

Street Lighting Energy Efficiencies and Carbon Savings

Summary

1. This report informs the Executive member of the work carried out so far to reduce the energy usage and carbon emissions from the City of York Council street lighting and the proposals for the next 12 months.

Background

2. Within the City of York we have 19,787 lighting units comprising of signs, streetlights, lit bollards, floodlights, and belisha beacons. Locally authorities need to reduce their carbon footprint. A large part of its make up is that of street lighting. Historically the City of York has been very innovative in trialling new lighting technologies in order to reduce energy and increase efficiencies. This report is looking to extend some of those trials further and introduce new ones.
3. In 2009/10 an additional £100,000 was allocated to the street lighting service specifically to reduce the energy usage and carbon footprint of the service. An additional £450,000 has been allocated for the current financial year for the reduction of energy usage and the general updating and replacement of street lighting equipment.
4. The street lighting service is targeted to reduce energy usage by 25% in real terms over the next 5 years. The work last year achieved a 2.5% reduction and the proposals this year should achieve another 7.5% putting the saving target at 10% over two years on target. Further reductions however will call for more radical proposals in future years.

Proposed works for 2010/11

Replacement of Mercury Vapour Lanterns

5. Historically York has had around 2600 mercury vapour lanterns within the city boundaries. In 2009/2010 approximately 1100 lanterns were changed for more modern and efficient compact fluorescent units. These units have saved over 50% energy in each location. The results of this can be seen in appendix 1.
6. The Mercury lanterns are of a 50 year old technology with very poor efficiencies and controls in their output. The EU directive has targeted them for phasing out before 2017. The proposal is to replace the remaining lanterns with 42-watt compact fluorescent lanterns on a like for like basis shown in appendix 2. The new lanterns will give either a similar or improved light on the ground in comparison to the mercury lanterns. Examples of mercury lanterns can be seen in appendix 3/7, examples of compact fluorescent lanterns can be seen in appendix 3/7A.

Solar Bollards Installations

7. In the last few years the authority has gained Dft approval to use solar bollards within the city (and further member approval to roll out their use) and we have replaced over 100 units. Last years installations consisted of 50 individual sites city wide (results in appendix 1).
8. The bollards design allows for all electrical components to be removed making them more robust and are designed to survive minor collisions from vehicles, reducing the need for repeated attendance and maintenance. As each unit is solar it will save 100% of the previous energy used. Proposals for 2010/11 can be seen in appendix 2. Examples of solar bollards can be seen in appendix 3/9, conventional bollards can be seen in appendix 3/9A.

Replacing sign lights with LED lights

9. Many of the lit signs within the city are currently lit 24 hours a day and use approximately 26 watts each. It is proposed to exchange them for a 6 watt fitting lit only in the hours of darkness saving a minimum of 20 watts. These units have already been used within the city and give a more stable form of light and reduce future maintenance, as they do not need a lamp replacement or component service for ten years. Any new schemes requiring illuminated signs will use LED lighting as standard. Examples of Standard and LED sign lights can be seen in appendix 3/10 and 3/10A.

De-Illuminating non-regulatory signs

10. Recent alterations and relaxation of the rules on the requirements for signs to be lit means that with little investment energy savings can be realised from the removal of the electrical components and replacement of the sign face (where required). Future maintenance is reduced to simply replacement of the sign faces when they become unclear, rather than having routine changes of lamps and safety testing of electrical equipment.

Replacement of conventional 150/250 watt lantern control

11. The vast majority of 150 and 250-watt lanterns within the authority are of an age where they use older wire wound controls. This method of control is very inefficient and wasteful. As such it is proposed to replace existing wire wound gear with full electronic gear. The new lantern control gear uses less energy and allows electrical power levels to be controlled through the light.
12. In the 2009/10 we replaced 30 lanterns on Coney Street and the adjoining streets. The result has been an improvement in the overall night time appearance of the area, as the lights appear far brighter than the old units (energy breakdown is in appendix 1). Proposals for a further 100 units can be seen in appendix 2.

