

Environment Development and Transport Committee

Item No.....

Report title:	Street lighting update
Date of meeting:	11 November 2016
Responsible Chief Officer:	Tom McCabe - Executive Director, Community and Environmental Services
Strategic impact Street lighting energy accounts for 43% part of the Councils total Energy use (assuming all schools are excluded). The Council has made a commitment to reduce its total Carbon Emissions by 50% (from 2008 base line), by 2020. Therefore managing the Councils Street Lighting portfolio plays a significant part in contributing to achieving that target. Growth in the number of street lights as a consequence of new developments continues to be a significant issue as does the potential general increase in wholesale energy prices.	

Executive summary

The County Council is responsible for over 52,000 street lights, 8,000 illuminated signs and nearly 2000 illuminated bollards. All street lighting operations, including upgrade and maintenance are covered within a 25 year Private Finance Initiative (PFI) contract, let to Amey in 2008. The PFI contract excludes electricity costs which are paid directly by the County Council.

EDT Committee discussed a broad range of street lighting options on 6 June and on 16 October 2014 approved the introduction of new technology including computer controlled LED (light emitting diode) street lighting and the removal of redundant lighting on main roads.

This report provides an update on initiatives that have saved nearly £1.4m in energy costs and approximately 7,500 tonnes of CO2 emissions to date.

This report updates committee on the various initiatives currently in progress:

- The installation of LED street lighting
- The management of street lighting by using new technology.
- Update on part night lighting.
- Removal of 'redundant' lighting on main roads.
- Change of policy with regard to the adoption of new street lights
- Continued rationalisation of illuminated signs and bollards
- Dimming and trimming

Street lighting performance is monitored as part of the council's vital signs.

This report does not seek to promote further part night lighting.

Recommendations:

- 1 That members note the progress made in delivering savings by introducing new technology and other initiatives.**
- 2 That further de-illumination of redundant lighting on main roads is not progressed.**

1. Existing approach

- 1.1. The PFI contract started in 2008 and was based on the improvement of lighting through the replacement of columns and street lights with traditional units, mainly high pressure sodium (white light). Since then a number of changes have been made which have helped reduce energy consumption.

The current approach to street lighting is based around:

- Adoption of part night lighting
- Implementation of new Technologies, LED/Central Management Systems
- Amended policy on the adoption of new street lights
- Dimming and trimming

This is currently being delivered through a number of initiatives:

- Part night lighting has been introduced to 18,759 street lights.
- 5,235 residential street lights in the core investment period (CIP) were changed to LED (with part night lighting where appropriate).
- Main road street lights are being changed to LED with CMS. 1,319 out of 4,675 street lights are complete as at the end of September 2016
- The next phase is to change the remaining residential street lights to LED, with PNL (as appropriate). Discussions are ongoing in order to introduce this quickly.
- A summary of the progress of initiatives is included in the section on Financial Implications (8.4). This report is produced every month.

2. Part night lighting

- 2.1. The part night lighting (PNL) programme across Norfolk was completed in 2013. Since then with the adoption of new street lights on developments over 18,700 lights have been brought into the initiative. The lights are automatically switched off for 5 hours each night. This delivers 7.28% saving in total energy consumption. For the year 2015/16 the saving in energy costs was £161,800.
- 2.2. Additional costs associated with introducing part night lighting was £247,000. The introduction of part night lighting commenced in June 2010 and the cumulative savings to the end of September 2016 are £693,232.
- 2.3. Local consultations were carried out in advance of introducing part night lighting and, in many cases, there was local opposition to the change. The main concern being raised was fears about feelings of safety and increases in crime. We have continued to liaise with Norfolk Police to monitor the impact of the introduction of part night lighting and there is no evidence to suggest that this has resulted in an increase in crime. We now receive very few complaints from the public. We expect a slight increase in those complaints at the time the clocks change from BST each October as the lights switch off an hour earlier at around midnight.
- 2.4. Evidence has shown that there is no increase in night time crime or anti-social behaviour due to the introduction of part night lighting. A post implementation report informed by the police's own review on night time crime and anti-social behaviour was written in 2013-14. We continue to support Norfolk Police by responding to requests for street lights to be switched back on for a limited period

to address a known issue. We also continue to liaise with members about concerns from residents.

