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Emma Kelso
Head of GB Markets
The Office of Gas and Electricity Markets
9 Millbank
London
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25th April 2008

Dear Emma,

Re: New Metering technology in public lighting.

Thank you for your invitation for responses to your letter 1st April concerning the adoption of metering within public lighting. Zodion Streetlighting Controls are a focussed supplier of controls into the streetlighting market. Our principal products are electronic photo-controls, although we have also supplied over 80,000 electronic ballasts specifically for streetlighting in the last 5 years, annually saving over 3GWh¹. We have recently introduced Vizion, a highly capable Central Management System (CMS).

We see that energy reduction is the primary 'driver' of our business, and our product development is focussed on this. We have a wide customer base, and I believe that we are highly respected within the streetlighting marketplace.

Your consultation raised a number of points which I summarise, and then expand on, below. For the sake of clarity I have adopted CMS (Central Management Systems) as a generic phrase for centrally managed streetlighting monitoring and control systems, uCMS to represent unmetered CMS, and mCMS for metered CMS. You introduce the expression 'Advanced CMS', however I see that the principal difference in your distinction is metering, as the other benefits of 'Advanced CMS' can be achieved with existing uCMS arrangements (I believe that we are already 'Advanced'!).

I feel that the fundamental issue is that frameworks exist today to adopt uCMS and gain the benefits (including reduced energy costs) without the need for mCMS. Indeed the process of generating a mCMS specification will confuse the public sector lighting market and significantly _____ adoption of energy reduction technologies. This delay will arise through lack of clarity as to the future acceptance of both approaches to CMS, one known, uCMS, the other currently unknown.

Even given this, the prospect of ofgem applying regulations to make metering of streetlighting mandatory has a strong commercial attraction, and we have an interest in the possibility of expansion of this sector of the market. I suspect, however, that the

¹ Based on a typical saving of 10W per unit compared to low-loss conventional gear with typical annual burning hours of 4050hrs.

significant costs of imposing metering will be strongly resisted, unless it provides an economic benefit, and metering on its own does not give this (in fact it will only increase energy usage due to the consumption of the metering system itself) the economic benefit only arises from implementing CMS.

Within the body of this letter I address the detail of the specific questions that you posed. In summary I think that the answer is 'Yes' to both the questions you ask. There are consequences of proceeding to develop a new standard for mCMS, and there are unfavourable impacts that might adversely affect the market and have a negative impact on the market and stakeholders.

Specific points (*numbers in brackets refer to the subsequent subject headings where the points are further examined*)

- Existing uCMS systems provide the functionality ascribed to 'advanced CMS' (1,2)
- Existing uCMS arrangements can reward reduction in energy consumption (2)
- Existing uCMS arrangements accurately reflect actual energy usage (2,3)
- The extrapolation of the 10% figure from load research is self-evidently invalid (3)
Given the above the £23m assumption is questionable
- Existing photocell arrangements are much more accurate than you ascribe (4)
The consultation seems unaware of currently available products enabling part night operation (including part-night dimming) without the need of CMS (5)
- The consultation seems to be indifferent to the work done within Elexon last year to address the specific requirements of uCMS (6)
- The proposal lacks clarity as to whether unmetered supplies will be compelled to be phased out by 'legislation', or other mandatory instrument. (7)
- The proposal lacks clarity as to whether uCMS systems will continue to be allowed (7)
- The uncertainty created by this initiative will delay the adoption of energy saving measures achievable through the existing uCMS arrangements (7)
- Manufacturers (including ourselves) have produced products to meet uCMS requirements and provide many of the benefits you believe are being constrained by 'perceived legal barriers' (7)
- Your perception of the accuracy and performance requirements of the metering within mCMS is not discussed, this could have a substantial impact on the cost of the system precluding adoption of either type of CMS(8)
- Will the data stream from the streetlight be standardised and the communications protocols be part of the specification? (8)

1 Control Gear within Existing Streetlighting

Most control gear installed within the current streetlighting stock is 'conventional' reactive ballasts with capacitive power factor correction. Generally this cannot be dimmed, so without modification the existing stock can only be monitored, with control limited to ON/OFF (effectively replacing the photocell). Part-night (to OFF) regimes can be implemented, and energy reduction gained, but these are currently unpopular and discouraged by the ILE². Hence unless part-night to OFF is adopted no energy reduction can be gained from this sector. CMS systems can be beneficial as the monitoring function significantly improves maintenance efficiencies (and identifies poor Power

² Institution of Lighting Engineers. 'Invest to save' <http://ile.org.uk/uploads/File/Street%20Lighting%20-%20Invest%20to%20Save.pdf>

Factor), but applying metering has no incentive to this sector as the consumption will remain unchanged³ (Assuming that current consumption is understated by 10% it is clear that it will act as a significant disincentive).

Dimming can only be implemented with compatible control gear. This is generally Electronic Control Gear (ECG) although there are some esoteric conventional solutions (which would not be considered above modern ECG). Enabling dimming will practically require the replacement of the control gear within the lantern. This operation almost certainly needs to be accomplished within a controlled workshop environment, hence requiring removal of the lantern from the installation. The costs of material and labour to achieve this are significant, and widescale adoption is only likely to be undertaken when the lantern is to be completely replaced⁴. The costs of implementing dimming are significantly larger than just the costs of CMS.

2 Features and Benefits of CMS

CMS promises to provide monitoring and control of public lighting. Whilst the exact features of products from different manufactures vary the functions typically available are:

- On/off control using time, photocell or other event triggers

- Dimming (where the gear supports dimming – generally only ECG)

- Lamp fault (actual or predictive)

- Gear faults (including power factor)

- Supply faults

- System operation

- Event history

- Parametric information (supply voltage, power factor, circuit current, lamp voltage, light level etc.)

- Power consumed (by calculation from event log in the case of uCMS)

The above list can be accommodated today within uCMS and, following the recent implementation of CP1196, the energy benefits can be passed on to operators via BSPC520. Invariably uCMS equipment has been recently introduced so it has been subject to the more rigorous charge code allocation process.

3 Load Research and Subsequent Market Reaction

Following load research undertaken a number of years ago the charge codes for some lamp/gear types was increased. The load research targeted 'low-hanging fruit' in terms of the quantity of luminaires with this gear/lamp in the streetlighting stock and perceptions of the variations in actual consumption to charge-code. These charge code discrepancies have been addressed, and the market has moved towards new gear/lamp types which have been very well researched and characterised. As an appreciable proportion of the unmetered lighting stock has been re-addressed (charge code changes, and movement to ECG) it is not applicable to assume that the previous load research can be considered representative of the situation of the current UK public lighting stock.

³ In fact the consumption will rise due to the additional consumption of a CMS over a photocell

⁴ Our sales profile for ECG confirms this assertion with the vast majority of units shipped to luminaire OEMs rather than contractors.

Today load research to allocate charge codes requires third party measurement of all equipment over the full voltage range and with a wide range of lamp types/ages. This rigor produces much more accurate & representative consumptions than the very early equipment allocated charge codes.

4 Photocell control

As the principal UK manufacturer of streetlighting photocells I feel compelled to defend this humble device. They are in fact accurate, and very reliable and it is a misapprehension that 'many are on longer than desired'. They are highly repeatable generally manufactured to tolerances that equate to a total annual burning hour variation of less than 10hrs/year. 'Day-burners' are observed and they represent units in fault. CMS systems will also have day-burners when units are in a non-recoverable fault condition (hence highly unlikely that the metering information can be recovered in mCMS). Given the relative complexities of CMS systems and photocells, the art will be in early detection of faults within CMS to keep the day-burners to the same level they are in a well managed deployment of photocells !

5 Advanced Photocell Control

Part night (to OFF) photocells have been available for about 20years⁵, and part-night dimming photocells were first produced by Zodion (amongst others) in the early 1990s. These technologies allow for some of the control seen within CMS, however their operation cannot generally be modified once deployed. There are also part-night dimming ballasts available, whereby the timing is undertaken in the ballast rather than the photocell. Existing BSPC520 charge and regime codes cover these modes of operation⁶.

6 BSPC520

Following the inclusion of CP1196 earlier this year, BSPC520 now allows for uCMS systems. An extensive amount of work (including consultation) was undertaken in late 2006 and early 2007 specifically to allow lighting authorities to realise the benefits within the existing charging and settlement structures.

7 Uncertainty

I am supposing that the starting point for mCMS is validation of the interpretations of the MID regulations and the electricity act, considering all the possible circumstances of supply. This all looks a bit tricky to the uninitiated and I suspect carries both uncertainty of outcome and delay. I am also uncertain about another logical conundrum⁷ which is whether uCMS will still be allowed once mCMS is introduced (indeed whether any unmetered streetlighting supplies are allowed). This uncertainty means that anyone considering a CMS system will delay full deployment during the period when mCMS requirements are developed. Effectively closing down investment in implementation of CMS technology, and arresting deployment of energy saving measures. There is also the

⁵ We first introduced the SS9, a part-night photocell, in the 1980's.

⁶ See Elexon document 'Guidance on dimming lighting equipment in Unmetered Supplies arrangements'.

⁷ If a specification for mCMS is considered for introduction the argument for any unmetered supply falls away as it is clearly now considered not to be prohibitively expensive or impractical. If it remains economically prohibitive or impractical what is the purpose of a specification for mCMS?

issue of manufacturers and software developers who have, and continue to, develop uCMS systems. They will be compelled to undertake costly re-development of systems to meet the mCMS requirements. I have no idea of timescales until a specification could be adopted, but see that this has to take 2-3 years at a minimum. This will translate into a delay of at least 4 years in the adoption of CMS systems.

8 Metering & Metering Costs

There are additional hardware costs within each streetlight to undertake metering, compared to simply monitoring and reporting events (as required for uCMS). Taking even simplistic metering will increase the costs of nodes for mCMS over uCMS. Whilst each individual streetlight will have a modest annual consumption (typically 400kWh) the aggregate could be very large >10GWh which almost certainly will require half-hourly active/reactive metering making a similar requirement on the meter within the individual streetlight, hence this meter will need reasonable accuracy and significant capability. Whilst this is not technically difficult, it raises the concern that metering may make CMS prohibitively expensive. I see little value in matching the performance of mCMS to cost targets if this will degrade accuracy below that achievable today.

The nature of the data from the streetlight in uCMS and MCMS are different. Whilst we have elected to use an 'interoperable' protocol for our 'Vizion' CMS, some vendors have chosen to use proprietary protocols. In contrast I see a strong argument that metering data needs to be 'open' to allow standardisation.

I recognise that I have raised a number of points in response to your enquiry and would welcome the opportunity to present my concerns in person. Please be assured that I would be willing to participate in an exploration of this proposal, or work with any expert group set up to examine it.

Please do not hesitate to contact me if you require clarification or amplification of any of the points raised within this letter.

Regards

A handwritten signature in black ink, appearing to be 'John Fox', written in a cursive style.

John Fox
Managing Director, Zodion Ltd.