

Cabinet

12 December 2012

Street Lighting Energy Reduction Project



Report of Corporate Management Team

Terry Collins, Corporate Director, Neighbourhood Services

Councillor Bob Young, Portfolio Holder for Strategic Environment

Purpose of the Report

- 1 The purpose is to seek approval from the Cabinet for the "invest to save" business case for the Street Lighting Energy Reduction Project.

Background

- 2 This "invest to save" project is part of the council's wider Carbon Management Programme. The strategic case for the programme is set out in the Carbon Management Plan which sets a target of reducing the council's carbon emissions by 40% by 2015.
- 3 The council's street lighting electrical inventory is summarised as follows:

<i>Street Lighting Electrical Inventory</i>	<i>Units</i>	<i>2008/09 Baseline Carbon Emissions (Tonnes)</i>	<i>2012/13 Electricity Consumption - KwH</i>	<i>2012/13 Forecasted Electricity Cost</i>	<i>2012/13 Forecasted Maintenance Costs</i>
Street lighting	81,981	18,512	35,090,651	£3,716,451	£2,311,044
Externally illuminated Signs	6,345	309	585,764	£61,628	£111,227
Internally Illuminated Signs	111	3	6,049	£917	£1,945
Bollards	879	51	109,078	£11,480	£25,763
Pedestrian Crossings	106	49	93,655	£9,898	£1,858
Traffic Signals	4,462	311	588,475	£62,325	£21,506
Other	1,368	94	69,161	£77,913	£79,820
Total	95,252	19,329	36,542,833	£3,940,612	£2,553,163

- 4 Street lighting represents 18% of the council's total carbon emissions of 105,816 tonnes (2008/2009 baseline). Therefore, reducing street lighting energy consumption is essential if the council is to meet its target of reducing its total carbon emissions by 40% by 2015.

Project Scope

- 5 The project will achieve energy reduction through a combination of:
 - Removal of unnecessary lighting
 - De-illumination of signs
 - Retrofit with more energy efficient light sources
 - Use of Central Management System or fixed settings to facilitate dimming
- 6 The above will be facilitated by the updated Street Lighting Policy which will be subject to a report to Cabinet in the near future.
- 7 The updated Street Lighting Policy will be subject to public consultation which will include presentations at Area Action Partnerships.

Removals

- 8 Some existing street lights on traffic routes in rural areas between towns and villages are unnecessary and can be removed. Street lighting is only required by statute and British Standards in residential areas, restricted speed zones and conflict zones. Before any street lighting is removed a full risk assessment will be undertaken to confirm that it is safe to do so. This risk assessment will take account of:
 - Road safety issues including accidents records
 - Fear of crime issues
- 9 Local Members will be provided with the locations of street lights that are proposed to be removed and consulted. No street lights in residential areas will be removed.

De-illumination of Signs

- 10 There is some potential to de-illuminate signs based on recent changes to Department for Transport regulations. This will involve removing existing illuminated signs and replacing with a new non-illuminated signs with improved reflectivity.

Retrofit

- 11 Much of the existing apparatus is aged. In recent years there has been tremendous technological improvement in the energy efficiency and quality of light sources such as Light Emitting Diodes (LEDs). Therefore, there is a major opportunity to retrofit aged apparatus with up-to-date energy efficient apparatus that will produce savings in energy and maintenance costs.
- 12 The street lighting retrofit will be undertaken in residential areas countywide.
- 13 LEDs have been in development for several years. Manufacturers are now prepared to offer long term warranties on performance and energy consumption. This enables us to proceed with confidence and as performance and energy consumption risks are mitigated.

Dimming

- 14 Recent years have seen the advent of Central Management Systems for street lighting that can be used to facilitate dimming, switching off and remote monitoring. The council has already installed a Central Management System on traffic routes that is used successfully to facilitate dimming and remote monitoring. Therefore, there is the opportunity to extend the Central Management System to residential areas to produce further savings in energy and maintenance.
- 15 Alternatively, there is an option to use fixed settings on the new apparatus to facilitate dimming and switching off. The council will undertake further detailed work to confirm the best option.
- 16 It is proposed to introduce a two-stage dimming process in our updated Street Lighting Policy as follows:
- 10.00 p.m. to 12.00 a.m. – 25% dimming
 - 12.00 a.m. to 5.00 a.m. – 50% dimming
- 17 There is the potential to switch off but this can be controversial; some councils have been subject to legal claims following road traffic accidents after switching off; there would likely to be public opposition; and the savings over and above dimming are relatively low.
- 18 Dimming to 50% is generally not perceptible to the human eye so we consider that this can be introduced without significant opposition. Indeed the council has dimmed the lighting on the A167 for several years by 25% and no complaints have been received.