Low Pressure Sodium (sox) replacement

13. Low-pressure sodium lighting makes up a large proportion of street lighting in York. More efficient lighting methods are now available, such as LED and compact fluorescent units. These more efficient alternative street lights provide a whiter light source giving improved visibility over the orange glow of a sox lantern. Proposals for 2010/11 can be seen in (appendix 2). Examples of sox street light can be seen in appendix 3/14.

Photo Cell Trimming

14. The vast majority of street lighting equipment in the city is turned on and off via the use of photo-voltaic cells. Historically these cells have been set to turn on at a level of 70 lux and off at a level of 35 lux. These levels were set following research undertaken in the 1980's. They took account of levels of light on the ground and how long it would have taken the technology of equipment to start and reach optimum performance. Current equipment allows the lights to start much quicker and reach optimum performance in far shorter times. There fore it is proposed to alter the switching regimes to turn the lighting on later and off earlier. This switching regime has been in use in York (as well as other authorities) for the past three years with absolutely no public recognition of the change. It is anticipated city wide that this trimming will save approximately 50 hours per year per lantern. Approximately 1800 units have been installed so far and the proposed numbers can be seen in appendix 2

City Walls lighting

15. The City Walls along with other architectural features within the city are currently flood lit with inefficient 250 watt units. LED flood lights are currently being trialled within the city, the most recent trial being adjacent to Lendal Bridge. The LED lighting is projected onto the wall and provides an aesthetically pleasing colour changing effect. Savings shown in appendix 1. Examples of LED flood lighting can be seen in appendix 3/16, conventional flood lighting appendix 3/16A.

Part night switching

16. It is proposed to undertake trials in areas where lighting is not deemed necessary during the early hours of the day, for example from 01:30am through to 05:00am. Examples of possible site locations would be Monks Cross Link, Monks Cross Drive and Malton Road. Consultation would be carried out with the Safer York Partnership, Police, Transport Safety and Local Ward Committees in order to agree safe locations and timings. Possible savings can be seen in appendix 2.

Led Lantern Conversions

17. Improvements in the technologies within the lighting industry has made it possible to light roads through the use of LED lanterns. LED street lights have the potential to use 30% less energy than a conventional street light. A trial using LED street lights is currently being monitored on Queen Victoria Street, feedback from residents is encouraging. LED street lights also reduce the need for future maintenance, the bulbs are guaranteed for 20 years as apposed to 4 years for a conventional street light. Saving for 2009/10 is shown in appendix 1, proposals for 2010/11 in appendix 2. Examples of LED lanterns can be seen in appendix 3/18.

Installation or array and conversion to half hourly trading

18. Currently energy usage is an estimated charge per year based on estimated energy usage and hours of operation. This "trading" is based on a very rough household basis and currently attracts slightly higher charges. The authority is currently moving to half hourly trading which through the use of an array of photo-cells, will more accurately measure actual energy usage. Possible savings in 2010/11 can be seen in appendix 2.

Consultation

19. Past trials have sought public feedback and consultation resulting in previous reports on street lighting. Energy and carbon reduction measures through street lighting are being carried out throughout the country. For example City of York Council was one of the first authorities to undertake a trial into variable lighting levels. Museum Street was chosen as a suitable site to carry out trials, differing lighting levels were set on a number of street lights in order to establish whether members of the public could tell the difference between them. Leaflets and street interviews were used to generate results for submission in the City Strategy EMAP report 08/09/08 (item 41, appendix 4).
20. Currently we are trialling LED lanterns in various locations and views are being sought via feedback questionnaires from the surrounding residents.
21. The City of York's street lighting engineer is a member of the authorities Carbon Core Team and has liaised with them during the development and implementation of the proposals set out within this report. This work contributes to the 10:10 campaign for the councils carbon reduction programme.

Corporate Priorities

22. The proposals conform with the following corporate priorities: -
 - Sustainable City
 - The proposals aim to use innovative and recycled materials and technologies in order to save carbon from both direct energy usage and reduced maintenance.
 - Safer City
 - Improved and appropriate lighting contributes to a safe environment and reduces crime and the fear of crime. Each of these proposals complies with minimum set standards to enable this requirement is met.

