



Derby City Council

NEIGHBOURHOODS BOARD 14 November 2013

Report of the Strategic Director of
Neighbourhoods

ITEM 8

Street Lighting Energy Reduction Project – Invest to Save

SUMMARY

- 1.1 The energy required for street lighting in Derby costs around £1.25 million per year and produces over 6,177 tonnes of carbon emissions (CO₂) based on 2012/13¹. This accounts for 18% of the Council's total CO₂ emission
- 1.2 Energy costs have increased by more than 56% between 2007 and 2013 which is an increase of more than 8% year on year. Recent announcements from energy suppliers indicate that prices are at least set to continue to increase at this rate.
- 1.3 Energy saving technology in Street Lighting has advanced greatly since the start of the PFI contract in 2007. There are now well proven and reliable systems on the market which can save energy costs by reducing the wattage of lamps and hence dimming the light output. This technology has been used successfully by both Coventry and Leicester City Council.
- 1.4 The Street Lighting invest to save project recommends the installation of a Central Management System (CMS), together with control nodes fitted to almost 6000 of our highest energy using columns. These columns are not in residential areas and are all on traffic routes.

This project is about the right light in the right place at the right time.

1.5 **Financial summary.**

The capital cost of purchasing and installing the new equipment is £1.36 million.

The energy saved from dimming the 6000 columns is £ 160 k per year.

The borrowing costs are £127 k per year

This results in a revenue saving of £33 k per year.

- 1.6 The 'invest to save' report was approved at Cabinet on September 11 2013 and the borrowing was approved at full Council on September 18 2013.
- 1.7 The installation and ongoing maintenance will be carried out by our Street Lighting PFI provider and the assets incorporated into the remaining 19 years of the contract.

¹ Budget 2012 Autumn Statement by the Chancellor of the Exchequer, the Rt Hon George Osborne MP detailed CRC would be simplified from 2013, rather than scrapped. £12 per tonne of carbon dioxide (tCO₂) in 2013-14, £16/tCO₂ in 2014-15 and from 2015-16 onwards, the price will increase in line with the Retail Prices Index (RPI)

RECOMMENDATION

- 2.1 To note the contents of the report and recognise the energy savings achievable from the introduction of this technology.

REASONS FOR RECOMMENDATION

- 3.1 To reduce the revenue burden from increasing energy costs and to reduce the carbon footprint of our street lighting inventory.

SUPPORTING INFORMATION

- 4.1 Our service provider maintains and operates approximately 30,250 street lighting units throughout the city under a 25 year PFI contract on our behalf. We remain responsible for the procurement and purchase of energy.
- 4.2 The energy required for street lighting in Derby currently costs around £1.25 million per year. Unmetered energy costs have increased by more than 56% between 2007 and 2013 which is an increase of more than 8% year on year. Recent announcements from energy suppliers indicate that prices are at least set to continue to increase at this rate. Action is required now to prevent energy costs becoming an increasing burden on the Council revenue budgets.
- 4.3 The street lighting network also contributes to our carbon footprint by producing over 6,177 tonnes of carbon emissions (CO₂) based on 2012/13. This accounts for 18% of the Councils total for CO₂ emissions. The City Council has a target to reduce its carbon footprint by cutting emissions by 25% by the end of 2013-14 as proposed in our Greenhouse Gas Emission Report (September 2012).
- 4.4 Advances in modern street lighting technology, coupled with the lower and variable lighting levels permissible by the revised British Standards (BS 5489) and EN 13201, means that it is now feasible to achieve energy savings by means of reducing the wattage of the lamps through dimming.
- 4.5 **Use in other similar Authorities**
- These methods and techniques are being successfully implemented by other similar urban Councils across the country. Coventry City Council already have a dimming system installed and has recently approved an increased dimming level from 25% light reduction to 40% light reduction after midnight in residential areas and a 50% reduction on traffic routes with times dependent of individual risk assessments of the road similar to this proposal. Leicester City Council are currently in the first year of a three year roll out of dimming technology which is designed to save energy in a similar manner to this proposal.

- 4.6 Unlike Leicester and Coventry, the Derby project only considers lighting on traffic routes and does not consider the lighting on subsidiary roads or residential streets. It has already been determined that the potential savings are much smaller and the payback periods much longer in residential areas due to lower wattage lamps.

4.7 Trial Installation

To establish proof of concept, a small installation of 200 control nodes and a CMS base station was installed in July 2013. This system is up and running and functioning well but the lanterns have not yet been dimmed. The results of this trial were used to establish the costs for the larger roll out and to identify any potential problems.