Project Scope

- 19 The project scope has been selected to meet or exceed the council's "invest to save" criteria. The project scope is as follows:

Light Source	Existing Units	Removals	Retrofit
Street Light	48,412	7,000	41,412
Bollards	28	0	28
Pedestrian Crossings	34	0	34
Traffic Signals	2,991	0	2991
Externally Illuminated Signs	942	0	942
	52,407	7,000	45,407

- 20 To illustrate the energy savings, a typical; existing street light consumes 90 Watts compared to an LED street light that consumes 30 Watts for the same light output. This is a saving of 66%. Further savings can then be made through dimming and switching off.

- 21 Officers have appraised all the 95,252 units in the inventory per the table in the background section for removal and retrofit in terms of technical and financial feasibility. It is considered that 7,000 of the existing units can be removed and 45,407 retrofitted.
- 22 As technology improves and the cost of LEDs reduces further we may be able to retrofit the remainder of the inventory over time on the same “invest to save” basis. Officers will review this on an annual basis and further reports will be presented to Cabinet as required.
- 23 The project scope excludes street lighting columns. It is assumed that these will be replaced as part of the capital programme.

Capital Funding

- 24 The upfront capital costs (investment) would be financed by prudential borrowing from the Public Works Loan Board (PWLB). Prudential borrowing costs are then funded through the following revenue savings:
 - Reduction in electricity budgets
 - Reduction in maintenance budgets
 - Reduction in Carbon Reduction Commitment budgets
- 25 Corporate Finance has specified a cost of finance of 5% per annum for the “invest to save” business case assessment.

Project Delivery

- 26 The project will be managed as part of the council’s Carbon Management Programme. The project will be delivered over a 6 year period.
- 27 Highway Operations will undertake the design and installation. They currently maintain all the council’s street lighting with the exception of traffic signals. Highway Operations successfully delivered the design and installation for the previous street lighting traffic route “invest to save” project.
- 28 If Highway Operations require additional labour they will engage staff on short-term contracts and/or sub-contractors from their supply chain.

Procurement of New Apparatus

- 29 New apparatus will need to be procured. The values necessitate an OJEU (Official Journal of the European Union) procurement under the Restricted Procedure. A procurement strategy is currently being developed with Corporate Procurement.
- 30 There are a number of OJEU compliant frameworks open to the council. The council may also procure its own framework if necessary.

Scheme Design

- 31 The project will be made up of several hundred schemes. Schemes will be developed taking account of the following:
- Asset management principles
 - Fit with ongoing maintenance regime
 - Economies of scale
 - Geographic spread across the county
 - Invest to save criteria.
- 32 No scheme will progress unless the design confirms that it will meet or exceed the “invest to save” criteria. This will provide assurance to the council that no investment will be incurred unless the forecast savings can be delivered.

Investment Appraisal

- 33 The reduction in electricity consumption and carbon is 73% for the in scope apparatus. This equates to a reduction of 38% compared to the current baseline for all street lighting electrical apparatus.
- 34 The reduction in annual carbon emission is 7,512 tonnes per annum which will reduce the council’s 2008/09 baseline emissions of 105,816 tonnes by 7%. This will go a long way to helping the council achieve its target of a 40% reduction in carbon emissions from the 2009/09 baseline by 2015.
- 35 Retail price inflation (RPI) inflation is assumed to be 2.80% per annum and energy inflation 3.80% per annum.
- 36 The capital costs are based on prudent unit cost assumptions informed by market feedback and local authorities including Gateshead Council who are progressing a similar project.
- 37 We have applied a contingency of 10% to all the capital assumptions.
- 38 The table below summarises the financial return over 25 years:

Project Cash Flows

Real @ 01-Apr-13 Prices

Capital	-£21,024,175
Maintenance Savings	£9,364,530
Electricity Savings	£33,301,779
Carbon Reduction Commitment Savings	£1,983,138
	<hr/>
	£23,625,271

Project Cash Flows

Nominal (Taking account of inflation)

Capital	-£22,551,977
Maintenance Savings	£13,785,096
Electricity Savings	£56,554,623
Carbon Reduction Commitment Savings	£6,971,364
	<u>£54,759,106</u>

