Lamp Type (Trimmed to 35/16 from 70/35)	Typical Total Circuit Wattage	Energy Saving per Annum (50 hours trimming per annum)	Cost Saving (per annum @ 8.5p kWh)	CO2 Reduction * (per annum)
400w SON	430w	21.5 Kwh	£ 1.83	9.245 Kg
250w SON	280w	14 Kwh	£ 1.19	6.020 Kg
150w SON	165w	8.25 Kwh	£ 0.70	3.548 Kg
100w SON	110w	5.5 Kwh	£ 0.47	2.365 Kg
70w SON	88w	4.4 Kwh	£ 0.37	1.892 Kg
50w SON	60w	3.0 Kwh	£ 0.26	1.290 Kg
140w CPO	153.3w	7.675 Kwh	£ 0.65	3.300 Kg
60w CPO	67.5w	3.375 Kwh	£ 0.33	1.398 Kg

*0.43 kg of CO2 produced per kWh of energy generated –DEFRA Guidelines



Reduced residential lighting

- Lighting in our towns and cities is understandable, rural location have other requirements
- Reducing the hours of operation
 - Part night photocells
 - Dimming
 - I never agree with the switching off of street lighting
- **Always light to BS5489 / BSEN 13201 not just a % of the lamp output**



Reduced traffic route lighting

- Traffic route lighting is designed for the worst case scenario
- 150w SON dimmed to 50% output = a saving of £11 per annum
- Further advice on the application of variable lighting levels is given in the Institution of Lighting Engineers Technical Report No. 27 Code of Practice for Variable Lighting Levels for Highways.



“White Light”



Before



After

SOX



SON



Ceramic
Metal
Halide



Compact
Fluorescent

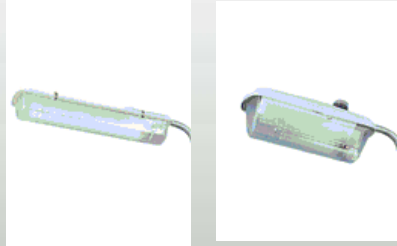


CosmoPolis





Conversions





Switch off Street Lighting !!!!!!!!!!!!!!!

- It is simple and quick to switch off a street light
- care needs to be taken when doing so and consideration should be given to the damage that will occur to the electrical equipment due to non use
- Following the mass switch off of lighting equipment during the 1970's and 1980's industrial disputes . In many instances the cost of repairs was significantly higher than the savings in energy. There is also a serious road safety issue if unlit columns are left in the highway as obstructions.

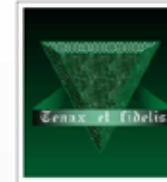


Powers and Duties

- Highways Authority has the power, not a duty, to provide and maintain road lighting -The Highway Act 1980
- Crime and Disorder Act 1998 -Highways Authority is required to take into account its effect
- 30mph speed limit imposed on those roads with a system of lighting lamps not more than 200 yards apart
- Road Traffic Regulations Act 1984 on crime and disorder -
Crime and Disorder Act 1988



Example



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- Using a sample area of 39 existing 5m columns
- Option 1-
 - All roads lit to S2 (average 10 lux min of 3 Lux)
 - with high pressure sodium (SON)
- Option 2A and 2B
 - Main estate road lit to S4 (Average 5 min 1 Lux) with SON
 - Other estate road lit to S5 (Average of 3 min 0.6 Lux) with SON
- Option 3
 - Main estate road lit to S5 with SON
 - Other estate road lit to S6 with white light source





Invest to Save Example

	Option 1	Option 2A	Option 2B	Option 3	Existing
Installation Costs	£29,220	£27,870	£25,620	£26,380	N/A
1st Year Energy Costs	£1,025	£690	£673	£456	1278
1st Year Operating costs	£594	£583	£507	£574	£756
Total 1st Year Operating Costs	£1,618	£1,273	£1,180	£1,030	£2,034



Invest to Save Example

	Option 1	Option 2A	Option 2B	Option 3	Existing
Total Costs for 30 years	£79,384	£67,331	£62,197	£57,845	£63,040
Total Costs for 30 years including Inflation	£129,494	£105,672	£98,050	£87,504	£125,920



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Variable Lighting Levels

- Invest to save study being carried out by Mouchel sponsored by the CSS



Cost Benefits

	Energy Saving	Cost Saving	CO2 Saving*
Existing annual usage with magnetic control gear	1,842,841 kWh	£184,284	792.4 tonnes
Annual savings due to changing to electronic control gear	120,185 kWh	£12,018	51.7 tonnes
Annual savings due to applying variable lighting levels	344,531 kWh	£34,453	148.2 tonnes
Annual savings due to applying dimming to maintenance factors	155,039 kWh	£15,503	66.7 tonnes
Total annual savings	619,755 kWh	£61,975	266.6 tonnes
Total annual savings per km	34,430 kWh	£3,443	14.8 tonnes

0.43 kg of CO2 produced per kWh of energy generated –DEFRA Guidelines



Conclusions

- **Doing nothing is not an option**
- Consider the full range of options and focus on the best policy and strategy for you!
- Fully utilise BS5489 and apply the standards appropriately
- Ensure Accurate Inventory and Asset Management Plans
- Model the Future – do the cost benefit analysis
 - Happy to answer questions after the next paper
 - Or email me mail@nicksmithassociates.com if you want a copy emailing to you.
 - A copy of the Invert to save document will be available later this year