

The Vale of Glamorgan Council

Cabinet Meeting: 25 April, 2016

Report of the Cabinet Member for Visible and Leisure Services

Street Lighting Energy Reduction Strategy - Update and Next Steps

Purpose of the Report

1. To advise Cabinet of the current position with the 'Street Lighting Energy Reduction Strategy' and to consider a series of further measures aimed at supporting the transition to full LED lighting and the achievement of increased energy savings.

Recommendations

1. That Cabinet notes the current position with the part night lighting and LED light installation programme.
2. That this report and all the options and associated issues included in this report be referred to the Scrutiny Committee (Economy and Environment) for consideration.
3. That a further report is presented to Cabinet on conclusion of the consideration of the issuing by the Scrutiny Committee (Economy and Environment).

Reasons for the Recommendations

1. To ensure that Cabinet is kept up to date with the current street lighting position.
2. To seek the views of the appropriate Scrutiny Committee before progressing with options.
3. To allow Cabinet to determine the way forward after taking into account the views of the relevant Scrutiny Committee.

Background

2. Cabinet considered a report entitled 'Street Lighting Energy Reduction Strategy', at its meeting of 20th October 2014, where the following was resolved:-
(1) T H A T the implementation of a street lighting strategy based on the principle of reduced energy consumption with part night lighting introduced for all appropriate areas of conventional street lighting as an initial measure, as outlined in Option 6 of the report be agreed.

(2) T H A T the Director of Visible Services and Housing be authorised to invite tenders for the installation of part night timing devices for the Council's conventional street lighting stock.

(3) T H A T the background information contained in the report relating to LED lighting be noted and a further report be provided to Cabinet detailing the proposed full street lighting energy reduction strategy on conclusion of the 'part night' street lighting introduction and discussions with potential partners.

(4) T H A T the report be referred to the Scrutiny Committee (Economy and Environment) for information.

Reasons for decisions:

(1) To approve the main principles of a new street lighting strategy, fit for the financial and environmental challenges ahead.

(2) To provide authority to engage contractors to undertake all works associated with the change to part night street lighting in accordance with option 6 of the report.

(3) To agree the full 10 year strategy when all future street lighting management options had been considered by officers.

(4) To inform the appropriate Scrutiny Committee (Economy and Environment).

3. The part night lighting programme, identified as 'option 6' in the recommendations shown above, is now complete and this report provides an update on the carbon and financial savings achieved and on issues encountered as a result of the change to part-night lighting.
4. The report also reviews various options aimed at working towards full LED lighting, along with possible changes to the operation of current and future light units aimed at obtaining a balance between carbon and financial savings, the views of residents and the appropriate illumination of the highway network. The intention is to request consideration of this report and the options by the relevant Scrutiny Committee prior to a final decision being taken by Cabinet.

Relevant Issues and Options

The current position

5. As advised, the strategic option chosen was 'Option 6' in the previous report, "Retain LED stock and part night 70% of remaining stock at 12 midnight". The report indicated an estimated implementation cost of £350,385 with energy cost savings per annum of £371,862.71 and a Co² saving of 1338 tonnes per annum. The payback period for this option was estimated at 0.9 years.
6. After extensive consideration by the 'Part Night Lighting Board', comprising officers from Highways and Engineering, Road Safety, Community Safety and the Police; it was only possible to part night 65% of the conventional lighting stock, some 7,400 units. The Board used a risk matrix to analyse the stock to assist in making their decisions and a copy of this risk matrix and associated explanatory information is attached at [Appendix A](#).
7. The matrix includes an assessment of highway and community safety impacts and wider social considerations. Whilst all part-night lighting decisions were well thought through, officers have received a number of complaints, primarily concerning overly dark areas in residential streets. As of 14th April 2016, 225 complaints and service requests had been received that were associated with a change to part night lighting.

Whilst the number of complaints is relatively low for such a significant service change, it is evident that some of the issues raised are of concern and could require further consideration.