Implications

Financial

23. Whilst initial investment is required, the long term anticipated effect will be the reduction in energy costs and in some cases the reduction in maintenance requirements. For breakdown and benefits see appendix 1.

Human Resources (HR)

24. Officer time will be required to evaluate the effects of each of the proposals

Equalities

25. Street Lighting Impact assessment in appendix 5

Legal

26. All items will be fully compliant with minimum requirements of the relevant statutes and standards.

Crime and Disorder

27. Good quality lighting has been found to help in the reduction of crime and the fear of crime. It is not anticipated that any of the proposal will have a direct effect on crime and disorder.

Information Technology (IT)

28. None

Property

29. None

Other

Options

30. There are no options as such but the executive member may choose to accept or modify the proposals in paragraphs 6-19.

Risk Management

31. As the recommendations follow best practice and minimum recommended levels set out within the relevant statutes and standards. No substantial risks are highlighted.

Recommendations

- (a) For the executive member to note the work undertaken in 2009/10 that will deliver savings in 2010/11 as set out in appendix 1.
- (b) Approve the proposals for 2010/11 detailed above and as set out in appendix 2.

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Report Approved **tick** **Date** Insert Date

Chief Officer's name
Title

Report Approved **tick** **Date** Insert Date

Specialist Implications Officer(s) *List information for all*
Implication ie Financial *Implication ie Legal*
Name Name
Title Title
Tel No. Tel No.

Wards Affected: *List wards or tick box to indicate all*

All *tick*

For further information please contact the author of the report

Appendices

- Appendix 1 – Last years works 2009/10**
- Appendix 2 – Breakdown of proposals for 2010/11**
- Appendix 3 – Pictures of Lighting Equipment**
- Appendix 4 – EMAP Report & Annex Sept 2008**
- Appendix 5 – Equalities Impact Assessment.**

Appendix 1

Last Years Works 2009/10

Paragraph No.	Project	no. of units	Total Kw saved	Co2 tonnes Per Year	Cost Per Unit	Total Cost	Total energy Saving Per Year
6	Mercury Lanterns	1100	189195.6	102.74	£95.75	£105,325.00	£17,973.58
8	Solar Bollards	50	21038.4	11.43	£509.56	£25,478.00	£1,998.65
11	City Centre lit Posts	30	7270.74	3.95	£1.00	£30.00	£690.72
12	250 watt to 150 watt	30	13134.24	7.13	£376.65	£11,299.50	£1,247.75
16	Lendal Floodlights	5	670.6	0.36	£0.00	£0.00	£63.71
18	Led Lantern Conversions	10	899.07	0.49	£200.00	£2,000.00	£85.41
	Totals		232208.65	126.1		£144,132.50	£22,059.82

