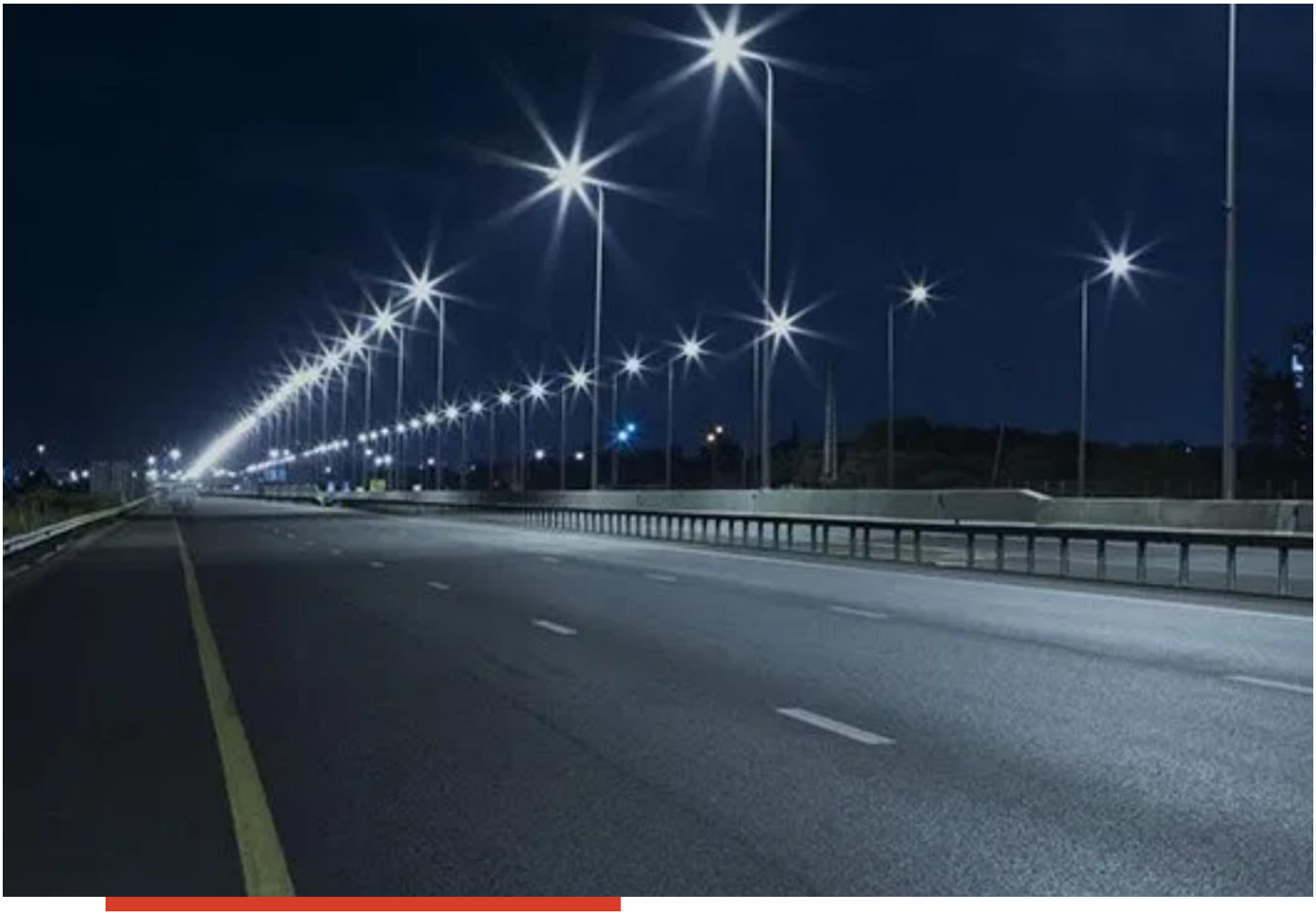

STATE OF THE NATION

2020 STREETLIGHTING SURVEY

UK ROADS LIAISON GROUP

CIHT

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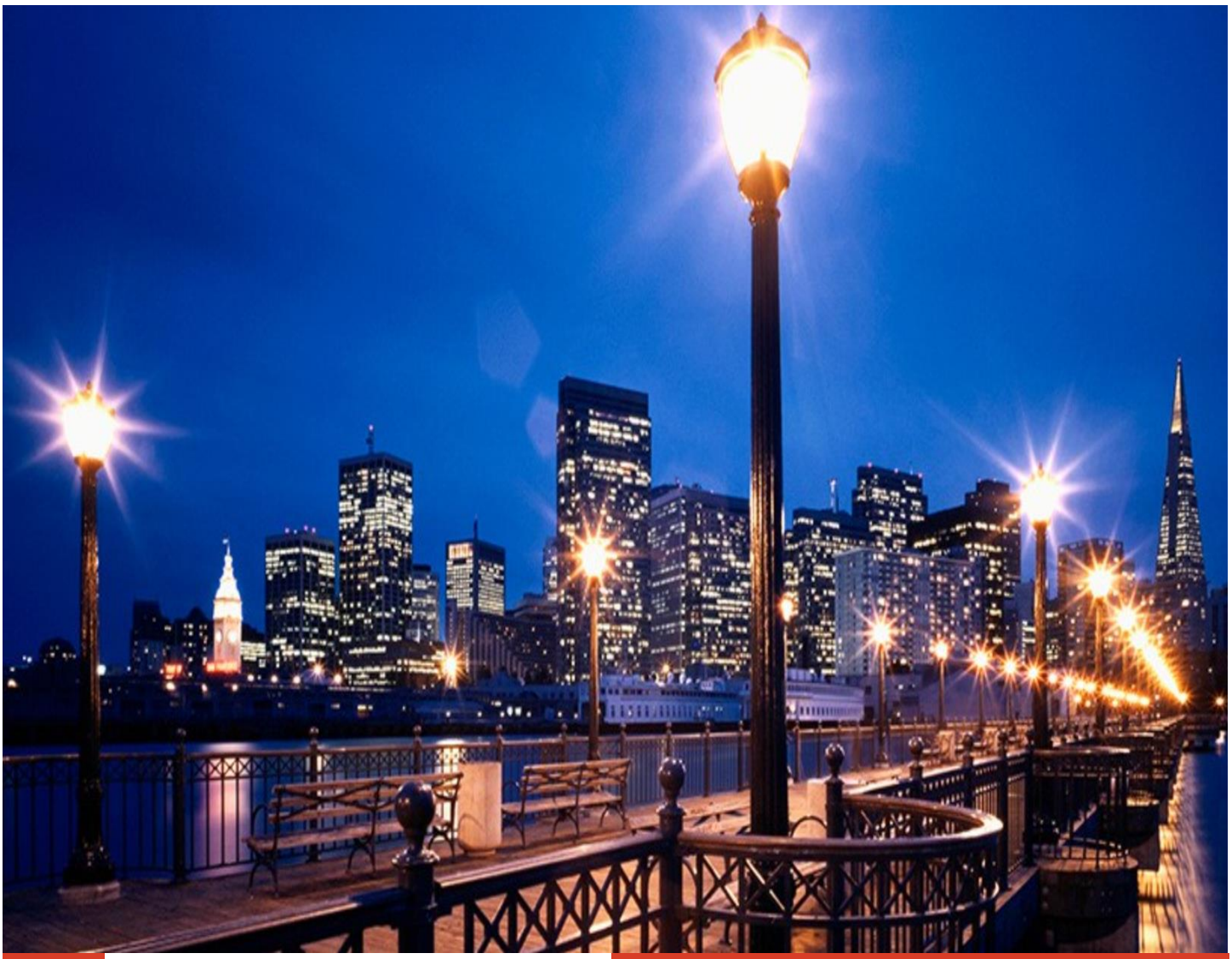


INTRODUCTION

Welcome to the first comprehensive and detailed analysis of the UK's streetlighting lantern assets since the last DfT Appendix A submissions survey in 2010.

The report highlights the massive financial savings and emission reductions that are still to be made. An ongoing investment of £755 million could generate £6.8bn of electricity cost savings and 5 million tonnes of emission savings over the next 25 years if the UK street lighting estate were fully converted to energy efficient LED.

The report provides an accurate picture of the UK's street lights -- how they are operated and controlled; their electricity consumption/carbon footprint and the progress being made by local authorities in adopting LED technology.

We believe it will be useful to all those involved with streetlighting including local authorities, suppliers, manufacturers, as well as support and service providers alike.

DATA COLLECTION

Local Authorities

A detailed collection exercise was undertaken to gather submitted inventory data provided to DNOs (Distribution Network Operators) which is used for calculating local authorities' electricity consumption bills each month.

Inventory information was collected for all 210 County Councils, Metropolitan and London Boroughs (including TfL) and Unitary Authorities across the UK, as well as the four highway agencies in Scotland, England, Wales and Northern Ireland.

The data captured covered the period from March to June 2020 and represents an accurate snapshot in term of the UK's streetlighting estate.

