Transport and Environment Committee

10.00am, Tuesday, 27 October 2015

Street Lighting – Roll Out of Light Emitting Diode (LED) Lanterns Across the City

Item number	7.5
Report number	
Executive/routine	
Wards	All

Executive summary

On 14 January 2014, the Transport and Environment Committee considered the report titled Street Lighting – Result of White Light Pilot Project and noted that further business cases/financial models to upgrade the remaining stock would be reported to this Committee.

Following the recent replacement of a further 7,000 lanterns, this report details the business case and optimum timeline for upgrading the remaining street lights across the city.

Links

Coalition pledges	P44, P49, P50
Council outcomes	CO18, CO19, CO21
Single Outcome Agreement	SO1, SO4

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THE CITY OF EDINBURGH COUNCIL

Report

Street Lighting – Roll out of Light Emitting Diode (LED) Lanterns Across the City

Recommendations

1.1 It is recommended that the Transport and Environment Committee:

1.1.1 approves the business case in principle and refers the report to Council for formal approval of the prudential borrowing; and

1.1.2 notes that the lessons learned from the Salix project have directly informed the design solution that will be used in any further roll out of LED lighting.

Background

2.1 Prior to April 2015, the cost of energy consumption for the city's street lights was in the region of £2.97m per year.

2.2 The Finance and Resources Committee, on 16 January 2014, approved entering into a funding agreement for an interest free loan from Salix to allow for the replacement of 6,000 old less efficient main road lanterns with new Light Emitting Diode (LED) lanterns. Due to economies of scale in the procurement of LEDs, the Salix project was able to fund the replacement of 7,020 lanterns.

2.3 Street lighting has been included in the Carbon Reduction Commitment (CRC) tax since April 2014, with the Council paying Carbon Tax on lighting energy consumption. Current estimates indicate that this is in the region of £250K per annum.

2.4 With energy costs continuing to rise and expected to double within 10 years, the use of LEDs across the city can allow the Council to reduce its consumption profile and assist with mitigating the expected rise in energy and carbon costs.

Main report

Business Case

3.1 Given the relative success of the White Light Pilot Project and the recently completed Salix project the Street Lighting section has been working closely with Finance and Procurement colleagues to complete a robust business case for the roll out of LEDs across the city.

3.2 To aid, support and inform the preparation of this business case the Council engaged with Scottish Futures Trust (SFT) which launched a specialist toolkit in February 2015, to enable local authorities to model how much they would save by installing energy efficient LED street lights.

3.3 Developed by SFT and supported by the Scottish Government through its Resource Efficient Scotland programme, the toolkit allows Councils to input their current street lighting data and calculate what the reduced electricity usage would be if they changed to new LED lighting. The toolkit also calculates what level of investment is required by the Council to replace its old lights with new LED lighting.

3.4 Through evaluation of various models produced by the toolkit it was established that the optimum timeline to install new LED lighting across the city was over a three year period.

3.5 The conversion of 54,000 street lights to LED lanterns in a three year programme is ambitious but it will allow the Council to maximise savings from reduced energy charges.

3.6 The finalised financial summary from the toolkit provided the following highlight figures:

- Capital Cost to upgrade 54,000 street lights to LED - £24.518m.
- Forecast energy, CRC and maintenance savings/cost avoidance over 20 years - £77.037m.

3.7 The SFT toolkit enables accurate comparisons to be made over a 20 year period between a ‘do nothing’ scenario and a wholesale change to LEDs across the city. Under the ‘do nothing’ option cumulative energy costs in the 20 years from 2017/18 are forecast to be £134m compared to £56.9m in the LED option – a £77m difference

3.8 The overall projected savings taken from the toolkit of £77.037m, are calculated on maintenance savings and forecast savings on existing energy budgets, negating the need to increase the Street Lighting energy budget each year in line with forecast rising energy costs and forecast CRC costs.

3.9 If the Council proceeds with the wholesale change to LEDs across the city then the Street Lighting Energy Budget will be aligned with the reduced consumption charges in future years. Investment in new LED lighting will therefore allow the Council to reduce the impact of future increases in energy costs.

Financing Costs

3.10 It is proposed that the capital investment costs for this project will be funded by Prudential Borrowing. The total cost of borrowing to support the £24.518m project will be £40.132m. The repayment of the finance cost will be met from the savings generated within service area's existing Street Lighting energy and maintenance budgets. (See Appendix 1 for additional information on project costs and key assumptions.) In all but three years, the financing costs will be met fully from these savings. There is a budget pressure of £89,000 in 2017/18 and £120,690 in 2018/19. There is then no budget pressure until 2021/22 when there is a shortfall of £81,036 but in all subsequent years costs can be fully contained through the reductions in energy and maintenance costs . It is intended that in those years when there are budget pressures these will be managed and contained within the wider Transport budget. It is worth noting, that for the purposes of the business case, a very cautious set of assumptions have been made on maintenance costs and that the savings are likely to be higher.

3.11 The £24.518m will be drawn down during the three years of the installation phase of the project and this will result in financing costs being levied over a 20 year repayment period for the respective years. The final financing payment will be made in 2038/39.