Appendix 2

Breakdown of proposals for 2010/11

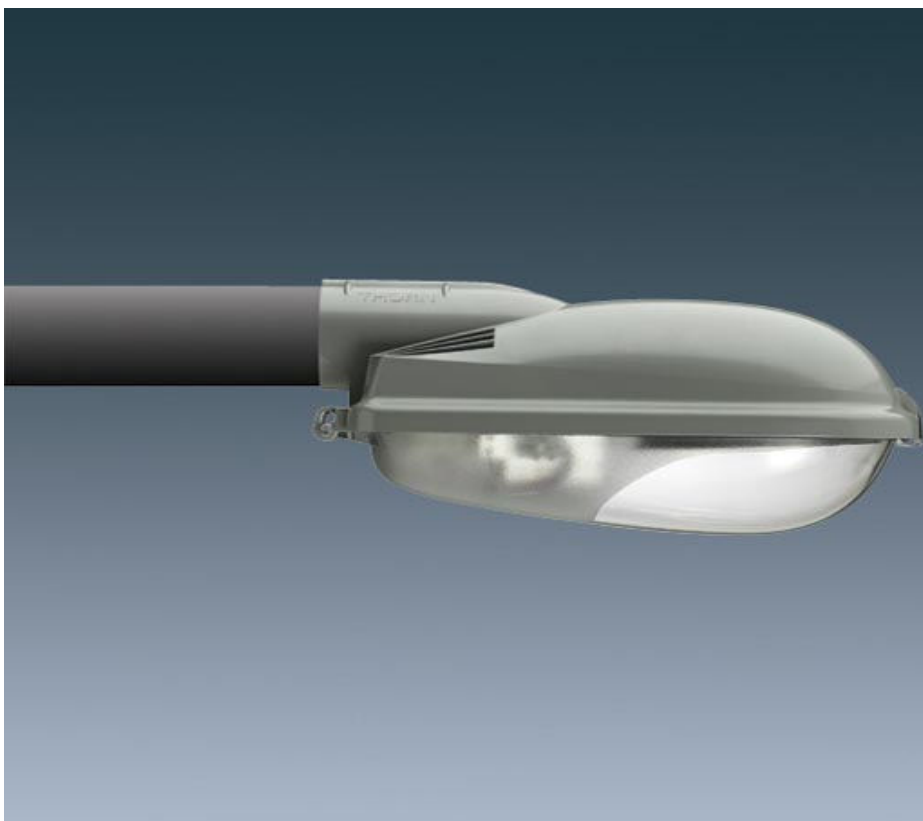
Paragraph No.	Project	No. Of units	Kw saving per year	Co2 tonnes per year	Cost Per Unit	Total Cost	Total energy/ Saving Per Year
6	Mercury Lanterns	1500	257994	140.10	£98.25	£147,375.00	£24,509.43
8	Solar Bollards	50	21038.4	11.43	£509.56	£25,478.00	£1,998.65
10	Led sign Lights	50	5081.7	2.76	£150.00	£7,500.00	£482.76
11	De-Illuminating signs	100	11336.1	6.16	£15.00	£1,500.00	£1,076.93
12	Conventional 150 watt to electronic	150	2931.75	1.59	£60.00	£9,000.00	£278.52
12	250 watt and adaptive lighting	100	43389.9	23.56	£80.00	£8,000.00	£4,122.04
14	Low Pressure Sodium Alteration	100	20326.8	11.04	£455.00	£45,500.00	£1,931.05
15	Photo Cell Trimming (all city)	15500	130099.54	70.65	£4.50	£69,750.00	£12,359.46
19	Half Hourly Trading	1			£6,000.00	£6,000.00	£12,000.00
12	250 watt to 150 watt	100	43780.8	23.77	£376.65	£37,665.00	£4,159.18
16	Floodlights	20	2682.4	1.46	£450.00	£9,000.00	£254.83
17	Part Night switching	300	80916.3	43.94	£20.00	£6,000.00	£7,687.05
18	Led Lantern Conversions	50	4495.35	2.44	£480.00	£24,000.00	£427.06
	Contingencies					£37,276.80	
			619577.69	336.45		£434,044.80	£70,859.88

Note: Half hourly trading will cost approximately £6,000 in the first year and save £18,000 in energy charges,