8. More of the existing conventional style lighting may be able to be changed to part-night lighting over time but the original figure did not include certain non-highway related hazards such as street lights close to areas of open water, where lights had to remain on. This is in part the reason why 65% was achieved and not 70%. The projected full year energy saving from the part-night scheme is now £217k with 1042 tonnes of Co². Whilst the financial and Co² savings are lower than the estimates detailed above, the implementation costs were considerably less than those predicted, meaning that the pay-back period has reduced from 0.9 years to 0.65 years.
9. The previous report featured a graph which plotted the costs of option 6 against the available budget for the next 15 years. The graph assumed a year on year energy unit price increase of 5% and showed the costs of the part night lighting strategy (with existing LED lighting units) exceeding the available budget in 2021 / 2022.
10. This graph has now been re-calibrated to take account of the actual data and reduced increases in the unit energy price (3% per annum inflation has now been assumed). Due to the reduction in the savings highlighted above the energy cost of the current part night lighting strategy is projected to exceed the 2016 / 2017 budget by £83,925. It should be noted that this budget position assumes the further £100k saving identified within the medium term financial plan for street lighting for the 2016 / 2017 period, but no additional savings. This position is clearly not sustainable as costs now exceed the budget from next year. The graph showing the current position is attached at [Appendix B](#).
11. As it now stands, the Council's lighting stock comprises 15,902 units. Of these, 5,113 are LED (32%).
12. A capital amount of £100k has been made available via the capital programme for LED lighting installations for 2016 / 2017 and 2017 / 2018. Whilst this is a positive move towards the strategy of having full LED lighting, even if this funding was to continue at this level, it would take in the region of 40 years to replace all the existing conventional lighting with LED units. If a shorter replacement period is required further investment will be needed and the current position and a number of possible funding options will now be considered in more detail.

Future Options

13. As background to the options to follow; at the end of 2015/16 there will be 10,789 conventional type street lamps remaining in the Vale. These are a mixture of residential and main road units, with a full LED replacement cost of approximately £4m. As was detailed in the previous Cabinet report, the payback period for this level of investment is in the region of 13 years. This is mostly due to the number of main road columns involved and the savings from changing these to LED being considerably less than those in residential areas.
14. Whilst at its previous meeting members agreed to the principle of a change to full LED street lighting over time, it would not be prudent to suggest the utilisation of this level of reserves to replace the entire remaining conventional street lighting stock at this time. The payback period is too long and service resilience could be compromised as the total current value of the Visible Services reserve is now circa £6.5m and there are other various significant commitments from the reserve.

15. Instead it is proposed that a smaller amount of capital funding be utilised from the Visible Services Reserve to change all the remaining conventional lighting in residential areas to LED. Bearing in mind this is where the vast majority of the part-night lighting complaints have come from and this is the area where maximum savings can be achieved. There are approximately 5,900 street lamps in residential areas that will need to be changed at a cost of circa £1.2m.
16. Including a possible option to make no further changes to the current part-night lighting arrangements, other than the LED installations already earmarked within the capital programme, there are four possible options. A table indicating these is attached at [Appendix C](#) with a graphical representation of each option, compared to the budget available, attached at [Appendix D](#). The various options are considered in more detail, as follows.
17. Option 1 - "Consolidate the current part-night lighting arrangements and invest £100k per annum in 2016 / 2017 and 2017 / 2018 on LED replacement lamps". This option provides for financial savings of approximately £14k per annum but, as previously advised, this is insufficient to match the budget available for this period. Also, whilst the number of part-night lighting complaints has not been necessarily high, there is a need to review some of these complaints to ensure that the Council's position in terms of risk is properly managed. For residential areas only this could mean that a small number of LED lamps may have to be installed to replace certain part-night conventional lighting units (this is more cost effective option than turning the conventional lights back on). This will require an element of funding and for the Part-night Street Lighting Board to be reconvened, so that each complaint can be technically considered on its relative merits. Until the Board sits to determine which, if any, part-night lights should be replaced estimating the increased cost of this option is difficult. As a guide, an additional £50k would enable a further 250 residential lighting units to be replaced on an individual basis.
18. The further savings in both carbon emissions and costs obtained from the £100k capital investment depend on the lamps that are to be replaced. In broad terms conventional street lights in residential areas that have not been subject to part night lighting realise the greatest savings, where in contrast strategic highway route street lighting that has been subject to part night lighting could increase revenue costs if changed to dusk until dawn full power LED lighting. As any lower level investment such as this should firstly be aimed at obtaining the highest possible savings, lights that have been subject to part-night lighting should not be changed first. This would not assist with the complaints received to date as all these have been from residential part-night lit areas.
19. This particular option, whilst very positive when compared to the previous costs and energy consumption for street lighting, is not sustainable due to costs from 2016 onwards. Further variations of this option could include either dimming or part night-lighting the existing and any future LED lights. However the additional savings associated with these options are relatively low at £11k and £16k per annum respectively. The latter option is also likely to be very unpopular with those residents who reside in LED lit areas, who are now used to low energy all night lighting.
20. Option 2 - "Dim existing LED lights at midnight and invest £1.2m in 2016/17 and £100k in 2017/18 and 2018/19 in LED residential street lighting followed by main road lighting, with existing residential and main road part-night light units retained as 'part-night' but LED." This option provides the second greatest savings when reductions in maintenance and carbon tax are taken into account and this is detailed

