REGENERATION AND ENVIRONMENT SCRUTINY COMMITTEE – 15TH MAY 2018

SUBJECT: FUTURE LIGHTING AND ENERGY SAVING PROPOSALS

REPORT BY: INTERIM CORPORATE DIRECTOR - COMMUNITIES

---

1. PURPOSE OF REPORT

1.1 The report outlines options available to achieve street lighting energy savings that could contribute to the Medium Term Financial Plan (MTFP) and mitigate energy cost increases. In addition, the proposals will provide carbon reduction savings that can contribute to the authority's carbon reduction commitment. Information is provided on the progress made so far in achieving financial and carbon reduction savings in relation to street lighting. Members are requested to review and provide comments on future street lighting energy savings options that can be considered prior to presentation to Cabinet.

2. SUMMARY

2.1 Caerphilly County Borough Council (CCBC) has a current lighting stock of approximately 27,300 units some of which have already been subject to a number of energy saving measures:-

- Part night lighting, where 4844 lights are turned off between midnight and 05.30GMT on Inter Urban routes.
- Dimming of 3974 lights by 50% reduction in power from 9pm each night.
- LED bulbs retro fitted to 11521 units.

2.2 These energy saving measures account for annual savings in excess of £500k and carbon footprint reductions of 1950 tonnes of CO2.

2.3 The report outlines further energy saving options to meet the requirements for the 2017-22 MTFP. These will in turn provide carbon reduction savings that will contribute to the authority's carbon reduction commitment.

2.4 The report also outlines the discontinuation of the manufacture of low pressure sodium (SOX) lanterns and the implications for the authority.

2.5 Due to the continued energy cost increases and the discontinuation with the manufacture of SOX lanterns "do nothing" is not an option that can be considered.

3. LINKS TO STRATEGY

3.1 This report links directly to the Well-being Goals within the Well-being of Future Generations Act (Wales) 2015:

- A prosperous Wales
- A resilient Wales
- A healthier Wales
- A more equal Wales
- A Wales of cohesive communities, and
- A globally responsible Wales

3.2 The street lighting energy savings will contribute to the authority's Well Being Objective 4: Promote a modern, integrated and sustainable transport system that increases opportunity, promotes prosperity and minimises the adverse impacts on the environment.

3.3 There are further links to the Engineering Objectives:

3.3.1 To provide safe and efficient transport and land drainage infrastructure through quality service delivered by means of cost effective management, maintenance and improvement of the networks.

3.3.2 To develop engineering solutions and methods which have regard to the value of the natural and built environment and to the principle of sustainable development.

3.4 The report supports the Safer and Greener themes of the "Caerphilly Delivers" in the Single Integrated Plan.

4. THE REPORT

4.1 Background to Street Lighting

4.1.1 There is no statutory requirement on local authorities in the United Kingdom to provide public lighting. The Highways Act 1980 (Sections 97 & 98) empowers local authorities to light roads, it does not place a duty to do so. Although Highway Authorities do have a duty of care to the road user, and an obligation to light obstructions on the highway, this does not imply a duty on the Highway Authority to keep all lighting operational. The Council has a statutory duty under the Highways Act to ensure the safe passage of the highway (as far as reasonably practicable) and this includes any lighting equipment placed on the highway.

4.1.2 While the profile of street lighting has changed in recent years, the stock has continually increased at an average of 110 units per annum which in turn reduces the impact of savings made. This increase is predominantly a result of adoption of new development sites.

4.1.3 Part of the Asset Management function of Highways Operations includes a maintenance role for all highway assets. The street lighting assets are recorded, monitored and maintained with a dedicated Street Lighting budget.

4.1.4 The street lighting budget allocation for 2017/18 was £1,704,000, which was inclusive of £1,228,000 energy costs. This has already seen a saving of £350,000 from 2016/17 budget to attain the MTFP target. This reduction in budget consists of £190,000 of energy savings and £160,000 from lighting maintenance.

4.1.5 A number of energy efficiency options have previously been implemented. During 2017/18 energy efficient lamps, dimming and part night lighting alterations achieved a 4.5% decrease in energy usage . The savings realised from these options were reversed due to a 12.4% rise in energy costs in 2017/18 resulting in a £40k increase in energy costs overall. This scenario is likely to continue and while the outlined proposals show projected savings, it should be noted the proposals should be viewed as a way of cost avoidance as energy costs are likely to continue to rise which will have negative impacts on any proposed future saving options.

4.2 Energy costs

4.2.1 Energy costs are calculated by the energy provider using the updated asset register (provided on a monthly basis by CCBC Highways Operations). The register will give the quantum and type of lighting assets CCBC currently hold and the estimated burn hours per night.

4.2.2 Energy savings are subject to market rates and fluctuations. Although the March 2018 energy invoice is yet to be received, during 2017/18 street lighting energy usage is anticipated to be 10,290,467 kWh, at a cost of £1,275,000 accounting for 5525 tonnes of Carbon Dioxide emissions

4.2.3 Caerphilly's energy is sourced via the National Procurement Service (NPS) and street lighting energy consumption, which is in the region of 10million Kwh equating to 5525 tonnes of CO2 annually, is only around a third of the energy that is used by the authority.

4.3 Part night lighting

4.3.1 The existing street lighting stock in CCBC has already been subject to a part night lighting exercise with the majority of the inter urban routes (connecting roads between towns and villages) now being switched to part night lighting (4844 units between midnight and 0530hrs).

4.3.2 From the options attached (Appendix 1) extending our current part night lighting portfolio along inter urban routes and connecting roads within towns and villages (Option 2 - following LED conversion) is a cost effective option for delivering annual savings of £27k, with a 16-month payback period. Some of the areas affected would include some outlying properties and streets within populated areas. Part night lighting would operate between midnight and 0530 hours.

4.3.3 Option 3 within Appendix 1 includes the wide spread introduction of part night lighting following LED conversion within all residential areas. While this may seem like a less attractive option, it would reflect a consistent approach to street lighting across the Authority while delivering further annual savings of £221K subject to a 22 month payback. Part night lighting would operate between midnight and 0530 hours.

4.4 Alternatives to Part night Lighting

4.4.1 The switch off option is always an alternative although this has its own significant costs and consequences. It is assumed some 25% of street lights would need to be left operational (junctions, conflict areas and major town centres). This is included as Option 4 within Appendix 1.

4.4.2 Alternatively reductions in maintenance and energy can be achieved by converting all street lamps to LED (Option 1). At current energy prices savings of £611k can be achieved, however, the implementation costs are estimated to be in the order of £4.25m giving a payback period of approximately 7 years. This option could be reviewed as part of a possible Salix funding bid proposal. Salix provides interest-free Government funding to the public sector to improve their energy efficiency, reduce carbon emissions and lower energy bills. This option would also reduce the authority's carbon reduction commitment payment by approximately £40k.

4.4.3 There are also options to mix and match proposals if there was a desire to pursue this approach. Identified in the appendices are the most common and cost effective proposals to allow members to consider each option and its relative merits. These options are considered by officers to be the most viable for consideration.

4.5 Summary of Options

4.5.1 The savings methods can be grouped into:

- Part night lighting
- Switch off
- LED conversion

4.5.2 Each of the three saving groups have options identified within Appendix 1, where details of the four most viable proposals are identified for members to consider.

4.5.3 In addition to the proposals highlighted, it should be noted that Philips Lighting have recently announced that due to falling demand they are to reduce production of Low Pressure Sodium (SOX) lamps from July 2019 with all production to cease in July 2020. Sources within the lighting industry advise that stocks of these lamps are rapidly diminishing and future deliveries are not guaranteed. Based on previous CCBC use, our contractor holds approximately 12 months' supply of these lamps. Currently CCBC has 1779 SOX lanterns on main roads and 348 within residential areas, these lanterns are being replaced with LED alternatives as and when they become life expired.

4.5.4 If the proposal is supported to convert all street lighting to LED this would resolve the issue of having to consider prioritising replacement of the SOX lanterns when stocks become unavailable.

4.5.5 Highlighted below is a summary of the options identified within Appendix 1:-

	Number of Units	Cost to Implement in £	Co2 Savings in Tonnes	Energy Savings in KWh	Annual Savings in £	Payback Period	Installation Timescale
Option 1 Convert all lanterns to LED	17011	£4,250,000	2,094	5,082,727	£611,452	84 Months	45 Months
Option 2 following LED conversion extend existing inter urban route/connecting roads part night lighting	1676	£30,847	93	227,566	£27,300	16 Months	4 Months
Option 3 following conversion to LED all lighting to be part night lit except junctions and major town centres	15891	£296,208	742	1,801,750	£221,906	30 Months	22 Months
Option 4 All lighting to be permanently switched off except junctions and major town centres	20735	£163,184	3,166	7,684,498	£925,105	12 Months	26 Months

5. WELL-BEING OF FUTURE GENERATIONS

5.1 This report contributes to the Well-being Goals as set out in paragraph 3.1. It is consistent in all of the five ways of working as defined within the sustainable development principle in the Act that it supports:

5.2 The options provide long term resourcing and asset management solutions of this specialised service and allows for more effective and predictable resource/financial/carbon reduction commitments going forward.

