

# Transport and Environment Committee

10am, Tuesday, 14 January 2014

## Street Lighting – Result of White Light Pilot Project

Item number	7.10
Report number	
Wards	All

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Coalition pledges	<a href="#">P44</a> , <a href="#">P49</a> , <a href="#">P50</a>
Council outcomes	<a href="#">CO18</a> , <a href="#">CO19</a> , <a href="#">CO21</a>
Single Outcome Agreement	<a href="#">SO1</a> , <a href="#">SO4</a>

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# Executive summary

## Street Lighting – Result of White Light Pilot Project

### Summary

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The Council currently has approximately 63,418 street lights. The cost of this electricity consumption is currently £2.97m per year.

Energy costs continue to rise and are expected to double within 10 years. The Street Lighting team are considering the new technologies, currently available on the market, to try and identify lighting design solutions which mitigate the current and future financial pressures.

A pilot project commenced in October 2012 across four separate residential areas. The objective of the project was to pilot different technologies. The lamps were installed in the autumn and winter of 2012/13 in order to inform future Council policy with regards to street lighting. Customer feedback was gathered during the Spring/Summer of 2013.

The Council also currently maintains stair lighting in most tenements in Edinburgh. This service is provided to an estimated 55,000 properties in around 14,100 tenements. The cost of this service is just over £2.20m per year, including energy costs of around £0.80m a year. Through a minor stair upgrading programme, just over 500 LED light fittings have been installed in stairs across the city.

### Recommendations

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It is recommended that the Transport and Environment Committee:

- 1 notes the content of the report;
- 2 notes that the results of the consultation show that all light types used in the pilots met with the approval of residents and residents in adjoining streets;
- 3 notes that further trials of variable lighting will be carried out;
- 4 notes that further business cases and models, to upgrade the remaining stock, will be reported to committee; and

- 5 approves the proposals to use energy efficient white light technologies in all future Street Lighting installations, choosing the design solution which best optimises energy savings, using LED's and PLL as the primary design solution.

## Measures of success

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Success will be measured by a sustained reduction in electricity consumption, reduced energy costs and carbon usage reduction.

## Financial impact

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The current annual budget for Street Lighting energy consumption is £2.97m for 2013/14.

Maximising the use of white light technologies will mitigate against future increases in costs and greatly contribute to the reduction of the lighting energy bill.

Reduction in energy consumption also directly reduces the Council's carbon emissions. The inclusion of street lighting within the Carbon Reduction Commitment (CRC) scheme from April 2014 will incur an anticipated fee to the Council of approximately £245,600 per annum. The introduction of lower energy lighting can make savings to help lessen the impact of the CRC tax.

## Equalities impact

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Improving the street lighting asset will positively contribute to the delivery of the Equality Act 2010 for all of the protected characteristics and will improve the lives and safety of all residents and visitors to the city.

The change from old yellow light to new white light lanterns has been proven to enhance community safety and will contribute to the right for physical security.

## Sustainability impact

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The new lamps, dependent upon type, can last from 5 to 20 years compared to the existing lamp's current life span of 2 to 4 years. These lamps use less energy, therefore securing savings in the lighting energy bill and future carbon tax.

Modern lamps and lanterns are manufactured in accordance with the Waste Electrical and Electronic Equipment (WEEE) Regulations taking account of all required environmental regulations and can be recycled at the end of their life helping the Council meet its carbon footprint and environmental targets.

Further to this, aluminium columns are now the first choice in street lighting designs as they require no ongoing maintenance and have a design life of more than 50 years, compared to 30 years for steel and concrete. These columns are manufactured from recycled aluminium and they can be recycled again at the end of their life.

## **Consultation and engagement**

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Following the installation of white lighting in the four pilot areas, an extensive door to door public consultation exercise was carried out on behalf of the Council by “Knowledge Partnership”.

471 households were interviewed throughout the pilot areas and the average high level results are as follows:-

89% were satisfied with the new lights.

83% think the brightness is ‘about right’.

78% agree that the new lighting is better than the old lighting whilst 50% agree that it enables them to distinguish colours better.

## **Background reading/external references**

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Briefing Note to local Councillors October 2012

## Street Lighting – Result of White Light Pilot Project

### 1. Background

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- 1.1 The Council currently has approximately 63,418 street lights and pays £2.97m for electricity consumption per year.
- 1.2 Currently only 15% of the Council's street lighting utilises white light technology.
- 1.3 Energy costs continue to rise and are expected to double within 10 years.
- 1.4 Street lighting will be included in the Carbon Reduction Commitment tax from April 2014 and will therefore pay Carbon Tax on lighting energy consumption. Current estimates indicate that this will be in the region of £245,600 per annum.
- 1.5 The use of modern white light technologies can allow the Council to reduce its consumption profile and assist with mitigating the expected rise in energy and carbon costs.