Project Net Present Value

£13,068,847

Project Internal Rate of Return – Nominal

13.17%

Simple Pay Back – Years

12

Discounted Pay Back – Years

15

A - Average Annual Revenue Savings

£3,092,443

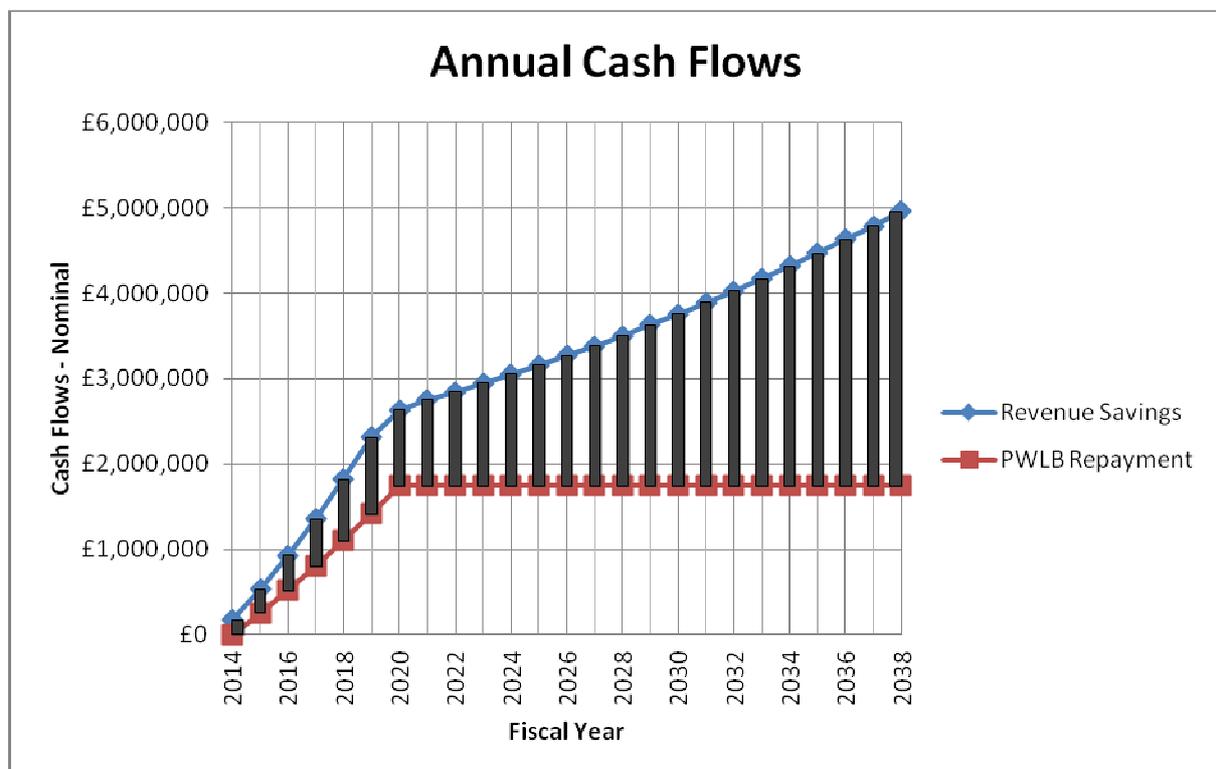
B - Average Annual PWLB Repayment

£1,490,622

A/B

2.07

- 39 The annual revenue savings compared to the annual PWLB repayment are as detailed in the graph below:



Expected Benefits

40 The expected benefits are:

- Quantified in Investment Appraisal
 - Reduction in electricity consumption
 - Reduction in carbon emissions
 - Reduction in maintenance costs
- Not Quantified in Investment Appraisal
 - Flexibility to vary lighting levels using the Central Management System or fixed settings: The council could increase dimming or introduce part-night lighting if further savings are required in the future.
 - The replacement of aged apparatus with new apparatus will avoid or defer significant lifecycle replacement costs that are not currently budgeted for.
 - The reduction in energy consumption will reduce the council's exposure to increases in energy costs.

Recommendations and Reasons

41 The Cabinet are requested to approve the business case based on the following:

42 The investment appraisal demonstrates that the proposed investment in capital produces a very strong financial return in the form of revenue budget savings that significantly exceeds the prudential borrowing costs by a ratio of 2.07:1. The net total savings over 25 years are £24 million in today's prices and £55 million taking account of inflation. The project generates a positive net cash surplus every year from year 1 onwards and grows over time.

43 The proposed investment also produces significant non-quantified benefits in terms of lifecycle cost avoidance.

44 The project will make a major contribution to reducing the council's energy consumption and carbon emissions.

45 The reduction in annual carbon emission is 7,512 tonnes per annum which will reduce the council's 2008/09 baseline emissions of 105,816 tonnes by 7%. This will go a long way to helping the council achieve its target of a 40% reduction in carbon emissions from the 2009/09 baseline by 2015.

46 The project will reduce the council's exposure to increases in energy costs by significantly reducing annual consumption.

Background Papers

- Street Lighting Energy Reduction Project – Business Case and Financial Model

Appendix 1: Implications

Finance

The costs and revenues are detailed in the business case and financial model. The project returns a positive net cash flow for each year after taking account of prudential borrowing costs.

Staffing

The project will be resourced by existing staff in Highways Operations and topped up with additional resource where necessary.

Risk

Project risks will be managed by the Project Management Team.

Equality and Diversity / Public Sector Equality Duty

An Equality Impact Assessment (EIA) has been completed for the street lighting policy and this EIA will be reviewed in line with the review of the policy. The recommendations of the EIA will be incorporated into the project delivery process.

Accommodation

None

Crime and Disorder

None

Human Rights

None

Consultation

There will be a public consultation on the updated Street Lighting Policy.

Procurement

New apparatus will need to be procured. A procurement strategy is being developed with Corporate Procurement. Existing frameworks are available.

Disability Issues

An Equality Impact Assessment (EIA) has been completed for the street lighting policy and this EIA will be reviewed in line with the review of the policy. The recommendations of the EIA will be incorporated into the project delivery process

Legal Implications

None