5.3 The reduction in carbon emissions is a commitment to the prevention of the long term threat of climate change to which energy reduction plays a key role. Routine maintenance of the highway assets is also a central part of the CCBC prevention strategy, thus reducing the need for larger scale repair operations (with the associated safety risks) required for poorly maintained/ inspected assets.

5.4 A well maintained highway forms part of an overall strategy providing efficient integration of local roads to regional transport systems on which public transport, private users, cyclists and walking networks can operate.

5.5 Collaboration with the Energy team within Caerphilly ensures that the reductions achieved in carbon emissions through efficient street lighting strategies positively contributes to the authority's sustainability targets for carbon reduction.

5.6 Proposed options for energy and carbon savings will require an effective consultation exercise that will require the involvement of all relevant stakeholders within the authority.

6. EQUALITIES IMPLICATIONS

6.1 An Eqla screening has been completed in accordance with the Council's Equalities, Consultation and Monitoring Guidance and some potential for unlawful discrimination and/or low level or minor negative impact affecting one or more of the target equality groups have been identified. A full Eqla has been carried out and the summary and recommendations are included in the Equalities paragraph of the Committee report.

6.2 Dimming or switching off of street lights could have a significantly greater negative impact on people with certain types of visual impairment compared with the majority of the population. It may also affect people whose eyesight is diminishing along with other vulnerable groups such as the elderly and lone persons in terms of feelings of vulnerability and an increased fear of crime.

6.3 Lower energy alternatives to conventional lighting can also have a greater luminance and as a result could have a significantly greater positive impact on those groups mentioned above.

7. FINANCIAL IMPLICATIONS

7.1 Proposed financial savings options are detailed in Appendix 1, which deliver reductions in street lighting energy and street lighting maintenance expenditure to assist with the Council's Medium Term Financial Plan (MTFP).

7.2 Each option will require investment in order to release the savings towards the MTFP. The preferred financing option would be to progress a Salix funding bid for the preferred energy efficiency proposal. Salix is an interest free Government funding loan to the public sector to improve their energy efficiency, reduce carbon emissions and lower energy bills. To be eligible to be considered proposals need to demonstrate the ability to achieve pay back within 7 years. All options meet the required Salix criteria.

7.3 The current street lighting contract has provisions within it that allow innovation and changes to the street lighting stock to be made. Appropriate rates are also included within the contract that would allow the works to be efficiently procured.

8. PERSONNEL IMPLICATIONS

8.1 The proposals will not have any direct impact on CCBC personnel.

9. CONCLUSIONS

9.1 Officers views are that the most beneficial approach would be to structure proposed changes to the street lighting provision in a phased approach.

9.2 **Phase 1** - progress a wholesale conversion of the street lighting stock to LED lanterns. This would meet the Salix funding requirements to achieve a pay back within 7 years and would be implemented over a time period of approximately 45 months.

9.3 **Phase 2** – Extend part night lighting on inter urban routes to include connecting roads in towns and villages. This would take 4 months to implement but if undertaken at the same time as Phase 1, the timeframe of 45 months could still be achieved.

9.4 **Phase 3** - part night light the whole of the stock, with the exclusion of junctions, conflict areas and major town centres. Part night lighting would operate between the hours of midnight and 05.30GMT. This would take 22 months to implement fully but if undertaken at the same time as Phase 1, the 45 months implementation would not need to be extended.

10. CONSULTATIONS

10.1 All comments received from consultees have been taken into consideration and are included in the report.

10.2 A wider consultation process will need to be considered before the implementation of any of the listed street lighting proposals are progressed.

11. RECOMMENDATIONS

11.1 Members are requested to review the options identified within the report and appendices along with the conclusions highlighted in paragraphs 9.2, 9.3 and 9.4 and provide comments on the proposals for Cabinet to consider.

12. REASONS FOR THE RECOMMENDATIONS

12.1 To allow Cabinet to understand Scrutiny committee views whilst considering their preferred option to achieve street lighting energy and carbon savings to assist in meeting the required MTFP savings and carbon reduction commitment targets.