- 2.5. A national research project named “Lanterns” investigated the impact of street lighting interventions, including part night lighting, on health and crime in 2014 and found that there was no significant effect. The project was jointly funded by the NHS and the Institute of Lighting Professionals. It was written by the London School of Hygiene and Tropical Medicine in association with University College London.

3. **LED Progress**

- 3.1. The first phase of this approach was to change residential lights in the core investment period to LED lights. 5,235 LED's have been installed in residential roads, some with PNL. The benefit of doing this was that it maximised the energy saving and we did not have the cost of revisiting the area at a later date for PNL.
- 3.2. The next stage is to change around 4000 main road street lights to LED. To date 1,319 LED's have been installed on main roads, all with CMS. When this phase is complete (due January 2017) the annual savings from the introduction of this initiative on main roads will be £166,839. Again we are only paying the additional costs of upgrading the lights.
- 3.3. The total saving generated from this initiative for LED's on residential and main road to date (September 2016) has been £351,660.
- 3.4. The savings due to LED conversion relate to the assessed wattage of the LED array verses the assessed wattage of a “standard” lamp

4. **CMS Progress**

- 4.1. CMS allows the lamps on street lights to be controlled/dimmed. This is more effective on LED units with dimming possible down to 0%.
- 4.2. CMS has been installed on the 1,319 main road street lights where we have installed LEDs and a dimming profile applied. This dimming generates a 40% energy saving. The saving to date (September 2016) have been £72,712 in energy costs, 680,242 kWh in energy and 68 tonnes of CO2. As the initiative is integral with the installation of the LED lights described above the savings detailed in 3.2 are the total, ie for both LED and CMS on main roads.
- 4.3. The saving due to this initiative relates the level of dimming applied to the LED main road street light.

5. **Removal of Redundant Lighting**

- 5.1. The proposal to remove street lights is based on a risk assessment approach. The risk assessment is based on the design criteria we would use now to prioritise the need for street lighting on a new road. We can use the same logic to determine whether street lighting is still justified on existing roads.
- 5.2. We have switched off 124 street lights as a trial which are generating annual savings of £8,966 in energy costs, 84,343 kWh in energy, 46 tonnes CO2, £821 in Climate Charge Levy and £6,900 in maintenance.

- 5.3. The removal (switching off) of street lights has proved to be unpopular in some locations with the initiative not receiving the support of the local community. We will continue to monitor this initiative before making recommendations for permanent changes at the end of the trial.

Due to the initial feedback on this initiative no further sites are currently being considered.

6. **Further rationalisation of non-essential lighting assets.**

- 6.1. The Department for Transport have indicated that they intend to further relax the regulations and remove the requirement for lighting to be provided on certain types of signs. In the meantime the legal requirement continues. Some local authorities are considering removing this type of lighting in advance of the change of regulations, taking a risk based approach.
- 6.2. The planned change in regulation would mean a further 6,280 signs and 1,116 bollards could be de-illuminated. There is an additional cost of removal of around £1.6m, which equates to a payback period of 6½ years. It is possible to do this as part of planning maintenance, but this will take longer.

7. **Change in Development Control.**

- 7.1. Growth in the number of street lights as a consequence of new developments continues to be a significant issue.
- 7.2. Prior to September 2015 street lighting would normally be provided on new developments to a standard requested by the local lighting authority and which the County Council would manage and maintain. There were some differences for example in environmental lighting zones in rural areas. The local lighting authority is either the district/borough council or a town/parish council. The County Council as the highway authority also has street lighting powers.
- 7.3. The County Council has now resolved to adopt lighting on new residential, retail and industrial estates, to the standard requested by the local lighting authority (roadway or footway), if the development in question is in an environmental zone where lighting is permitted and there is a highway need. Developers will be charged a commuted sum to cover the cost of 25 years energy and maintenance costs for non-residential roads with a highway need. Local Lighting Authorities can retain responsibility for footway lighting if they so wish. If Local Lighting Authorities require lighting on estates within village envelopes in Rural Areas, then this will have to be a footway standard and adopted by the Local Lighting Authority (normally the District, Town or Parish Council).
- 7.4. If street lighting is required by the County Council or by a local authority, then this requirement would be included in the legal agreement to adopt the road. The developer would have to install the lights and pay the commuted sum before the road was adopted.

