East Lothian Council

REPORT TO: Policy and Performance Review Committee

MEETING DATE: 28 April 2015

BY: Depute Chief Executive - Partnerships and Community Services

SUBJECT: Street Lighting Update 2015

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1 PURPOSE

1.1 This report provides PPRC with an opportunity to assess East Lothian Council's Street lighting replacement strategy and provides an update on the new technologies and design solutions currently being rolled out throughout the Council's lighting network such as white light LED's (Light Emitting Diode).

2 RECOMMENDATIONS

2.1 That PPRC note the content of this report which forms the basis for discussion with regard to the future provision of street lighting in East Lothian.

3 BACKGROUND

3.1 There is no statutory requirement on local authorities to provide public lighting however, The Roads (Scotland) Act 1984, Section 35 empowers a local roads authority to provide lighting for roads, or proposed roads, which are, or will be, maintainable by them and which in their opinion ought to be lit.

3.2 The Council has a duty of care to road and footway users and to design lighting installations which provide illumination to public roads and adjoining public footways only. There is no requirement for street lighting to illuminate doorways, accesses to houses or driveways.

3.3 The Council currently has 17,793 road lighting units (i.e. support, lantern and lamp) within the East Lothian Council boundary. This is an increase of almost 250 units from 2011. With an average replacement cost of £1,500, the asset value of the lighting stock is in excess of £26,689,500. A breakdown of the different road lighting units as of November 2014 is shown in Appendix A.

3.4 This year ELC will be charged approximately £577,000 by our energy supplier for electricity consumed by street lighting. With councils typically paying four times as much today for their electricity compared to five years ago, the pressure on the public purse has been growing. Energy costs continue to rise and are expected to double within 10 years.

3.5 The Street Lighting unit within Road Services employ a team of 4 electricians who undertake all routine maintenance on the network including emergency call outs.

3.6 In 2002 Transportation embarked on a programme of lighting column replacements to aged stock, spending on average £200,000 capital per annum. This has been ongoing, demonstrating the commitment and importance the Council places on road lighting for the communities of East Lothian.

3.7 The age profile and structural testing has primarily determined which columns and areas, are selected for upgrading. In 2011 concrete columns and their lighting units represented approximately 3.3 % of the lighting inventory in East Lothian and were over thirty years old. In 2011 a 4 year plan was put in place to replace all concrete columns with recyclable aluminium columns. We are on target to achieve this and will have replaced all concrete columns in East Lothian by May 2015.

3.8 The first steel columns installed in the 1970s were not galvanised and are coming to the end of their natural lifespan and require replacing. Steel columns that fail are replaced immediately and those near to failure are replaced with aluminium columns as part of the ongoing capital planned works the following budget year. It is estimated that within the next 5-10 years at least 4,000 steel columns will have exceeded their design life and will need to be replaced.

3.9 It is a requirement that all new housing areas, where roads are being adopted onto the public network, are provided with road lighting. The design of this lighting must comply with national regulations and strict ELC guidelines. The installation works are closely monitored and the completed installation inspected and tested to ensure compliance with all requirements.

3.10 The increase in our lighting stock from 14,519 in 1996 to 17,549 units in 2011 has been largely due to the extensive housing developments that have taken place throughout East Lothian. We project a significant increase in lighting stock in a similar fashion over the next 5-10 years, putting additional pressure on ELC street lighting budgets.

3.11 The older types of sodium lighting still in use have little optical control of the light produced and tend to scatter light in many directions. This “spill light” is sometimes referred to as light pollution or intrusion. Complaints have been received from residents about light pollution stating this interfering with sleep during the night, however many people welcome this unintended light spill as an aid to entering and exiting their homes. A public perception therefore still exists that street lighting is provided to light these private areas.

3.12 Street lighting has been included in the Carbon Reduction Commitment tax since April 2014 and the Council pays over £16 a tonne for lighting emissions (approximately £50,000 this coming financial year). There is increasing pressure on local authorities to reduce the spiralling electricity costs associated with their lighting, while tackling the environmental pressures of light pollution and CO2 emissions. At the same time, it is estimated that street lighting across the whole of the UK results in more than a million tonnes of CO2 emissions annually.

3.13 To achieve savings and reduce our C02 emission, one of the strategies is the gradual replacement of existing less efficient and traditional forms of 'orange light' (Low Pressure Sodium lights or SOX) with new white light LED technology.

3.14 There has been an increase of LED technology in the street lighting industry which has indentified that the 'yellow light' is wasteful in the way it controls the light emission and usage of energy and also costs more to maintain. Additionally, due to the limited numbers of manufacturers of the older bulbs (lamps), they are becoming more expensive to maintain. As such, a large amount of carbon, energy, light pollution and costs can be saved by moving to a more efficient LED light source.

