

Save Money and Keep the Lights ON

The budget cuts the Coalition Government has introduced, combined with its Carbon Reduction Commitment and associated tax on carbon-based energy consumption, have re-ignited the zeal of accountants and Local Authority managers to make easy savings by switching off our public lighting. Although the Government is keen to make financial savings it is also very conscious of the potential dangers of switching lights off. At the start of September, Louise Ellman MP, a member of the Commons Transport Select Committee, was quoted as saying: *'I am extremely concerned that financial pressures are leading to steps which can jeopardise people's lives and increase the number of injuries.'*

However, these money-saving initiatives take no account of the known benefits that good lighting brings to the community, including:

1. It reduces street crime and the fear of crime – lighting can help Authorities meet their requirements under the Crime and Disorder Act
2. It reduces the number and severity of night-time road accidents - by up to 30%
3. It helps the emergency services carry out their roles after dark - providing sufficient illumination to work safely and effectively
4. It increases evening activity and promotes the evening economy by making people more confident in using public transport; enabling them to walk the streets after dark in safety; and offering access to evening work, education and leisure activities. Good public lighting is essential in allowing life to continue after dark.
5. Street lighting is extremely good value in cost-benefit terms. A recent survey carried out by the ILP indicates that the average UK street lamp is about 70 watts and energy costs are only £30 per year at the average national tariff.

Some recent evidence of these benefits was recently demonstrated in the case of a recently completed PFI re-lighting scheme in Wakefield. The borough has substantially re-lit its highway network during the last five years and the new lighting:

- Has helped reduce vehicle collision and damage by 50% - 143 incidents in 2004) went down to 69 in 2008
- Has helped reduce vehicle crime by 62% between 2004 and 2008
- Has helped reduce night-time accidents - overall accidents were down by 31% from 2004-2009 and night-time fatalities fell from 9 to 0 in the same period.

Switching Off

The term 'Switch Off' is used to describe locations where the street lights are switched off all night, so the area is in total darkness. 'Partial Switch Off' or 'Part Night Lighting' is where the lighting is switched off for part of the night – typically from midnight until early morning, usually to save energy when the roads are quietest.

The Implications of Switching Off

Various Highway Authorities have already started switching off street lights to save money. Buckinghamshire has areas blacked out and has seen a number of accidents in these non illuminated areas. The Coroner investigating a fatality in this area directly linked the lack of lighting with the accident. He said, *'the driver had no chance to see the lady crossing the road without any street lights operating'*.

Recently some communities have rebelled against their local authorities and in 2008 a resident of Llangynop, a village in South Wales, paid £295 to have his village lit at night for the winter after Powys Council turned off the street lights to save money. This worked out at around 15p per lamp per night.

Prisoners in our Homes

Lack of lighting on our streets at night can have dramatic effect on society, particularly on groups at either end of the age spectrum. Not just the elderly, but also the young, can be made to feel like prisoners in their own homes through their fear of going out at night.

A recent report by children's charity PLAN UK highlighted that 91% of 13-18 yr old girls said better street lighting would make a big difference to whether they felt safe on the streets. Their CEO Marie Staunton said that issues such as poor street lighting needed to be tackled (and not switched off).

Police Road Death Investigation Manual

An extract from the above manual clearly identifies the responsibility of the local authority: *'When a collision has occurred and highway involvement is alleged, then the highway authority should be able to show that it took reasonable measures to ensure that the safety of road user was not compromised.'* Clearly highway lighting is an important component of that responsibility.

Associated Issues Involved in Switching Off Lighting

There are a number of other implications to any lighting 'switch-offs', namely:

- The lighting of speed limit signs (30mph etc) is often linked into street light circuits and no lighting will require new signage.
- CCTV systems require street lighting – camera operation at night could be severely compromised.
- Where lights have been in operation, it will be necessary to clearly inform the public that the lights are not supposed to work, rather than simply malfunctioning.
- Switching lights off could actually raise the energy tariffs paid by local authorities, by reducing the low-rate tariff paid at night and increasing the percentage of high tariff use. Energy suppliers are already reviewing the use of variable rates and the lower tariff energy saved from midnight to 6.00am will reduce overall cost savings.
- The cost associated with changing the lamp's photo-cell to part-night switching is £21 – or nearly nine months' energy costs for the average street light.

- The installation of road studs ('cat's eyes') – an alternative safety measure on motorways and high-speed roads without lighting - is approximately £2220 per km per lane (or more than £14,000 per mile on a three-lane motorway).
- Obviously too, if road lights are permanently switched off, they can't be left connected to the mains supply – or left to decay and possibly collapse. The removal of the electrical supply to each column costs £400 per lamp – and the removal of columns and associated equipment is £85 per lamp. Therefore the total cost of a switch-off of a single column could pay for the electricity for the average street light for a further 16 years! This is simply wrong-headed, misguided economics.

The Cost of Increasing Road Accidents

However increased road accidents are probably the major unseen costs associated with road lighting switch-offs. Even if road accidents increase only slightly as a result of switch-offs, the social costs will far outweigh any energy savings. The table below indicates recognised UK accident costs.