Appendix 3 Pictures of Lighting Equipment



3/7 Mercury Vapour lantern



3/7A Compact Fluorescent Lantern



3/9 TMP Solar Bollard



3/9A Standard Lit Bollard



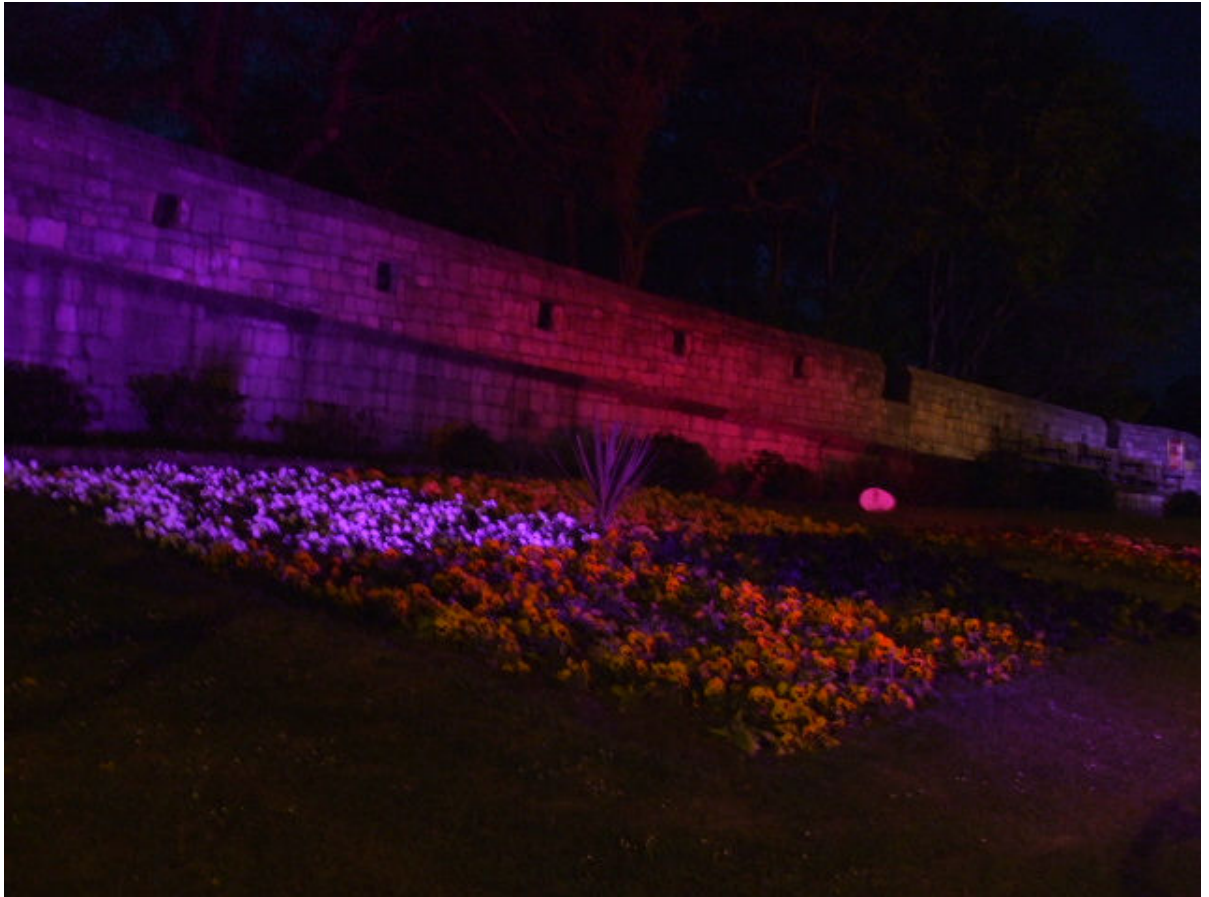
3/10 Conventional sign light



3/10A LED Sign Light



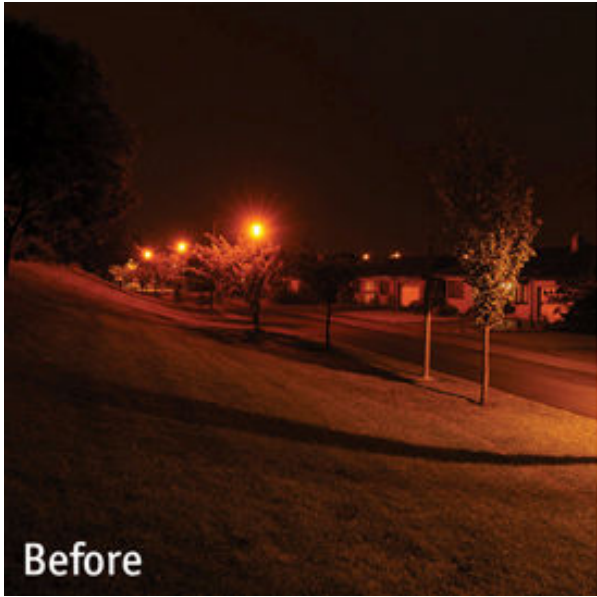
3/14 Low-pressure sodium lantern (sox)



3/16 Bar Walls lit with LED's



3/16A Conventional Flood Light



3/18 Pictures of a trial in Middlesbrough showing Before with SOX Lighting and After with LED's.