3.12 The information regarding costs avoidance is detailed within Appendix 2 however it should be noted that by 2038/39:

- less maintenance savings, the forecast energy costs following the change to LEDs across the city will be £3.013m;
- this is just slightly more than 2015/16 budget of £3.120m; and
- this is still a saving, or cost avoidance, of £4.468m when comparing it to the 2038/39 forecast energy costs £7.481m, which would result if the Council do not upgrade the existing Street Lighting infrastructure.

Changes from previous LED lighting project

3.13 In developing the business case for a city wide roll out of LED lighting, account has been taken of the lessons learnt in the Salix funded project where the lighting columns in 537 streets had LED lanterns installed.

3.14 The Salix funded project affected 45,214 properties and, although night appraisals subsequently confirmed that the new lighting met the required British Standard, 331 residents complained that the new lighting was either dim or inadequate. As a consequence the business case is based on installing brighter P3 Design Class LED lanterns in residential streets. Although this results in increased energy consumption compared to the P4 lanterns, the predominant design class used in the Salix funded project, the business case still yields significant savings compared to the 'do nothing' scenario.

3.15 LED lanterns are more efficient as they control the light distribution better than traditional street lighting lanterns, so that there is little or no light 'spillage'. The majority of complaints received were associated with P4 Design Classes, which were based on typical combined roads and footpaths widths of between 10m and 11.5m.

3.16 On the basis that the close control of the LED light distribution was one of the main causes of concern for residents, as well as designing to a higher class as stated above, lanterns that distribute the light over a wider surface area (on average 14.5m) will also be used. This will have the effect of increasing light spillage into adjoining properties without significantly affecting the energy and carbon tax savings resulting from this project.

3.17 The LED lanterns are configured in such a way that they can be modified on site however changing the lighting levels in response to complaints from residents had to be undertaken on site at each lantern. This was a time-consuming process.

3.18 The use of a Central Management System (CMS) has been included as part of the business case to roll out LEDs across the city and this will allow the lighting levels in streets to be remotely altered via an office computer. This will make this change process significantly easier and more cost effective.

3.19 A CMS will also provide an easy mechanism to remotely adjust lighting levels in response to changing demands on the service and changing dynamics of traffic flows and street usage in future years.

Measures of success

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

4.2 The new LED street lighting will also meet the needs and aspirations of residents and road users and will be measured through resident satisfaction with street lighting.

Financial impact

5.1 The current annual budget for Street Lighting energy consumption is £3.120m.

5.2 Rolling out LED lanterns across the city will mitigate future increases in cost and contribute to the reduction of the annual street lighting energy bill.

5.3 The reduction in energy consumption will directly reduce the Council's overall carbon emissions. With the inclusion of street lighting in the Carbon Reduction Commitment (CRC) scheme since April 2014, savings can be made to lessen the impact of CRC fees to the Council which are anticipated to be £250,000 per annum.

5.4 The report outlines total capital expenditure plans of £24.518m. If approval is given to fund the project fully by borrowing, the overall loan charges associated with this expenditure over a 20 year period would be a principal amount of £24.518m and interest of £15.614m, resulting in a total cost of £40.132m based on a loans fund interest rate of 5.1%. The annual loan charges would be £2.006m.

Risk, policy, compliance and governance impact

6.1 The recommendations of this report will support the roll-out of LED lighting across the city and build upon the lessons learned from the recent replacement of around 7,000 lanterns.

6.2 There are no significant compliance, governance or regulatory implications expected as a result of approving the recommendations in this report.

Equalities impact

7.1 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.

7.2 A significant number of the lanterns that will be changed in future projects are of the old yellow light type. Changing these lanterns to new white light lanterns has been proven to enhance community safety however it has been recognised that based on the experience of the Salix Project LED lighting can affect some residents' perceptions of safety. The business case has therefore been modified to take account of the concerns raised by residents.

7.3 A full Equality and Rights Impact Assessment will be undertaken prior to rolling out future projects.

Sustainability impact

8.1 The new lanterns last for 20 years compared to the existing lamp's current life span of 2-4 years. These lamps use less energy and therefore will secure savings in the Council's lighting energy bill and future carbon tax.

8.2 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.

8.3 The lanterns that are replaced under this project will be recycled in accordance with the WEEE Regulations.

Consultation and engagement

9.1 Consultation and engagement was undertaken as part of the initial pilot project. This took the form of door to door surveys and attendance at Neighbourhood Partnership meetings.

9.2 If the recommendations of this report are approved, there will be a comprehensive communication plan developed to inform Elected Members and residents affected by this project and a full Equality and Rights Impact Assessment will be carried out.

Background reading/external references

Street Lighting – Result of White Light Pilot Project – Item 7.10 Transport and Environment Committee, 14 January 2014

Street Lighting – Salix Funding – Item 7.20, Finance and Resources Committee, 16 January 2014

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Links

Coalition pledges	**P44** – Prioritise keeping our streets clean and attractive.
	P49 – Continue to increase recycling levels across the city and reducing the proportion of waste going to landfill.
	P50 – Meet greenhouse gas targets, including the national target of 42% by 2020
Council outcomes	**CO18** – Green – We reduce the local environmental impact of our consumption and production.
	CO19 – 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.
	CO21 – Safe – Residents, visitors and businesses feel that Edinburgh is a safe city.
Single Outcome Agreement	**SO1** – Edinburgh's economy delivers increased investment, jobs and opportunities for all.
	SO4 – Edinburgh's communities are safer and have improved physical and social fabric.
Appendices	Appendix 1 – Capital Costs and Servicing Costs.
	Appendix 2 – Cost avoidance

Appendix 1

Year	Total LED Energy/Maint/CRC, Financing & Salix loan costs	Expected Energy Budget *See assumptions	CRC Costs Budget	Budget Variance (Surplus)/Defecit *Additional resource required over £150k uplift*	Budget Requirement Uplift/Reduction *Note: Up to a max of £150k uplift*
2017-2018	3,702,996	3,419,970	194,024	89,002	150,000
2018-2019	3,884,684	3,569,970	194,024	120,690	150,000
2019-2020	3,805,768	3,611,744	194,024	0	41,774
2020-2021	3,853,564	3,659,540	194,024	0	47,796
2021-2022	4,084,600	3,809,540	194,024	81,036	150,000
2022-2023	4,104,562	3,910,538	194,024	0	100,998
2023-2024	4,155,572	3,961,548	194,024	0	51,010
2024-2025	4,108,727	3,914,703	194,024	0	-46,845
2025-2026	4,243,640	4,049,616	194,024	0	134,913
2026-2027	4,367,301	4,173,277	194,024	0	123,661
2027-2028	4,497,128	4,303,104	194,024	0	129,827
2028-2029	4,597,416	4,403,392	194,024	0	100,288
2029-2030	4,596,892	4,402,868	194,024	0	-524
2030-2031	4,640,807	4,446,783	194,024	0	43,915
2031-2032	4,768,928	4,574,904	194,024	0	128,121
2032-2033	4,820,505	4,626,481	194,024	0	51,577
2033-2034	4,925,520	4,731,496	194,024	0	105,015
2034-2035	4,981,394	4,787,370	194,024	0	55,874
2035-2036	4,948,612	4,754,588	194,024	0	-32,782
2036-2037	4,922,343	4,728,319	194,024	0	-26,269
2037-2038	4,218,997	4,024,973	194,024	0	-703,346
2038-2039	3,599,939	3,405,915	194,024	0	-619,058
2039-2040					
Total	**95,829,895**	**91,270,639**	**4,268,528**	**290,728**	**135,945**

Key Assumptions

The budget base at 2017-18 assumes uplift in energy budget of £150K in 16-17 and in future years, which is in line with current and previous year conditions and assumed current CRC budget. After 2017/18, the budget uplift assumed is set out in the Budget Requirement Uplift/Reduction column. With investment , most years show that a below current budget uplift provision (i.e. less than £150k) will be required to make the project self financing.

Please also note that the revised energy costs reflect the total estate of 64,000 lanterns, however the Business Case is to invest in 54,000. The other 10,000 units have been upgraded to LED in previous years and have been included to ensure total revised LED energy and financing costs are compared against the total energy and CRC budgets available.

Appendix 2

Year	Do nothing option Energy costs	Change to LED Energy costs (inc maint savings)	Total Cost Avoidance
2017-2018	£3,218,775	£2,684,427	£534,348
2018-2019	£3,540,150	£2,161,765	£1,378,385
2019-2020	£3,628,863	£1,495,969	£2,132,894
2020-2021	£3,756,379	£1,543,765	£2,212,614
2021-2022	£4,312,913	£1,814,280	£2,498,633
2022-2023	£4,463,437	£1,873,720	£2,589,717
2023-2024	£4,795,353	£2,014,875	£2,780,478
2024-2025	£5,029,494	£2,102,135	£2,927,359
2025-2026	£5,355,689	£2,237,048	£3,118,641
2026-2027	£5,660,555	£2,360,709	£3,299,846
2027-2028	£5,977,631	£2,490,536	£3,487,095
2028-2029	£6,238,194	£2,590,824	£3,647,370
2029-2030	£6,305,054	£2,590,300	£3,714,754
2030-2031	£6,457,822	£2,634,215	£3,823,607
2031-2032	£6,773,061	£2,762,336	£4,010,725
2032-2033	£6,941,339	£2,813,913	£4,127,426
2033-2034	£7,212,879	£2,918,928	£4,293,951
2034-2035	£7,336,997	£2,974,802	£4,362,195
2035-2036	£7,290,869	£2,942,020	£4,348,849
2036-2037	£7,257,705	£2,915,751	£4,341,954
2037-2038	£7,298,671	£2,927,767	£4,370,904
2038-2039	£7,481,138	£3,013,059	£4,468,079
2039-2040	£7,668,166	£3,100,483	£4,567,683
Total	£134,001,134	£56,963,627	£77,037,507