8. **Financial Implications**

- 8.1. Street lighting is a significant energy user, accounting for 43% of the County Councils total use (excluding schools) and costing £2.0m each year. In terms of tonnes of CO₂, in 2008 the total was 11,216 tonnes each year. Energy reduction

measures already in place have enabled this to reduce to 10,517 tonnes (2015/16 year end figure).

- 8.2. We have funded these initiatives capital investment from the street lighting reserves. In reviewing the detailed business case, consideration would need to be given to restoring the balance to the reserve to ensure that future PFI contract payments can be fully funded. Investment will be funded from the Street Lighting PFI fund and will be subject to a full business case approved and monitored by the Executive Director of Finance.
- 8.3. The extent to which each of the initiatives are able to deliver a cashable saving, as opposed to just mitigating the increased cost pressure to the service due to increasing energy prices, depends largely on the future prices in the energy market. This continues to be a significant pressure for the authority.

Street Lighting Monthly Update to Council For: September 2016

Summary

This updates the ongoing results of energy saving initiatives undertaken to improve street lighting across Norfolk.

September 2016 saw initiatives by NCC street lighting save the following:

283,220 kWh in energy 153.2 tonnes of CO₂ £30,110 in energy bills.

For the Financial Year to date the savings are:

1,332,139 kWh in energy 720.7 tonnes of CO₂ £141,575 in energy bills.

In total, since April 2008, when NCC street lighting initiatives started we have saved
13,622,615 kWh in energy 7,370 tonnes of CO₂ £1,386,079 in energy bills.

1 Breakdown by Initiative.

1.1. Savings due to Part Night Lighting

During September 2016	Financial year to date	Total Savings since 2008
120,908 kWh in energy.	582,264 kWh in energy.	6,845,840 kWh in energy.
65.4 tonnes of CO ₂	315.0 tonnes of CO ₂	3,703.6 tonnes of CO ₂
£12,854 in energy bills.	£61,881 in energy bills.	£693,235 in energy bills.

1.2. Savings due to Dimming

During September 2016	Financial year to date	Total Savings since 2008
35,020 kWh in energy.	168,673 kWh in energy.	1,968,967 kWh in energy.
18.9 tonnes of CO ₂	91.3 tonnes of CO ₂	1,065.2 tonnes of CO ₂
£3,723 in energy bills.	£17,926 in energy bills.	£200,126 in energy bills.

1.3. Savings due to Trimming

During September 2016	Financial year to date	Total Savings since 2008
10,158 kWh in energy.	48,879 kWh in energy.	614,003 kWh in energy.
5.5 tonnes of CO ₂	26.44 tonnes of CO ₂	332.2 tonnes of CO ₂
£1,080 in energy bills.	£5,195 in energy bills.	£61,295 in energy bills.

1.4. Savings due to LED lanterns

During September 2016	Financial year to date	Total Savings since 2008
72,561 kWh in energy.	348,617 kWh in energy.	3,447,224 kWh in energy.
39.3 tonnes of CO ₂	188.6 tonnes of CO ₂	1,864.9 tonnes of CO ₂
£7,714 in energy bills.	£37,050 in energy bills.	£351,661 in energy bills.

1.5. Savings due to CMS

During September 2016	Financial year to date	Total Savings since 2008
37,847 kWh in energy.	150,802 kWh in energy.	680,242 kWh in energy.
20.5 tonnes of CO ₂	81.6 tonnes of CO ₂	368.0 tonnes of CO ₂
£4,024 in energy bills.	£16,027 in energy bills.	£72,713 in energy bills.