### 2. Main report

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#### Progress Made to Date

- 2.1 In October 2012, the Council's Street Lighting section installed three different types of energy efficient white lighting in four locations within the city in a pilot scheme to trial new lamp technologies.  
  
The sites were Saughton Mains (one location) and Gilmerton Dykes (three locations).  
  
The three different types of white lighting were:
  - Ceramic Metal Halide discharge lamps (CMH)
  - Outdoor Long Life Fluorescent Lighting (PLL)
  - Light Emitting Diodes (LED)
- 2.2 Two different sizes of LED's were used in Gilmerton Dykes, 41watt and 49watt.
- 2.3 The project used energy saving equipment to replace existing less efficient materials that had reached the end of their design life.
- 2.4 271 lights were changed and approximately 988 households were affected by the new lights.

- 2.5 In three of the four areas, a 'control' street was left with the existing type of lighting to provide a contrast and a reminder for residents of the previous style of lighting. Lighting levels in one area were reduced at all times through the use of variable lighting. This trial received a mixed reception and it is anticipated that further trials of this technology will be required before its suitability as an energy reduction measure can be evaluated. This may involve trials of variable lighting from late evening onwards to early morning as this may prove to be more acceptable to customers.
- 2.6 Prior to the commencement of the pilot projects residents were notified of the reason for the projects and they were informed that they would be asked for their opinions on the change of lighting following the winter period.

### **Current Position**

- 2.7 The lighting in the pilot areas remains operational.
- 2.8 The introduction of these new technologies is a significant change from the majority of the existing street lighting infrastructure in Edinburgh. For this reason it was important that the opinions of residents in pilot areas was sought.
- 2.9 The Customer Feedback survey was carried out by a company called Knowledge Partnership with results broken down into levels of satisfaction for each trial area. Individual comments were also sought from residents.
- 2.10 In summary across all four pilot areas 89% are satisfied with the new lights, 83% think the brightness is 'about right', 78% agree that the new lighting is better than the old lighting. 50% agree that it enables them to distinguish colours better. Further detailed information can be found in Appendix 1.
- 2.11 Carrying out the pilot project and the survey has enabled the local residents to inform how the Street Lighting service should be delivered in the future.
- 2.12 Modern street lights have the ability to direct their light output on to roads and pavements where it is required, with the benefit of consuming less energy, reducing light pollution and contributing to clearer night skies.

## Findings from the Pilot

### 2.13

<b>Pilot &amp; Technology</b>	<b>Expected Lamp Life</b>	<b>Carbon Footprint/ Lamp/ Annum</b>	<b>Energy Saving/ Lamp (%) (ii)</b>	<b>Customer Satisfaction (i)</b>	<b>Material Cost</b>
Saughton (CMH)	4 years	126Kg	3.5%	94.5%	£198
Gilmerton Dykes 1 (41w LED)	20 Years	92Kg	29.3%	85%	£386
Gilmerton Dykes 2 (49w LED)	20 Years	111Kg	15.5%	88.9%	£420
Gilmerton Dykes 3 (PLL)	10 Years	81Kg	37.9%	89.5%	£124

Notes:

(i) Customer Satisfaction shows residents who were Very Satisfied or Fairly Satisfied with the new Street Lighting.

(ii) Each pilot area was different in size and the new White Lights replaced different types of "old" lighting, therefore for the purposes of this report, the Energy Savings per lamp has been calculated by comparing each of the new White Lights with the same type and size of "old" light.

2.14 Saughton received the highest level of Customer Satisfaction and Gilmerton Dykes 3 had the cheapest material cost. However, based on all of the above information, including expected lamp life, LED's and PLLs will be the primary design solutions. In general terms all main roads will likely be LED schemes and residential streets will likely be PLL schemes. The decision on which technology to use will be a fundamental consideration at the design stage and will be dependant on not only energy savings but a number of technical factors and be primarily based on a whole life costing approach.

## **Risk Assessment**

- 2.15 Pre-installation of the pilots, there were concerns about the better control of light output of the new white light technologies, particularly LED's, resulting in less light spillage, which in turn would result in residents private paths not being well enough lit. However, the survey results showed a high degree of satisfaction with the new lighting, with only a few areas of concern with regard to some local issues. These issues will be taken into consideration when designing future projects with white lighting.
- 2.16 The availability of lanterns, such as LED, is a risk in any future projects, mainly due to a high demand globally and from other authorities wishing to make similar savings. Future projects should therefore be planned with sufficient timescales to allow procurement lead times to be accommodated.