13. STATUTORY POWER

13.1 Highways Act 1980.

Author: Chris Adams, Highway Operations Group Manager, adamsc@caerphilly.gov.uk
Consultees: Cllr. Sean Morgan – Cabinet Member for Economy, Infrastructure, Sustainability and Wellbeing of Future Generations Champion
Cllr. Tudor Davies – Chair of Regeneration and Environment Scrutiny Committee
Cllr. Christine Forehead – Vice Chair of Regeneration and Environment Scrutiny Committee
Christina Harrhy – Interim Chief Executive

Mark S. Williams – Acting Corporate Director of Communities
Liz Lucas – Head of Procurement
Stephen Harris – Interim Head of Corporate Finance
Lisa Lane – Interim Monitoring Officer
Marcus Lloyd - Acting Head of Engineering Services
Richard Crane - Principal Solicitor
Mike Eedy – Finance Manager
Shaun Watkins – HR Manager
Anwen Cullinane – Senior Policy Officer – Equalities and Welsh Language
Tom Llewelyn - Senior Assistant Engineer
Paul Rossiter – Energy and Water Officer

Background Papers:
Highways Act 1980
Part Night Lighting and Future Energy Saving Proposals – Regeneration and Environment Scrutiny Committee – 8th December 2015

Appendices:
Appendix 1 Street Lighting Options 2018/19

APPENDIX 1

Street lighting options March 2018

To meet the challenges of carbon reduction commitments and reducing budgets within Highways street lighting, the following options have been compiled for consideration. The options are not exhaustive but illustrate some of the energy saving measures available and a mix and match approach where a partial use of some or all of these measures may also be considered.

The energy used operating street lighting, illuminated signs, CCTV and traffic signals during the 2017/18 financial year was 10,290,467 KWh, with 5525t of Carbon dioxide emissions and at a cost of approximately £1,275,000. 2017/18 saw an energy rate increase of 12.4% to 12.0386 pence/KWh adding approximately an additional £40,000.00 onto the energy payments. Whilst the ongoing installation of energy efficient equipment during maintenance works has reduced the annual energy consumption by approximately 4.5% during 2107/18, a further minimum 1% increase in the base energy rate is anticipated for 2018/19 giving an additional expenditure of £10,000.00/annum.

All savings are based on the current energy rate of 12.0386 pence per kilowatt hour, the known lamp wattages and the estimated numbers of units affected. The number of street lights identified in each of the options is likely to alter following detailed surveys and risk assessments that determine the items of inventory that must remain in lighting at high risk traffic and pedestrian conflict areas.

Indicated monetary savings relate only to the reduction in kilowatt hours and not from any reduction in equipment maintenance and testing. Additional costs will be incurred when the removal of lighting equipment and Western Power Distribution service connections are required 12 months following any permanent decommissioning.

Should lighting be decommissioned on roads where a speed limit of 50 mph or above exists there will be a requirement to install cats eye type lane markers. No allowance has been made for time or resources in identifying suitable items of inventory for conversion or for mandatory illuminated traffic signs to remain lit following any permanent disconnection of street lighting.

Assumptions made:

Options 2 through 4 require lighting to be extinguished for either part of or the whole period of darkness. A working assumption has been made that in areas affected by these proposals 25% of the inventory will need to remain switched on to maintain Highway safety at high risk traffic and pedestrian conflict areas.

A 12 week delivery of equipment required for any works.

100 lanterns or 200 photocells/disconnections to be carried out per week.

40 units per Western Power disconnection on inter urban routes to be carried out per week.

The column removal costs are £400.00 per column.

WPD disconnection charges are £160.00 per column.

Wood pole equipment removal costs are £125.00 per pole.

OPTIONS

1: Convert all lanterns to LED

Number of units affected	17,011
Cost to implement	£4,250,000
Co2 savings in Tonnes	2,094
Energy savings in kWh	5,082,727
Annual savings in £	£611,452 Allowing for the procurement and installation, the total energy savings per annum will not be realised until after 45 months have elapsed. Payback period will therefore be 84 months.

2: Following LED conversion extend existing inter urban route/connecting roads part night lighting

Number of units affected	1676
Cost to implement	£30,847
Co2 savings in Tonnes	93
Energy savings in kWh	227,566
Annual savings in £	£27,300 Allowing for the procurement and installation, the total energy savings per annum will not be realised until after 4 months have elapsed. Payback period will therefore be 16 months.

3: Following conversion to LED all lighting to be part night lit except junctions and major town centres

Number of units affected	15891
Cost to implement	£296,208
Co2 savings in Tonnes	742
Energy savings in kWh	1,801,750

Annual savings in £	£221,906	Allowing for the procurement and installation, the total energy savings per annum will not be realised until after 22 months have elapsed. Payback period will therefore be 30 months.

4: All lighting to be permanently switched off except junctions and major town centres

Number of units affected	20735	
Cost to implement	£163,184	
Co2 savings in Tonnes	3166	
Energy savings in kWh	7,684,498	
Annual savings in £	£925,105	Allowing for the decommissioning, the total energy savings per annum will not be realised until after 26 months have elapsed. Payback period will therefore be 12 months.
		Potential future column removal costs circa £2,520,000
		Potential future WPD disconnection costs circa £1,250,000
		Potential future wood pole bracket removal costs circa £787,500