

Method of assessing the Part-Night Lighting Savings

The existing street lighting stock in CCBC has already been subject to a part-night lighting exercise with the majority of the inter-urban (roads between towns and villages) now being switched to part night lighting (switched off between mid-night and 5.30 am GMT – as agreed by the Council in 2009 for implementation in 2010 onwards). In combination with this, there are nominated areas for low energy lighting (installed 2012-14 in selected areas around the borough to assess the effectiveness of energy savings) and the replacement of existing residential (high energy use) sodium bulb units with LED gear trays (installation 2015-16), which are excluded from consideration in this Part-night lighting exercise.

The remaining eligible stock for street lighting (i.e. not subject to LED/ low energy replacement or part-night lighting regime) numbers around 7,500 units and are located in a mixture of all of the Council's rural and urban areas, these can be summarised in Table 2 as follows:

(A) Lamp Type	(B) Main use Locations	(C) Number	(D) Annual Energy (kWh)	(E) Annual Cost (as of 2015)	(F) Average Cost per Unit (p.a.)
250 High Pressure Sodium	Main Roads	864	1,085,184	£123,711	£143.18
150 High Pressure Sodium	Main & Minor Roads	3,533	2,653,283	£302,474	£85.61
100 High Pressure Sodium	Main & Minor Roads	1,187	563,825	£64,276	£54.15
135 Low Pressure Sodium	Residential	286	212,212	£24,192	£84.59
90 Low Pressure Sodium	Residential	327	166,443	£18,975	£58.03
55 Low Pressure Sodium	Residential	1,300	417,717	£47,620	£36.63
Totals		7,497	5,098,664	£581,248	

Table 2: Existing energy usage/ costs of the eligible Street Lighting stock for proposed part-night lighting regime

Part-night lighting the entire remaining eligible stock results in that shown in Table 3:

(A) Lamp Type	(C) Number	(G) Annual Energy (kWh)	(H) Part-Night Lighting Annual Cost	(I) Savings - Column E (Table 2) minus Column H
250 High Pressure Sodium	864	546,048	£62,250	£61,461
150 High Pressure Sodium	3,533	1,335,474	£152,244	£150,230
100 High Pressure Sodium	1,187	283,693	£32,341	£31,935
135 Low Pressure Sodium	286	106,678	£12,161	£12,031
90 Low Pressure Sodium	327	83,712	£9,543	£9,432
55 Low Pressure Sodium	1,300	217,517	£24,797	£22,823
Totals	7,497	2,573,122	£293,336	£287,912

Table 3: Costs & savings for proposed part-night lighting regime on the eligible Street Lighting stock

Though this exceeds the target of £190k, the majority of these proposed part-night lighting units are in urban areas. In these areas conflict locations have been identified prohibiting part night lighting, due to safety considerations, such as:

- Junctions
- Roundabouts
- CCTV
- Traffic calming measures

These change the potential saving profile as follows:

(A) Lamp Type	(C) Number	(J) Number <u>minus</u> conflict locations	(K) Amended Part-Night Lighting Annual Cost	(L) Amended Annual Savings (Column K minus J x F)	(M) Part Night Light Conversion Cost
250 High Pressure Sodium	864	166	£11,960	£11,808	£8,300
150 High Pressure Sodium	3,533	1,897	£81,745	£80,664	£94,850
100 High Pressure Sodium	1,187	935	£25,475	£25,155	£46,750
135 Low Pressure Sodium	286	134	£5,698	£5,637	£6,700
90 Low Pressure Sodium	327	221	£6,450	£6,374	£11,050
55 Low Pressure Sodium	1,300	1,300	£24,797	£22,823	£65,000
Totals	7,497	4,653	£156,125	£152,461	£232,650

Table 4: Energy savings costs of part-night lighting in non-conflict areas

As a worked example, 250KW High Pressure Sodium units in non-conflict areas number 166, their Part-night Light energy cost is £11,960; the cost of full night lighting equates to the figure shown in 'Average energy cost per 250W High Pressure Sodium' (top line - Column F - Table 1) £143.18 multiplied by 166 (number of units in non-conflict areas) giving £23,768. Subtract the first figure £11,960 from the second £23,768 gives -£11,808 in cost savings.

The desk-top study above reveals the savings that can be made from urban part-night lighting will achieve a saving of £152,461 (from Amended Annual Savings total figure in Column L), this falls short by approximately £8,000 from the proposed target of £160k; these figures to being subject to change due to local challenges and energy pricing.

Where part night lighting is introduced, line painting and cats eyes may need to be extended on roads (particularly on those with speeds of 50mph and above), though this should not be a significant amount.

There is also the experience from peer-Councils that complaints and queries about part-night lighting will increase, therefore the costs of resourcing this extra work into the call-centres and officers' time will need to be factored in to this proposal.

A possible part-night lighting objection from the Public could be about the detrimental effect on safety; this seems to be more of a perception rather than a reality. A recent study, led by the London School of Hygiene & Tropical Medicine in partnership with University College London (published in the Journal of Epidemiology and Community Health - July 2015) showing no increase in crime rate (from 2010 to 2013) or decrease in road safety (from 2000 to 2013) in locations where a part night lighting regime had been in place (briefing note for this in Appendix D). These conclusions being echoed in the findings of the Torfaen Street Lighting Cabinet Report – 2011 (copy in Appendix G).

The units in conflict areas identified in this exercise could be replaced with LED alternative, so mitigating the energy costs, this can be summarised as follows:

(A) Lamp Type	(N) Total Number	(O) Number of units in Conflicted Areas – Column N minus Column J (Table 3)	(P) Total Cost for LED Conversion (approx. £800/unit)	(Q) Annual Energy Saving for LED conversion – (Column E x Column O minus LED Rating x Column O)
250 High Pressure Sodium	864	698	£558,400	£60,096
150 High Pressure Sodium	3,533	1,636	£1,308,800	£72,354
100 High Pressure Sodium	1,187	252	£201,600	£10,768
135 Low Pressure Sodium	286	152	£121,600	£4,180
90 Low Pressure Sodium	327	106	£84,800	£1,764
Totals	6,131	2,844	£2,275,200	£149,162

Table 5: Categorized table of units in conflicted areas with associated costs and savings (as of August 2015)

The units exempt from Part Light Lighting - identified in Column O (Table 5), are to be given prioritisation for LED replacement, with outline investment costs given in Column P (Table 5) and projected yearly savings in Column Q.

In summary the process for assessing the cost savings from this Part-Night Lighting exercise is followed in the schematic below:

