High Level Assessment of the Potential Benefits of a pan-Scotland Investment in Street Lighting LEDs

Introduction

During 2012 SFT worked alongside both West Dunbartonshire and East Dunbartonshire Councils in developing a Business Case for the introduction of energy efficient street lighting technology. Based on this work both Councils have incorporated investment in LED lighting as part of their future Capital Investment plans. Building on this, and supported by Scottish Government and the Scottish Cities Alliance, Scottish Futures Trust ("SFT") and the Society of Chief Officers of Transportation in Scotland ("SCOTs") have developed a street lighting Toolkit to enable Local Authorities to explore the investment need and potential benefits of an energy efficiency investment in street lighting assets comprising the use of LEDs to upgrade existing lanterns.

In order to assess the potential investment need and benefits of a pan-Scotland implementation of LED lighting, SFT and SCOTs have engaged with all 32 Local Authorities in Scotland to provide an initial high level indication of the benefits of such an investment. This paper details the results of this assessment as well as highlighting some of the key assumptions and identifying potential next steps.

Results

The analysis forecasts that an investment in LED street lighting of £298m could generate potential savings in the region of £1.3bn over a 20 year operational period before allowing for financing costs. These savings decrease to £900m if funded through PWLB (assumed rate of 3.47%) and £780m if funded through private finance (assumed rate of 6%). The savings are generated from energy savings (62%), maintenance savings (36%) and CRC savings (2%). The investment results in a 67% reduction in energy consumption and 1.35m tonnes of carbon saved over the 20 year analysis period.

The following Table summarises the results of the collated inventories from the Local Authorities. We received data on existing street lights from all 32 Authorities. No allowance has been made at this stage for additional discounts which may be available if projects were procured together. No additional capital costs, such as column replacements or cabling works, are included in the analysis.

Results of High Level Assessment of a pan-Scotland Investment in LED Street Lighting				
	Scotland	Range across Local Authorities		
		Min	Max	Median
Initial investment (in 2015/16)	£298m	£1.0m	£26m	£9m
Maintenance saving over 20 years	£472m	£1.4m	£40m	£15m
Energy saving over 20 years	£815m	£2.2m	£79m	£25m
CRC saving over 20 years	£33m	£0.1m	£3m	£1m
Saving pre-financing over 20 years	£1.32bn	£3.7m	£122m	£41m
Saving post-financing over 20 years (assuming PWLB finance at 3.47%)	£901m	£2.3m	£86m	£28m
Saving post-financing over 20 years (assuming private finance at 6%)	£780m	£2.0m	£77m	N/A*
Payback pre-financing	6 years	5 years	7 years	6 years
Payback post-financing (at 3.47%)	9 years	7 years	11 years	9 years
Payback post-financing (at 6%)	10 years	N/A*	N/A*	N/A*
Reduction in annual energy consumption	66.6%	63.7%	69.6%	66.6%
Reduction in carbon over 20 years	1.35m tonnes	3 kt	131 kt	42 kt

* The assumed finance rate of 6% has been run on a pan-Scotland model and not across all the individual Local Authority models.

Key Assumptions

The street lighting feasibility is based on the following key assumptions:

- The data is based on the collated information provided by all 32 Local Authorities on their existing street lighting assets;
- A full retrofit is undertaken for all the Local Authorities in Scotland in 2015/16. The estimated capital cost reflects the forecast decrease in LED prices over the next two years and the forecast increase in efficiencies;
- Existing lanterns are replaced by LED lanterns with equivalent lumen output;
- The actual age profile of the existing lanterns has not been taken into account and it is assumed that there is no dimming or trimming of either the existing lanterns or the installed LED lanterns;
- Central Control/Management Systems have not been included due to the wide range of options available and mixed appetite for inclusion as part of the upgrade from Local Authorities;
- No additional capital costs, such as column replacements or cabling works, are included in the analysis although these may have to be considered as part of an upgrade;
- It is assumed that the Authorities would finance the investment through either (i) PWLB borrowings and we have assumed an interest rate of 3.47% based on the borrowing being repaid over 20 years on an annuity basis; or (ii) through private finance where we have assumed a rate of 6% which is at the lower end of the cost of private finance;
- Electricity prices are assumed to increase at the 2012 rate forecast by DECC plus inflation. Inflation is set at 2.5% pa for all operating and energy costs and by 1% pa for capital expenditure;
- Carbon Reduction Commitment (CRC) is payable at £12 per tonne initially increasing to £16 per tonne in 2015/16 and stepping up to £30 per tonne by 2023/24.

Next Steps

The analysis indicates that substantial benefits could be achieved by all Local Authorities. We would recommend that all Local Authorities develop a specific street lighting business case which can examine the technical options which may be most appropriate to their street lighting estate (i.e. type of energy efficiency measures, the need for phasing of the investment, prioritisation of areas, the different contracting and financing approaches).

In order to develop a robust business case, the condition of the existing columns will also need to be assessed – we would therefore recommend that each Local Authority undertakes a conditions survey and LED readiness assessment of the columns and cabling. The results of this will inform not only the individual Authority's ongoing strategy for column replacement but the analysis of the affordability of an energy efficiency investment through (i) informing the assumptions of which LED lanterns are most appropriate and (ii) informing the analysis of which column replacements will need to be accelerated if an LED investment is occurring (i.e. if LEDs are being fitted it is sensible to do this on columns which have an existing lifespan of at least 10 years).

SFT and SCOTs are continuing to work together to develop standard contracts for a number of approaches to delivery including design and install, design, install and maintain as well as exploring the utilisation of public and private finance. This includes the potential procurement of a framework of contractors to deliver the range of approaches outlined above. This would enable the timely upgrade of street lighting assets and maximise the benefits to Scotland for example, through economies of scale, community benefit clauses and the potential development of local supply chains. In moving into the delivery and implementation phase, we will continue to engage with Local Authorities and key stakeholders including COSLA, SOLACE, the Scottish Government and the Scottish Cities Alliance as well as maintaining an ongoing dialogue with potential service providers and financial institutions, including the Green Investment Bank.