Data Aggregation

The detailed level data was then aggregated into the nine recognized regions of England and these in turn combined to give the national positions for England, Scotland, Wales and Northern Ireland as well as the UK as a whole.

A reconciliation of the data was undertaken with inventory information included within the Highway Electrical Association Yearbook 2019, to identify potential omissions and anomalies and ensure the data included was comprehensive, accurate and robust.

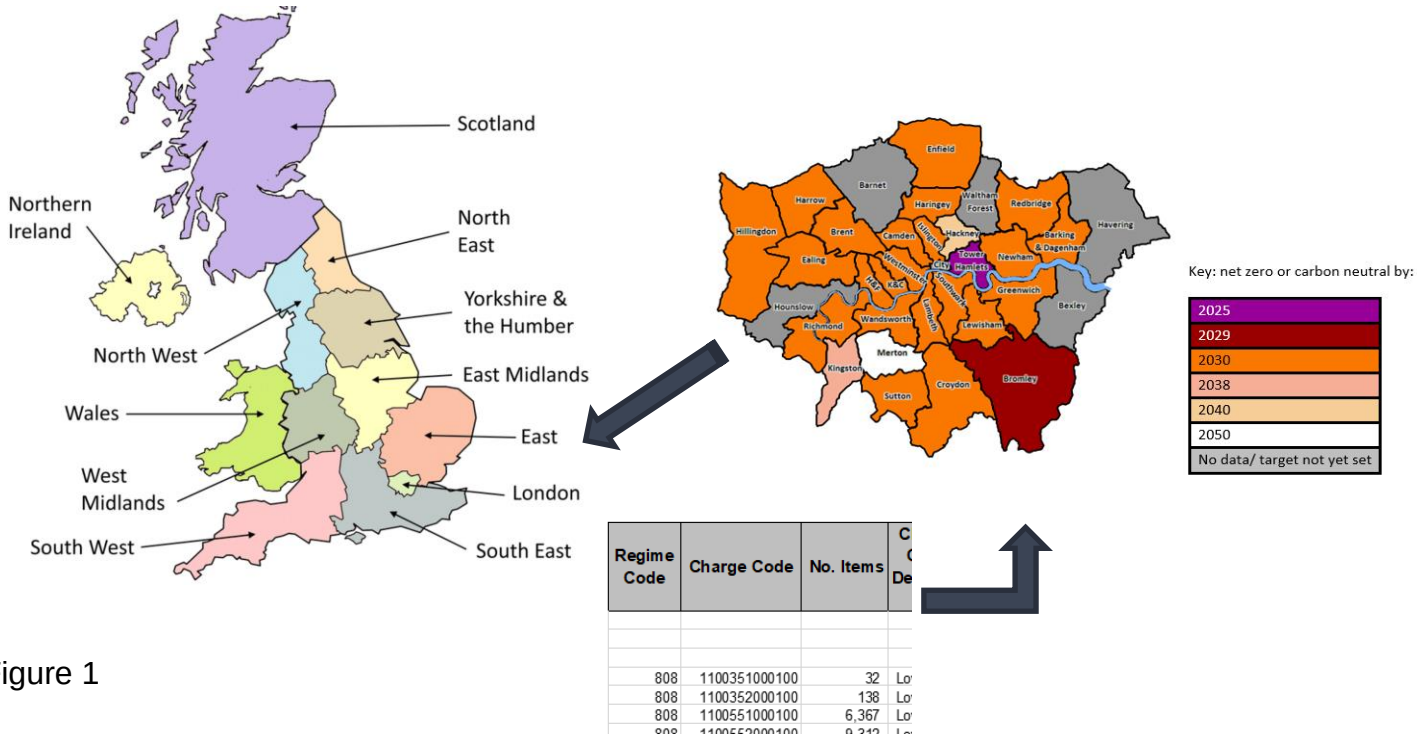
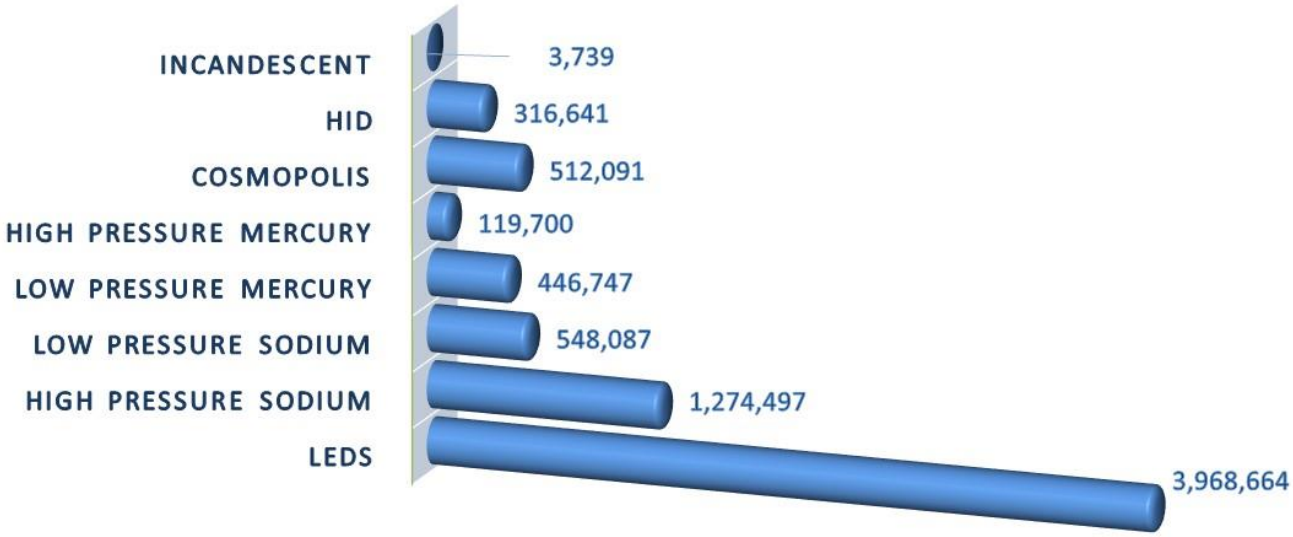