## **Financial Implications**

- 2.17 The cost of the pilot was £74,720.
- 2.18 Energy savings for the project areas ranged from 3.5% to 37.9% with a corresponding reduction in carbon emissions.
- 2.19 It is acknowledged that the initial purchase cost of these new technologies is high. In order to obtain large energy savings additional funding will be required. The Street Lighting section, working with Financial Services, has recently received approval for £2.1m funding through Salix to allow a further 6,000 street lights to be converted to LED, city wide. These works are planned to start in February 2014 and will be completed during September 2014. It is anticipated that this project will save approximately £280,000 per annum in energy costs with a return on investment of less than 8 years. A report will be provided to the Finance and Resources Committee on 16 January 2014.
- 2.20 Salix Finance Limited is an independent, not for profit, company funded by the Department for Energy and Climate Change, the Welsh Assembly Government and the Scottish Government via the Carbon Trust. Their borrowing interest rate is 0%.
- 2.21 In addition to the Salix proposal, a 'spend to save' proposal was progressed to install white light lanterns on a number of main roads. These two initiatives will result in approximately 24% of the City's street lighting being upgraded to energy efficient white light sources. To follow on from these, the intention is to develop further business cases and models to upgrade the remaining lighting stock. These would start to be prepared in early 2014 and will be reported to Committee in due course.

2.22 To give some context to the possible savings resulting from a wholesale upgrade to LED and PLL across the city, the table below shows theoretical potential savings. These could be achieved by changing all other lamps not included in the recent white light pilot scheme, 'spend to save' project or the proposed Salix project, which affects 9,782 lamps. These savings are based on the principles detailed in 2.14 above, that main roads will likely be LED schemes and residential streets will likely be PLL schemes. There are 25,988 main road lamps and 27,648 residential street lamps included in this analysis. It should be noted that the Carbon tax costs for the excluded 9,782 lamps is £52,826.

Lamp type	Number of lamps	Electricity Consumption Costs	Carbon Tax Costs
Existing main road lamps	25,988	£1,513,079.00	£119,066.00
LED Conversions	25,988	£674,225.70	£53,055.43
<b>Theoretical potential LED Savings</b>		<b>£838,853.30</b>	<b>£66,010.57</b>
Existing residential street lamps	27,648	£936,673.00	£73,708.00
PLL Conversions	27,648	£540,704.67	£42,548.54
<b>Theoretical potential PLL Savings</b>		<b>£395,968.33</b>	<b>£31,159.46</b>
<b>Total theoretical potential Savings</b>		<b>£1,234,821.63</b>	<b>£97,170.03</b>

2.23 Obviously, detailed designs will have to be completed for each scheme to determine the best 'whole life cost solution' and additional budget will need to be sourced to fund these works. The above table, however, does show that there is potential for significant savings to be made in electricity consumption and Carbon tax costs.

## Stair Lighting

- 2.24 Stair lighting is another area in which LED conversion could generate savings to the Council for energy and maintenance costs. The Council currently maintains stair lighting in most tenements in Edinburgh. This service is provided to an estimated 55,000 properties in around 14,100 tenements. The cost of this service is just over £2.20m per year, including energy costs of around £0.80m a year.
- 2.25 Through a minor stair upgrading programme, around 500 LED light fittings have been installed in communal stairs across the city. Two multi-storey blocks have also been upgraded with LED light fittings.
- 2.26 The installation of LED light fittings in all tenements would cost approximately £7.50m with anticipated energy and maintenance savings of £0.55m and £0.70m per annum respectively. A review of the options for funding these improvements will take place in 2014.

## 3. Recommendations

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- 3.1 It is recommended that the Transport and Environment Committee:
- 3.1.1 notes the content of the report;
  - 3.1.2 notes that the results of the consultation show that all light types used in the pilots met with the approval of adjoining residents;
  - 3.1.3 notes that further trials of variable lighting will be carried out;
  - 3.1.4 notes that further business cases and models, to upgrade the remaining lighting stock, will be reported to committee; and
  - 3.1.5 approves the proposals to use energy efficient white light technologies in all future Street Lighting installations, choosing the design solution which best optimises energy savings, using LED's and PLL as the primary design solutions.

## Mark Turley

Director of Services for Communities

## Links

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<b>Coalition pledges</b>	<b>P44</b> – Prioritise keeping our streets clean and attractive. <b>P49</b> – Continue to increase recycling levels across the city and reducing the proportion of waste going to landfill. <b>P50</b> – Meet greenhouse gas targets, including the national target of 42% by 2020.
<b>Council outcomes</b>	<b>CO18</b> – Green – We reduce the local environmental impact of our consumption and production. <b>CO19</b> – Attractive Places and Well Maintained – Edinburgh remains an attractive city through the development of high quality buildings and places and the delivery of high standards. <b>CO21</b> – Safe – Residents, visitors and businesses feel that Edinburgh is a safe city .
<b>Single Outcome Agreement</b>	<b>SO1</b> – Edinburgh’s economy delivers increased investment, jobs and opportunities for all. <b>SO4</b> – Edinburgh’s communities are safer and have improved physical and social fabric.
<b>Appendices</b>	Appendix 1 - Survey Results

## Appendix 1 -Street Lighting - Result of White Light Pilot Project

Compared to the street lights replaced in November, would you say that the current street lighting provides?