4.8 Off Peak Dimming

Traffic flows on many of our roads between the hours of midnight and 6am are significantly lower than those during peak hours in the morning and evening rush hour. New technology now allows us to vary the level of lighting during these hours of lower traffic flows.

- 4.9 Each street will be individually risk assessed and traffic counts will be used to ensure that dimming does not occur until outside of peak traffic times. The road/footway use and traffic type will also be used to consider what level of dimming will be appropriate and a robust documented approach will be taken.

- 4.10 Appendix 3 shows examples of the dimming profile that will be used to reduce energy in non-peak periods. The key points are the times marked as (A) and (B) and the key lighting levels marked as (C) and (D). Based on actual inspections roads lit to the same standards in other cities the values of the parameters will initially be set to (A) = 20:00, (B) = 23:00, (C) = 30% and (D) = 50%.

This will mean the lighting levels will typically be dimming by 30% after 8pm and then dropped to 50% from 11pm before being raised to the 30% dimmed level in time for early morning traffic. These levels will then be adjusted individually depending on risk factors and traffic levels.

4.11 Finance and payback

The costs for the conversion of all remaining 250w SON, 150w SON and 140w Cosmopolis are £1,362,966

Using the average dimming profile of 30% after 8pm and 50% after 11pm and assuming an energy inflation figure of 8%, realises a saving of £160,242. The table below shows the breakdown.

- 4.12 The borrowing costs for the project are £127,000 per annum for the remainder of the Street Lighting PFI agreement of 19 years. The table below shows the breakdown.

Lamp Type	Num Lanterns	Cost of Fitting (£)	Annual Saving (£)	Annual Borrowing Costs (£)	Annual Saving less Borrowing Costs (£)	Annual Saving on Cost of Fitting
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250w SON	725	185,114	30,798	17,249	13,549	16.6%
150w SON	1,926	432,946	48,723	40,341	8,382	11.3%
140w CPO	3,316	744,906	80,721	69,410	11,311	10.8%
TOTAL	5,967	1,362,966	160,242	127,000	33,242	11.8%

OTHER OPTIONS CONSIDERED

- 5.1 Take no action - energy usage will remain static and we will need to pay the various taxes on carbon and energy usage and pay increased energy costs. In the current financial climate with increasing energy costs this option was not seriously considered as it is clear that action needs to be taken to address the future increasing energy bills and associated carbon costs²
- 5.2 Switch off lights - some rural based councils have switched off lights for a portion of the night (part night switching) which has provided reasonable levels of energy saving but has proved very unpopular and attracted negative press coverage. No local authority has so far chosen to switch off lighting in an urban environment due to crime and safety issues. This option was also discounted as the council has stated publicly³ that switching off street lights in Derby City would not occur.

The chosen option is already being considered and implemented in most local authorities around the country. This provides the only realistic solution to Derby as it will reduce energy consumption in such a way that the street lighting service can be maintained.

This report has been approved by the following officers:

Legal officer Financial officer Human Resources officer Estates/Property officer Service Director(s) Other(s)	
For more information contact: Background papers: List of appendices:	David Bartram 01332 641516 david.bartram@derby.gov.uk None Appendix 1 – Implications Appendix 2 – Map of large wattage lamps for project Appendix 3 – Proposed dimming profile

² The energy costs for Derby City Council's street lighting stock have increased significantly over the last few years, from £0.04351 KWh in June 2007 to £0.10186 KWh in June 2013, (57.28% in 6 years) this is a direct result of above inflation increase in energy costs. This upward trend is projected to continue, particularly given the current financial climate. This poses a real challenge for the Authority.

³ Former Council Leader Philip Hickson stated "We're not going to be switching any street lights off and on the whole I think it's really good news for the public" in a BBC interview on 6th October 2011 - see <http://www.bbc.co.uk/news/uk-england-derbyshire-15205529> for further details

IMPLICATIONS**Financial and Value for Money**

- 1.1 The saving calculations for this project are based on known and well established figures for the consumption of street lighting.
- 1.2 Unmetered energy costs have increased by more than 56% between 2007 and 2013 which is an increase of more than 8% year on year.
- 1.4 The saving from the Street Lighting PFI budget after borrowing costs for the project is £33,242. Once the borrowing period has ended then the £127,000 budget can be used to support the council's budget position.

Legal

- 2.1 None

Personnel

- 3.1 None

Equalities Impact

- 4.1 Effect is primarily on road users and the lighting levels are above those required for pedestrians

Health and Safety

- 5.1 Works to be carried out in accordance with the Street Lighting PFI Service Provider Health and Safety arrangements.

Environmental Sustainability

- 6.1 By completing the works identified in the recommendations there will be a reduction in energy that will increase the council's ability to meet its sustainability targets for CO₂ reduction.

