ELEXON

Charge Code Solutions for Smart Streetlighting Assets

Unmetered Supplies User Group

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Owner/author	**Freya Gardner**	Purpose of paper	**Decision**
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Summary **Smart equipment is being attached to existing streetlights, and new streetlighting solutions are being introduced with integrated smart technologies and/or optional accessories. This paper is intended to prompt a discussion on how to raise awareness of UMS requirements and allocate Charge Codes or Switch Regimes for Smart Streetlighting Solutions.**

1. Background

1.1 Smart equipment is being attached to existing streetlights, and new streetlighting solutions are being introduced with integrated smart technologies and/or optional accessories. This is understandable as streetlighting offers an easy place to mount and power equipment. UK councils are also taking advantage of smart city technologies which can address economic, social, and environmental challenges.

1.2 Elexon has received Charge Code applications for streetlight solutions that can contain many different IoT devices and offer solutions for Lighting, Surveillance, Communication, Monitoring, Analytics and Emergency Alert. Charge Codes have recently been approved for smart city sensor devices that are installed on streetlights and luminaires are now being introduced with renewable energy solutions, designed to achieve energy savings and reduce the impact on the environment.

1.3 Some UMSUG members have raised concerns that many of these new solutions do not have Charge Codes, as the manufacturers and customers lack an understanding of Unmetered Supply (UMS) requirements. It is therefore necessary for Elexon and the UMSUG to raise awareness of UMS requirements so that all unmetered energy use is accounted for in Settlement.

1.4 Elexon has also seen an increase in Charge Code application guidance requests from manufacturers with unique smart city products. This requires UMSUG discussion to agree on the best approach before allocating Charge Codes.

2. Awareness of UMS requirements

2.1 Streetlighting assets and infrastructure is discussed frequently at the Association of Directors of Environment, Economy, Planning and Transport (ADEPT) streetlighting working groups.

2.2 An UMSUG member suggested getting in front of the innovation bodies to make them aware of the need to make bidders aware of the rules and requirements around UMS power use. They suggested that a rolling programme of outreach was required, to ensure that not only the innovators, but also the customers and system integrators are aware of their obligations.

3. Examples of Smart Streetlighting Solutions

Autonomous IOT

3.1 Autonomous IOT have two products (AIOT-S and AIOT-V) which are both hybrid smart lights powered by renewable energy which charge either lithium or lead crystal batteries. The system is a 12v DC system but a grid connection is required in the event of the battery not being sufficiently charged by solar or wind.

3.2 Due to the size of the products, the Lighting Industry Association (LIA) who has carried out their testing requested the charging circuits for both units (both devices use the same charging circuit) to test and obtain the results. They have also provided data from both models which are currently live on customer sites to calculate how many times per year the charging occurs. Charging time is approximately 5 hours.

- AIOT-V = charging engaged 200 times over 1 year (Max Power 40W Load) – 89.6% off grid annually
- AIOT-S= charging engaged 151 times over 1 year (Max Power 30W Load) – 94% off grid annually

3.3 The unit is configurable and power can be reduced to save energy, lights can be dimmed or even activated via an on-board PIR and there is also the possibility of accessories including CCTV and Wi-Fi. The figures they have provided (see attachment A) is for the standard units to be maximum power all year round.

Signify Solar Hybrid Streetlighting

3.4 Signify have introduced a hybrid solar luminaire which requires an interim Charge Code solution until their product is integrated into CMS. The solar panels charge the batteries during the day and the stored energy powers the LEDs at night. If the batteries run out of power, the LEDs are powered with energy drawn from the grid. The hybrid solar systems only need a solar panel and battery capacity of one day as grid power is available during cloudy days or in wintertime.

3.5 Signify anticipate that their solar hybrid luminaire will be fully powered from the solar solution for 197 nights of the year, and for the remaining 168 nights it would be powered from a mixture of solar energy and energy from the grid. They anticipate that over the year the energy saving from solar would be 60% on average.

		Hybrid (1 night Autonomy)							
Market	No. of autonomy nights	No of nights in a year ON Battery	No of nights in a year ON GRID (NOT full night)	Wattage	System Lumen	Yearly unit Energy need (Kw-h)		Yearly unit Energy taken from grid (Kw-h)		Energy savings
London	1 (12 hours)	206	159	17 / 34	3000 / 6000	74.46	148.92	27.77	55.79	63%
Manchester	1 (12 hours)	186	179	17 / 34	3000 / 6000	74.46	148.92	30.48	61.21	59%
Edinburgh	1 (12 hours)	197	168	17 / 34	3000 / 6000	74.46	148.92	26.82	53.90	64%

3.6 Elexon and Signify have discussed the solution of using a base Variable Power Switch Regime (VPSR) with their Generic LED Charge Code so that over the full year the luminaire would be dimmed by 60% to account for the energy taken from the grid. Any additional dimming would require separate VSPRs reflecting the additional % dimming and timings.

4. Recommendations

4.1 We invite the UMSUG to:

a) **DETERMINE** how Elexon and the UMSUG can raise awareness of UMS requirements; and

b) **DETERMINE** an approach for allocating Charge Codes or Switch Regimes for Smart Streetlighting Solutions.

Attachments

Attachment A (confidential) – Zip folder containing AIOT-S and AIOT-V Product Overview and Energy Consumption Test Data

Attachment B (confidential) – Zip folder containing Signify Solar Hybrid Solution presentation and data confirming energy saving

For more information, please contact:

Freya Gardner, Product Analyst

freya.gardner@elexon.co.uk

020 7380 4107