Costs of Road Accidents in the UK			
	Built-up Areas	Non-Motorway	Motorway
Fatal	£1,613,970	£1,754,950	£1,789,030
Serious	£184,850	£212,940	£219,460
Slight	£18,560	£21,790	£25,680

Clearly just one additional fatality could pay for an entire county's street lights to be kept on for a whole year.

If we take the example of the Highways Agency, which is switching off lighting on many main roads and motorways from midnight to 5.30am, energy savings will be around 50%. However, accidents could increase as a result... and any savings could be easily negated. An alternative policy of dimming the same lights to 50% power for the same time, thereby reducing light levels, but maintaining lighting uniformity (a key factor in reducing glare and ensuring visual comfort) would reduce energy cost by 25%... but would entail no increased risk to road users.

How to Save Costs... and Keep the Lights On

All UK roads are lit to a British Standard, which sets differing light levels for different road types. Interpretation of the guidance has led to some areas being lit to higher levels than are needed. Therefore we recommend a review of the appropriate lighting standards, carried out by the local authorities' professional lighting team, as part of its lighting policy, to see if light levels could be lower.

Research in Europe has shown that through the use of competent professional lighting designers/engineers the energy-efficiency of a lighting installation can be improved by up to 30%. It is therefore imperative that any authority employs a competent lighting professional to manage its lighting asset and get the most from it. Too often we have seen the authority's lighting role being passed to a highway manager, with little, if any, knowledge of lighting. As part of EU energy

reduction measures, it is likely that the requirement for competent professional design expertise will become an EU legal requirement within the next few years,

It has long been recognised that a quality measure of a lighting scheme is its uniformity level; and roads with good uniformity can be lit to an overall lower level, while maintaining good visibility. But switching off every other street lamp, or one in three street lights – a policy being adopted by some UK authorities – destroys lighting uniformity and creates comparatively dark shadowed areas on the road, which are not visually comfortable for drivers.

Another key design component is control of glare - and the last 20 years or so have seen the introduction of street lamps with excellent light control, with minimal glare. This has resulted in a dramatic fall in the orange glow over our urban conurbations and improvement to the night sky.

New Technologies

Today around 90% of the UK is lit with sodium lighting, which exceeds the government's ultra efficient lighting measure requirement of 100 lumens of light per watt of energy (lm/W). However, street lighting will not stand still.

White Light: The UK was also the first country in the world to recognise that white light provided better visual conditions for motorists – and improved visibility at reduced lighting levels. In 2003 we changed our national codes to allow a drop in lighting levels of one lighting class if white lights were used in the residential roads. Further research has concluded this could be applied to traffic routes and the next BS update may reflect this option.

Central Management Systems (CMS): CMS systems are now available to allow control of every lighting point in an authority at a very reasonable cost, with relatively early payback. CMS doesn't only save money through dimming, it also ensures that the lighting system is always working at maximum efficiency. It can also provide information so that we never see a light out on the street because they are replaced just before they fail.

Light Emitting Diodes (LEDs): LEDs have a very long life, offer excellent lighting control and are increasingly energy-efficient. LED street lights capable of lighting residential streets to the correct level have been available for a number of years - and recently larger units, capable of lighting our main traffic routes, have come to market. As with any new technology the items are more expensive than conventional lighting, but as development continues, light output is rising year on year and prices are starting to fall significantly. The USA DoE forecast that LED chips may halve in cost by 2015 and could drop to 1/25th of current prices by 2020.

Institution of Lighting Professionals (ILP) Recommendations

Switching off street lights, in all but a limited number of locations (see below) is a short-sighted, socially corrosive and ultimately uneconomic course of action. Instead we propose the following alternative steps, which are more economically and socially viable – and will ensure our society's safety and security is maintained, even during these hard times:

- Authorities should ask, are we over-lighting the streets? And could we drop a lighting class?

- Authorities could change to 'white light' – BS5489 allows a drop of one lighting S class by using white light.
- Authorities should embrace new technology: electronic control gear replacing old magnetic gear can immediately save 10% of energy; and LED street lights are increasingly able to illuminate streets with less power -- and their price is falling.
- Authorities should dim their lighting, using CMS or pre-set electronic gear:
 - **On Traffic Routes** – provide the right lighting for the traffic demands. When traffic flow is low then drop the light levels to suit.
 - **In Residential Areas** - consult with residents and other stake-holders, but consider dimming to 50% light output from 8.00am, and consider dropping to 20% if possible between midnight and 5.00am. When dimming to low levels also consider the use of local presence detectors to raise levels if pedestrians are around.
- Authorities should retain lighting Uniformity – and ***should not*** switch off alternate lamps.
- Authorities could switch off lights in rural locations, but only after all parties have been consulted and the majority agree with the proposed curfew times.

The ILP says that the correct policy is to have ***the right light in the right place at the right time***. It is only by employing a competent lighting professional that an authority can look to achieve the optimum solution for their road network, their customers – and society as a whole.

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