3.15 LED street lights can consume up to 70% less energy than existing discharge lighting. Advances in this technology and subsequent reductions in the purchase costs mean that a typical lantern replacement can have a "pay back" period of less than eight years from energy savings alone.

3.16 Each LED street light has many individual components within the unit and each of these individual LEDs is independently focused. This is one of the factors which make them highly efficient. As most of the light produced lands on the intended target, light pollution is significantly reduced. Although from a lighting perspective this is our aim, members of the public may perceive it to be a conservative step as they no longer benefit from the generous light previously enjoyed.

3.17 The use of LED lighting will allow the Council to reduce its consumption profile and assist with mitigating the expected rise in energy and carbon costs.

3.18 Most of our existing lighting network has exceeded its design life, is inefficient and is expensive to maintain. Lamps typically require replacement every three to four years and may require visits for other component failures between lamp replacements.

3.19 LED lighting is a solid state technology with light being produced by the movement of electrons in the semi conductor material; consequently they have a notional life span of 100,000 hours. As our street lights are illuminated for 4088 hours per annum this gives a theoretical life of almost 25 years.

3.20 Existing lighting units will have between six and eight maintenance visits during the life span of unit. The LED light should require only minimal attention in this period.

3.21 Manufacturers currently provide a defect guarantee period of ten years for new LED street lights meaning there should be no maintenance costs to the Council during this period. Existing lighting has one light source, the lamp and if this fails, the unit is dark. LED units have multiple light emitting diodes and in the unlikely event one fails, the rest will continue to function.

3.22 Concern has been raised regarding a potential increase in criminal activity in locations where the new LED light has been installed. The concern is that the new LED lighting does not spill light to areas previously illuminated by the older orange light and will increase criminal activity. To date, there has not been any evidence to suggest this is the case, however we would advise any resident who has any safety concerns to contact Police Scotland who will be happy to advice on measures to improve security and reduce risks.

3.23 The British Astronomical Association has done research(1) into lighting and crime. They have found the majority of crime occurs either in daylight hours or beneath artificial light. Crime usually occurs where or when there are few (if any) witnesses and so the lighting levels are in some cases irrelevant. Lighting can highlight potential targets ("easy pickings"), security lapses and even escape routes - in short, light can help criminals be quick and quiet. Lighting can help criminals see what they are doing, minimising any risk to themselves. PIR activated floodlights are often frequently triggered that they may be ignored by neighbours.

3.24 The light provided by the LED lanterns produce a crisp white light which makes facial recognition for the public much easier. This will improve images captured at night from CCTV, as well as allowing clothing colours and car registration numbers to be more easily identified. Recent research at the University of Sheffield, by Steve Fotios (2) concluded that under white light sources, driver's reaction time can increase by up to 50% which improves road safety.

3.25 Existing discharge lamp sources contain mercury which require the Council to recycle all waste products. ELC incur a charge for each new lamp bought to cover this recycling. LED's contain no hazardous chemicals and are, in most cases, 100% recyclable. The natural resources and energy used to produce replacement lamps will be reduced as we move away from this technology.

3.26 Less fuel will be used to transport the lamps from the factory, to the distributor, to the contractor, to the job site.

3.27 Moving over to LED lighting will mean drastically reduced numbers of lighting maintenance visits with a consequence of less fuel used, less emissions produced and the potential for reduced congestion on the road network through lane closures or roadworks.

3.28 As LEDs use significantly less energy and their light output can be controlled more efficiently than traditional street lights, this reduces the amount of carbon emissions from production of the electricity required to operate the lights.

3.29 LEDs emit light in a specific direction, which is aimed at providing uniform illumination of the area to be lit, it will reduce light trespass and light pollution.

4 POLICY IMPLICATIONS

4.1 RCC guidelines to be amended to make white light LED's the primary design consideration.

5 EQUALITIES IMPACT ASSESSMENT

5.1 This report is not applicable to the well being of equalities groups and Equality Impact Assessment is not required.

6 RESOURCE IMPLICATIONS

6.1 Financial -To complete the renewal programme of lighting columns there will be ongoing capital investment required per year.

Introduction of new white light technology will reduced energy charges, reduced Carbon Reduction Commitment Tax and reduced levels of maintenance expenditure.