in appendices [C](#) and [D](#). The pay-back period for the investment associated with this work is 7.04 years and this is shown at [Appendix E](#).

21. However, the Council could be challenged for taking a decision which leaves the current LED lights on through the night, albeit dimmed, whilst all new LED installations are part lit. This would be difficult to defend as there is no technical justification for this differential, the main reason being to avoid criticism from residents who currently live in LED lit areas. This option also doesn't fully address the problems currently being experienced with part-night lighting. For these reasons this option is not considered appropriate.
22. Option 3 - "Dim existing LED lights at midnight and invest £1.2m in 2016/17 and £100k in 2017/18 and 2018/19 in LED residential street lighting which are also to be dimmed at midnight." This option provides the third greatest savings when reductions in maintenance and carbon tax are taken into account and this is detailed in appendices [C](#) and [D](#). The pay-back period for the investment associated with this work is 7.54 years and this is shown at [Appendix E](#).
23. This option is preferred as it provides considerable savings whilst also allowing for consistent and appropriate lighting levels to be achieved throughout the Vale. Existing LED units are able to be programmed to dim electronically at certain times of the evening / morning and to a range of power levels with no additional hardware required. The same will apply with all new LED units. The LED dimming calculations in the appendices are based on a half power option from midnight but this could be increased or decreased depending on the lighting circumstance.
24. Complaints are likely to be less than all other options as there will be no unlit areas. It should not be forgotten that currently almost 50% of the Council's total street lighting stock is turned off at midnight. In any event complaints of poor lighting will be much easier to deal with, as increasing the lighting output from any column would be a simple matter of reprogramming the LED controls on a column by column basis via adjustments to the lantern controls.
25. Option 4 - "Part-night 70% existing LED lights at midnight and dim remaining LED lights at midnight, invest £1.2m in 2016/17 and £100k in 2017 / 2018 and 2018 / 2019 in LED residential street lighting which are also to be either part-night lit or dimmed." As identified within the costs comparison Appendices this option realises the greatest savings both in terms of energy costs and carbon emissions. It is however likely to be the most unpopular option with the public, especially with those residents who are currently residing in areas lit by LED street lamps.
26. The savings from this option are only £22k greater than option 3 in 2017 / 2018, though the implications to the public in terms of their required lighting levels are considered to be significantly greater. Whilst achieving the highest savings possible from street lighting continues to be the aim, it is felt that this option does not provide sufficient additional savings over option 3 to warrant the discord that the option would cause with the general public. At this stage it has therefore been discounted.
27. Options 2 to 4 above all assume that the considerable investment in LED lighting will result in a 25% saving in ongoing maintenance costs for street lighting as the expected life of an LED lantern is much greater than that of a conventional unit. The table below provides an extract of the expected costs of street lighting energy, maintenance and carbon tax over the next two financial years. As can be seen it is expected that the options 2 to 4 all provide a saving over and above that of the projected budget in 2017/18. The preferred option 3 estimates an additional saving of £134k. Any additional saving made may contribute to the overall Reshaping Services

saving of £1.3million for Highways & Engineers however due to the volatility in energy prices this saving could change significantly.

Projected Street Lighting Costs (Energy, Maintenance and Carbon Tax)			
	2015/16	2016/17	2017/18
Budget	£947,501	£857,746	£866,323
Option 1	£1,017,246	£894,502	£902,152
Option 2	£1,017,246	£887,909	£717,971
Option 3	£1,017,246	£887,909	£731,957
Option 4	£1,017,246	£878,775	£709,859