	Pilot area				Total
	Gilmerton Dykes 1	Gilmerton Dykes 2	Gilmerton Dykes 3	Saughton Mains	
Much better lighting	70.1%	57.6%	54.8%	66.1%	62.3%
Slightly better lighting	7.5%	21.2%	22.1%	11.0%	15.3%
Neither/nor	2.8%	11.1%	9.6%	15.6%	9.8%
Slightly worse lighting	4.7%	3.0%	1.9%	2.8%	3.1%
Much worse lighting	4.7%	5.1%	1.9%	1.8%	3.3%
Don't know	10.3%	2.0%	9.6%	2.8%	6.2%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

Would you say your current street lighting was?

	Pilot area				Total
	Gilmerton Dykes 1	Gilmerton Dykes 2	Gilmerton Dykes 3	Saughton Mains	
Too dim	15.0%	5.1%	5.8%	11.0%	9.3%
About right	78.5%	83.8%	84.6%	87.2%	83.5%
Too bright	3.7%	10.1%	1.0%	1.8%	4.1%
Don't know	2.8%	1.0%	8.7%		3.1%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

Would you say your current street lighting?

	Pilot area				Total
	Gilmerton Dykes 1	Gilmerton Dykes 2	Gilmerton Dykes 3	Saughton Mains	
Allows you to distinguish colours better	41.1%	49.5%	51.9%	56.9%	49.9%
Doesn't make any difference	18.7%	42.4%	27.9%	41.3%	32.5%
Makes it more difficult to distinguish colours	3.7%	4.0%	8.7%		4.1%
Don't know	36.4%	4.0%	11.5%	1.8%	13.6%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

Taking everything into account, how satisfied or dissatisfied are you with the current street lighting in your street?

	Pilot area				Total
	Gilmerton Dykes 1	Gilmerton Dykes 2	Gilmerton Dykes 3	Saughton Mains	
Very satisfied	65.4%	59.6%	55.8%	72.5%	63.5%
Fairly satisfied	19.6%	29.3%	33.7%	22.0%	26.0%
Neither/nor	1.9%	5.1%	4.8%	1.8%	3.3%
Fairly dissatisfied	4.7%	1.0%	1.9%	2.8%	2.6%
Very dissatisfied	5.6%	5.1%	1.9%	.9%	3.3%
Don't know	2.8%		1.9%		1.2%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

Why are you dissatisfied with your street lighting? (in response to previous question)

	Pilot area				Total
	Gilmerton Dykes 1	Gilmerton Dykes 2	Gilmerton Dykes 3	Saughton Mains	
(positive responses)	88.8%	94.9%	96.2%	96.3%	94.0%
Awfully dark	.9%				.2%
Brighter with old lighting; distance between lights makes dark patches in-between	.9%				.2%
Could do with another light; mother fell when coming in over steps from pavement	.9%				.2%
Doesn't light up whole street	.9%				.2%
Eerie; don't give as much light as old ones; just shine down; no spread of light	.9%				.2%
Far too dark	.9%				.2%
It's horrible; far too bright; comes straight into the house; it's the positioning of it		1.0%			.2%
It's very dark; not so good as old ones			1.0%		.2%
Light shines down; dark patches between the lights		1.0%			.2%
Lights are a lot darker than the old ones			1.0%		.2%
More eerie and vandalism; doesn't feel safe; a bit colder	.9%				.2%
Not bright enough	.9%				.2%
Not bright enough; not enough of them				.9%	.2%
Not seen them on	.9%				.2%
Not very good but very light		1.0%			.2%
Now have dark patches when we didn't before; only light where lights are; horror now of walking back at night; good for cars parking can see them in light	.9%				.2%
Ok for motorists and roads; but dark for seeing houses	.9%				.2%
Only light small bit; under lamp posts; not whole street	.9%				.2%
The lights are always out			1.0%		.2%
The old ones were a lot better; you could see better		1.0%			.2%
They are dimmer than the old ones				.9%	.2%
They are not bright enough; its just comes down; it doesn't go side to side			1.0%		.2%
They are not strong enough in winter				.9%	.2%
They are too bright				.9%	.2%
Too bright; cant even turn the corner with the cars		1.0%			.2%
Total	100.0%	100.0%	100.0%	100.0%	100.0%