Property and Asset Management

- 7.1 None

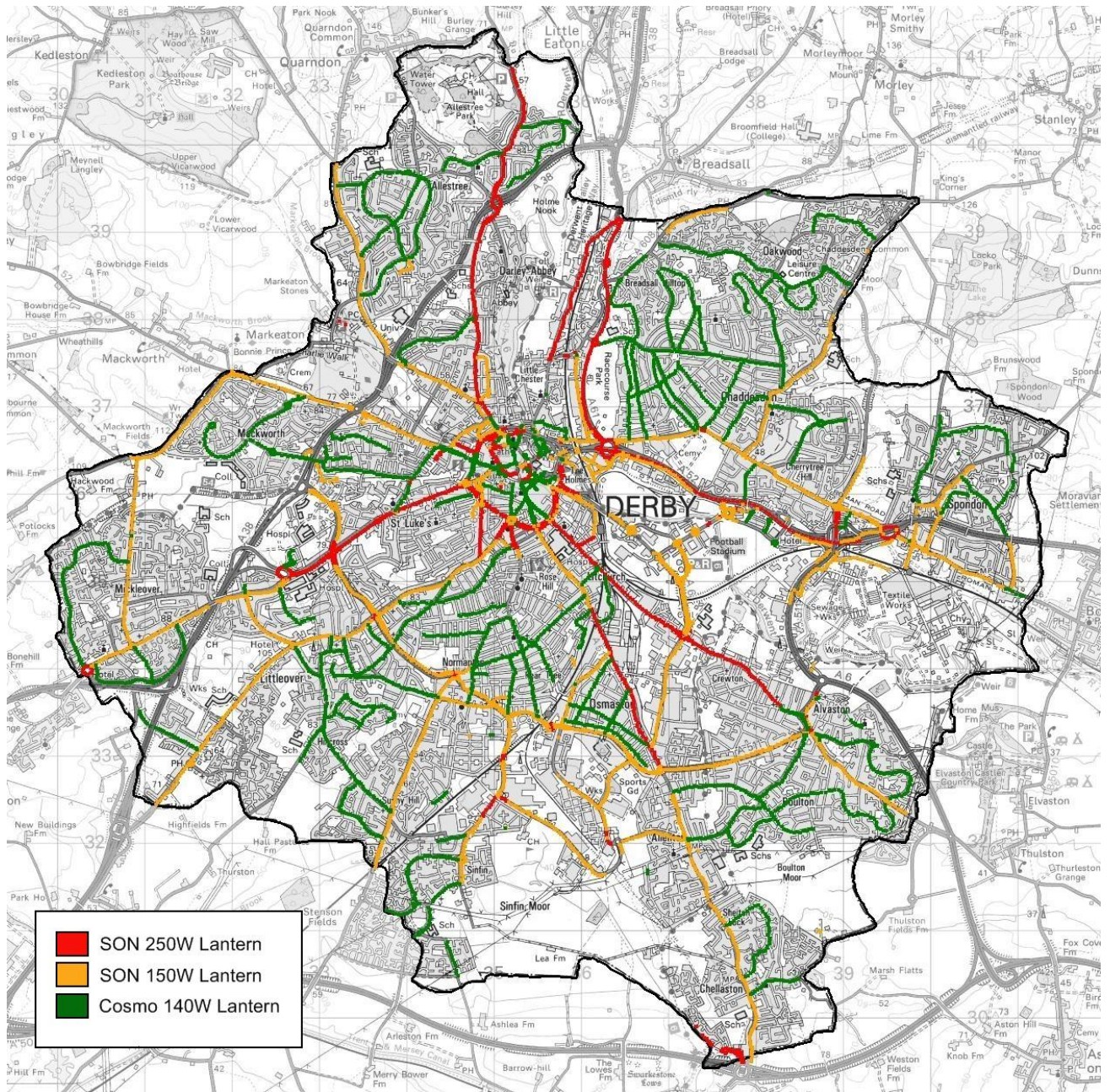
Risk Management

- 8.1 There is a risk of public dissatisfaction which may arise from the use of variable lighting levels. The benefit of the proposed solution is that the lighting is controlled centrally and it is easy to adjust for specific conditions and changes if issues occur with the public.
- 8.2 Dimming to 50% is generally not perceptible to the human eye so we consider that this can be introduced without significant opposition.

Corporate objectives and priorities for change

- 9.1 This recommendation will continue to meet the following corporate objectives:
 - Being safe and feeling safe
 - Providing good quality services that meet local needs

Derby City (Proposal Target Lighting - Large Wattage)



Derby City (Proposed Energy Savings through Dimming Profile)