6.2 Personnel - None

6.3 Other – None

7. BACKGROUND PAPERS

7.1 None

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DATE	30 March 2015

LAMP TYPE	CIRCUIT WATTAGE	BURNING HOURS	NUNBER OF LAMPS OLD	CHANGE	NEW	Kw Load	EAC
35w SOX	65	4,088	25	25	0	0	0.00
35w SOXLL	58	4,088	759	24	735	42.63	174271.44
55w SOX	84	4,088	0		0	0	0.00
55w SOXLL	67	4,088	0		0	0	0.00
90w SOX	123	4,088	52	38	14	1.72	7031.36
90w SOXLL	104	4,088	51		51	5.304	21682.75
70w SON	84	4,088	2579	196	2383	200.172	818303.13
100w SON	114	4,088	176		176	20.064	82021.63
150w SON	172	4,088	241	13	228	39.216	160315.00
250w SON	279	4,088	246		246	68.634	280575.79
70w MBI	86	4,088	2		2	0.172	703.14
8w MCF	14	4,088	395		395	5.53	22606.64
11w PLS	16	4,088	55		55	0.88	3597.44
2x13w MCF	36	4,088	25		25	0.9	3679.20
2x15w MCF	40	4,088	37		37	1.48	6050.24
20w MCF	30	4,088	0		0	0	0.00
36w PLLH/F	36	4,088	0		0	0	0.00
35 CDM-T	47	4,088	323	24	347	16.309	66671.19
70wCDO-TT	79	4,088	61		61	4.819	19700.07
100w CDO-TT	114	4,088	183	35	218	24.852	101594.97
150w CDMT	162	4,088	2	3	5	0.81	3311.28
45w Cosmo	51	4,088	506	47	553	28.203	115293.86
90w Cosmo	99	4,088	9	2	11	1.089	4451.83
57w PL-T4p	62	4,088	73		73	4.526	18502.29
42w PL-T4p	46	4,088	67		67	3.082	12599.22
Axia 16 led	21	4,088	39	187	226	4.746	19401.65
Axia 24 led	30	4,088	105	153	258	7.74	31641.12
Axia 32 led	40	4,088	0	6	6	0.24	981.12
Axia 48 led	62	4,088	0	8	8	0.496	2027.65
35w SOX	65	3905	116		116	7.54	29443.70
35w SOXLL	58	3905	3834		3834	222.372	868362.66
55w SOX	84	3905	156	156	0	0	0.00
55w SOXLL	67	3905	0		0	0	0.00
90w SOX	123	3905	845		845	103.935	405866.18
90w SOXLL	104	3905	0		0	0	0.00
180w SOX	223	3905	7		7	1.561	6095.71
70w SON	84	3905	2421		2421	203.364	794136.42
100w SON	114	3905	425		425	48.45	189197.25
150w SON	172	3905	322		322	55.384	216274.52
250w SON	279	3905	290		290	80.91	315953.55
35w CDMT	47	3905	980		980	46.06	179864.30
70wCDO-TT	79	3905	5		5	0.395	1542.48
100wCDO-TT	114	3905	146		146	16.644	64994.82
150w CDMT	162	3905	10		10	1.62	6326.10
45w Cosmo	51	3905	236		236	12.036	47000.58
60w COSMO	65	3905	93		93	6.045	23605.73
70w MBI	86	3905	19		19	1.634	6380.77
90w COSMO	99	3905	38		38	3.762	14690.61
140w COSMO	151	3905	29		29	4.379	17100.00
150w MBI	167	3905	119		119	19.873	77604.07
250w MBI	266	3905	98		98	26.068	101795.54
8w MCF	14	3905	182		182	2.548	9949.94
11w PLS	15	3905	48		48	0.72	2811.60
2x13w MCF	36	3905	8		8	0.288	1124.64
2x15w MCF	40	3905	24		24	0.96	3748.80
18w PLC	24	3905	5		5	0.12	468.60
36w PLLH/F	36	3905	9		9	0.324	1265.22
42w PL-T4p	46	3905	192		192	8.832	34488.96
Axia 16 led	21	3905	14		14	0.294	1148.07
Axia 24 LED	30	3905	108		108	3.24	12652.20
Dw Windsor Led	30	3905	7		7	0.21	820.05
55w PLL	62	3905	23		23	1.426	5568.53
57w PL-T4p	62	3905	764		764	47.368	184972.04
55w QL	55	3905	186		186	10.23	39948.15
Indal 10 LED	15	3905	9		9	0.135	527.17
Indal 24 LED	30	3905	4		4	0.12	468.60
Indal 36 LED	51	3905	10		10	0.51	1991.55
			17793		17793		5645203.09

Appendix B

Research reference

1. The British Astronomical Association **http://www.britastro.org/dark-skies/crime.html**

2. Research, Sheffield School of Architecture, University of Sheffield.
Email: steve.fotios@sheffield.ac.uk

Some quotes from GE Lighting and links to articles where the research has been quoted.

http://www.gelighting.com/LightingWeb/emea/products/technologies/led/outdoor-luminaires.jsp

http://lrt.sagepub.com/content/41/4/297.abstract

http://lrt.sagepub.com/content/43/2/143.abstract

http://lrt.sagepub.com/content/39/3/233.short?rss=1&ssource=mfc