1.6. Savings due to De-Illumination

During September 2016	Financial year to date	Total Savings since 2008
6,726 kWh in energy.	32,903 kWh in energy.	66,339 kWh in energy.
3.6 tonnes of CO ₂	17.8 tonnes of CO ₂	35.9 tonnes of CO ₂
£715 in energy bills.	£3,497 in energy bills.	£7,048 in energy bills.

The savings due to LED conversion relate to the assessed wattage of the LED array verses the assessed wattage of a “standard” lamp.

9. Issues and Risks

- 9.1. Regarding the legal implications; the provision of new street lighting is a discretionary power, not a duty, and the Courts have held that no liability arises where a local authority decides to withdraw street lighting for reasons of economy. However if there are non-natural obstructions in the highway introduced by the Council, such as street furniture, then reasonable care is required to see that they are not a hazard to users of the highway.
The Council also has to take into account its duty to promote road safety and prevent accidents, and its duty to have due regard to the prevention of crime and disorder. The impact of the non-provision of streetlights on crime should be considered on each new development. However the main factor here is that street lighting is provided by the County Council as highway authority if there is a justifiable highway safety need. Other Local councils can provide footway lighting if they feel it is appropriate for other reasons.
- 9.2. Street lighting forms part of the local street scene. As such, the provision of street lighting can be an emotive issue. Consultations with local communities were carried out in advance of implementing part night lighting and there was a split between those in favour and those against. Further resistance to initiatives have been encountered when consulting on and implementing the removal of redundant street lights.
- 9.3. Some of the initiatives we have implemented have required a change to the existing PFI contract. To date, we have been able to reach agreement about amendments to enable new approaches/trials and initiatives to be delivered which were not originally identified when the contract was let, for example, part night lighting. In addition the government (HM Treasury) is committed to reducing the PFI revenue cost to local authorities through a centrally co-ordinated savings programme. The code of conduct for operational PFI contracts seeks to foster agreement between local authorities and their PFI partners to deliver efficiencies and savings on a voluntary basis.
- Although Amey have signed the PFI operational savings protocol; representatives from the SPV (a special purposes vehicle created to fund the PFI) have not. It would require negotiations with the SPV's representative to progress further initiatives.
- 9.4. As discussed in the initial statement about a 50% reduction in energy is a challenging target for the County Council to achieve, we are confident and expect to exceed our street lighting target of 12.5% despite the continued increase in street lighting stock. Because street lighting is one of the biggest energy users in the County Council, if further energy savings cannot be achieved the risk of the Council not achieving this target increases.

10. **Officer Contact**

- 10.1. If you have any questions about matters contained in this paper or want to see copies of any assessments, eg equality impact assessment, please get in touch with:

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If you need this report in large print, audio, Braille, alternative format or in a different language please contact 0344 800 8020 or 0344 800 8011 (textphone) and we will do our best to help.

The terminology of street lighting technology

LED

A Light-Emitting Diode (LED) is a semiconductor device that requires less energy, lasts longer and it also requires less maintenance than the lights that were originally approved for the contract. They are more expensive to buy although the price has reduced in recent years. They are now an economic alternative over the long term.

CMS

A Central Management System (CMS) is a method of remotely controlling street lights using computer software to determine the way the street light or groups of street lights operate. The software is usually hosted by a commercial organisation that provides the end user with a computer control interface via the internet. The end user can then readily program, at any time, how they want the streetlights to operate. The communication between the CMS and the street lights utilises the internet and the mobile phone networks.

Trimming

Trimming refers to turning on road lights later in the evening and switching them off earlier in the morning commonly by the use of photo electric control units (PECU). Trimming takes advantage of shorter warm up times and greater brightness of modern lanterns to reduce lighting hours at the start and end of the night.