28. There has been some concern raised in the past about the safety of LED lighting. It is reaffirmed that the LED luminaires specified will be compliant with the 'Waste from Electrical and Electronic Equipment Directive 2002/96/EC', which aims to minimise the impact of end-of-life electrical and electronic equipment on human health and the environment. The LED modules themselves are totally sealed and the lens is made from vandal resistant polycarbonate and due to the fact that LED's do not have a filament lamp or glass enclosure they are largely impervious to vibration. Additionally, LED luminaire do not produce infrared or ultraviolet emissions and are used to protect foraging areas to preserve the habitat for bats.
29. Additionally the luminaires specified have had photo-biological testing undertaken in accordance with IEC/EN 62471 for LED Lighting Products, Standards for Eye and Skin Safety. The report states that there is no photo-biological safety hazard associated with the luminaire. Additionally, the European Commission, Scientific Committee on Emerging and Newly Identified Health Risks SCENIHR has stated "there is no evidence that blue light from artificial lighting belonging to Risk Group 0 ("exempt from risk") would have an impact on the retina graver than that of sunlight. Traditional lighting with an optical system will utilise reflectors or lens' to direct the light in the desired direction which results in wasted light in undesired direction whereas, due to the physical characteristics, the LED luminaire is directional and lights the task with minimal light pollution/sky glow.

Resources

30. The estimated cost to replace the remaining 5,900 conventional street lamps in residential areas is £1.2m and it is proposed that this funding be taken from the Visible Services Reserve. This investment along with savings from dimming the vast majority of all LED lights from midnight until 6:00 a.m. provides for a payback period of 7.54 years, if payback of the full reserve amount is to be made. It is not however suggested that this be the case as any surplus savings realised in excess of those required for the street lighting energy budget would be put towards the reshaping services savings for the Directorate.

31. As advised, the savings shown for option 2, 3 and 4 assume a 25% reduction in the budget for annual maintenance. In order to make this saving there will have to be a reduction in the current staffing levels in that area, if the service is to be retained in-house or more cost effective arrangements for maintenance will have to be made.
32. Street lighting is part of the re-shaping services programme, it is also being considered as one of the areas where savings in isolation could be realised in the short term. In order to fully consider all the various options for the service which will be done in consultation with the service trade unions, it is proposed to give the necessary authority to the Director to make any changes to the current arrangements that are necessary.

Sustainability and Climate Change Implications

33. The proposed option reduces the Council's CO² emissions by 493 tonnes per annum and this represents a major contribution towards the Council's greenhouse gas reduction targets.

Legal Implications (to Include Human Rights Implications)

34. The Council has a legal duty to protect users of the public highway and its liabilities in respect to this will have to be assessed and carefully managed to avoid any additional third party risks resulting from the lighting changes.

Crime and Disorder Implications

35. Part-night lighting schemes and light dimming schemes are not new initiatives. They have been in operation in certain Local Authorities in England for some time. So far the evidence from these schemes, suggest no increases in crime and disorder as a result of the lighting change. However, the size of the samples for such assessments and the timeframes used are generally insufficient to provide unequivocal evidence of the effects of the change. There will also be a 'local' element to any such changes and this will have to be carefully monitored and assessed in the vale if the proposal is accepted.
36. The effects of reduced lighting on road traffic collisions' is also a debateable point. Certain newspaper headlines over recent years have suggested a correlation between reduced street lighting and an increase in the number of road deaths and serious injuries. Again this is a matter that requires much greater investigation over a longer time period. All road traffic incidence within the Vale are monitored and consideration is always given in such monitoring to the possible highway implications, which includes street lighting.

Equal Opportunities Implications (to include Welsh Language issues)

37. An assessment will be required as to whether the strategy proposed detrimentally affects any members of the public with protected characteristics, though due to the timing of the part night arrangements proposed it is not considered at this stage that this will be a major issue.

Corporate/Service Objectives

38. This report links primarily to the well being outcome of "An environmentally responsible and prosperous Vale", but also links to the outcome of "An inclusive a Safe Vale".

39. The specific objective is objective 4; "Promoting sustainable, development and protecting the environment, and the related action is; Review and implement the Council's Carbon Management Plan and targets to reduce emissions from Street Lighting, Council vehicles and Council buildings 2017 / 2018.

Policy Framework and Budget

40. This is a matter for Executive decision.

Consultation (including Ward Member Consultation)

41. As this is a Council wide matter no individual ward member consultation has been undertaken.

Relevant Scrutiny Committee

42. Economy and Environment.

Background Papers

None

Contact Officer

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Officers Consulted

Accountant, Visible Services and Housing

Responsible Officer:

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