Dimming

Dimming refers to reducing the light output of a lamp by adjusting the amount of energy supplied to it. The older types of lamps are less dimmable than modern LED ones because there is a threshold where if the energy is reduced, the lamp will extinguish. LED lamps are capable of being dimmed down to 0%. Some dimming was included in the original contract but dimming can be substantially increased with LED's and CMS.

Part Night Lighting

This is when the street lights are turned off during the night for a period of time. (12am to 5am GMT)



Old 26w traditional residential street light



16w LED Residential Street Light

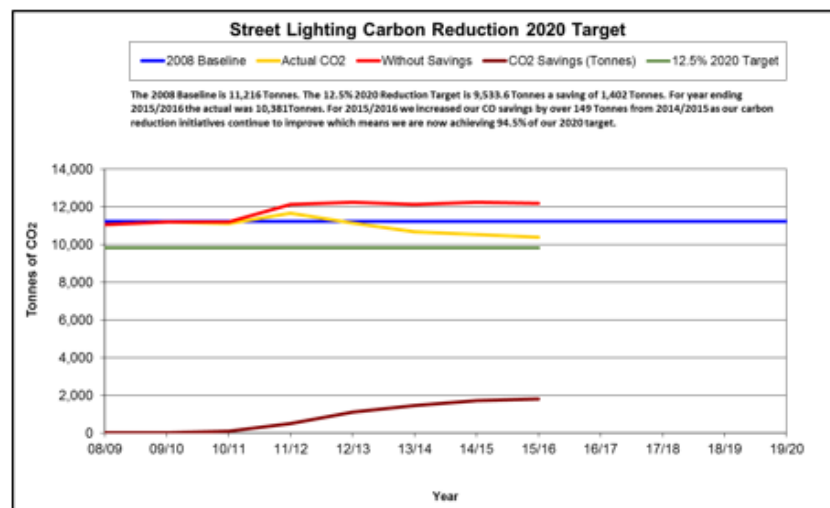
Elm Hill – Traditional





Street Lighting CO2 Reduction Initiatives

Performance



Why is this important?

- To reduce our CO2 emissions to achieve national and local targets
- To reduce our costs and therefore reduce revenue pressure.
- To make our street lighting efficient and sustainable in the future
- For each tonne of CO2 we reduce we save £18 in CCL and £196 in energy costs

What will success look like?

- Achieve the target to reduce carbon emissions by 12.5%
- This will save of 1,402 Tonnes of CO2 annually.
- This will reduce the Climate Charge Levy (CCL) we pay by £25,236 a year.
- We will reduce the amount of energy we use by 12.5%
- We will reduce the cost of energy by £269,000 a year.
- We will reduce the cost of maintaining street lighting by £62K PA.

What is the story behind current performance?

- A 25 year PFI Contract with Amey
- In-contract and new initiatives introduced to drive down our CO2 emissions including
 - Dimming and Trimming has saved 1,352 tonnes.
 - Part Night Lighting (PNL), turning street lighting off during part of the night has saved 3,584 tonnes since 2008.
 - The introduction of LED Lanterns has saved 1,793 tonnes.
 - Proposal to de-illuminate street lighting which will save 2,600 tonnes over the remainder of the PFI contract.
 - The introduction of using computer controlled (CMS) street lights has already resulted in a 359 tonnes saving since 2013.
 - In 2015/2016 we made a saving of over 1,800 tonnes of CO2, an increase of over 149 tonnes on 2014/2015 despite the increase in number of street lights.
- The July 2016 target is 569.80 tonnes the measured is 574.93 tonnes.

Action required

- Increase focus on demand led street lighting or smart lighting during the final phases of the PFI contract capital investment period, including continued investment in LED lights.
- Implement the latest street lighting technologies, including CMS.
- Charge developers for all costs for new street lights for 25 years.
- Focus on proactive maintenance of the street lighting stock.
- Continue with de-illumination of street lighting where applicable.
- Following the Members decision of September 2015 we will continue to oppose the installation of street lighting on all new developments where we deem there is no Highway need.

Responsible Officers

Nick Tupper – Highways Maintenance Manager
Campbell H Jones - Street Lighting Technician