Figure 1

UK LIGHTING ASSETS

The asset profile of the UK's streetlight assets is summarised below, according to the main principle lantern types used in the UK. There are 3.9m LED lanterns, representing almost 55% of lanterns. It is notable that there are still a high percentage of lamps which have either been banned or will soon be banned under legislation or are no longer being manufactured.



	LEDs	High pressure sodium	Low pressure sodium	Low pressure mercury	High pressure mercury	Cosmopolis	HID	Incandescent
UK	3,968,664	1,274,497	548,087	446,747	119,700	512,091	316,641	3,739

7,190,166 streetlights across UK

Number

Of the total lighting, there are 3,968,664 LEDs

Current cost of £302m per annum

Consumption

The current consumption is 1,887GWh per annum compared to 2,620GWh in 2010

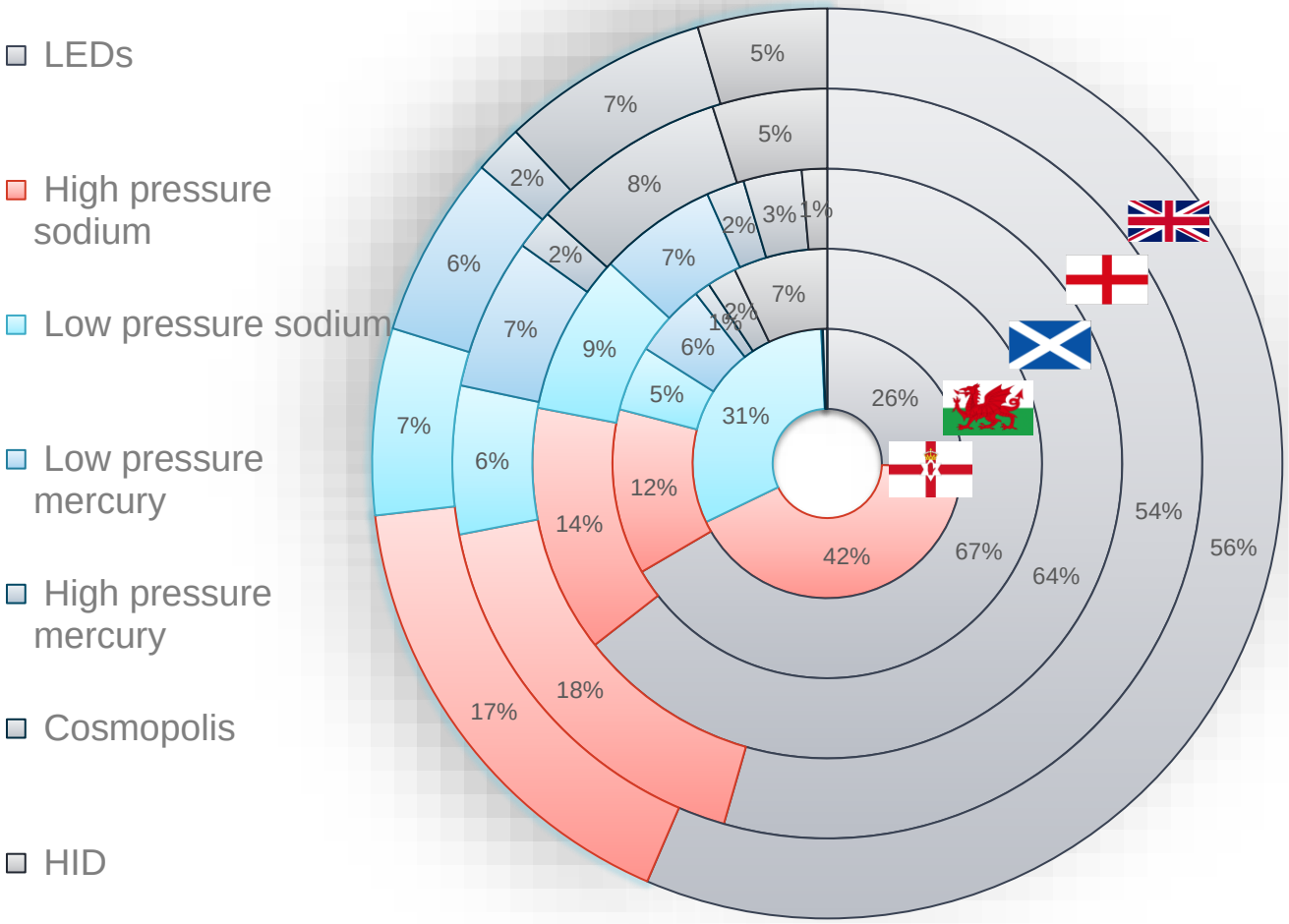
478,000 tonnes per annum

CO_2 Emissions

The emissions are equivalent to replacing 250,000 petrol or diesel cars with electric

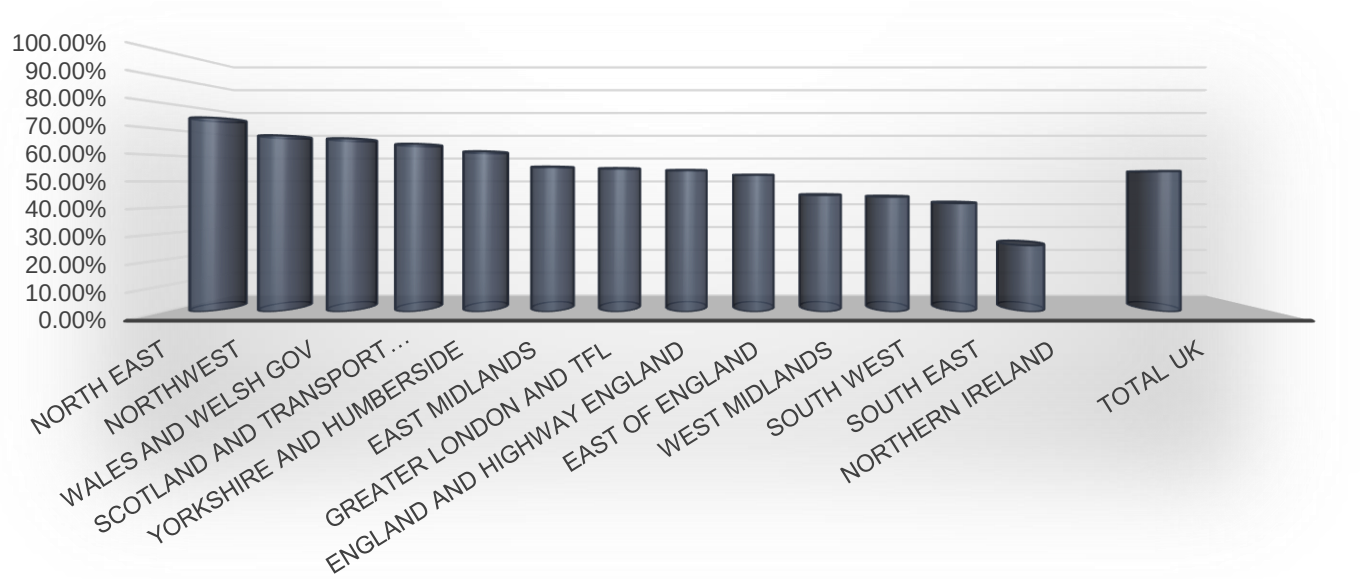
LED Lanterns

The progress in replacing lanterns with LED lanterns across the UK's different nations is quite varied, with Wales leading in converting its national estate to LED equivalents.

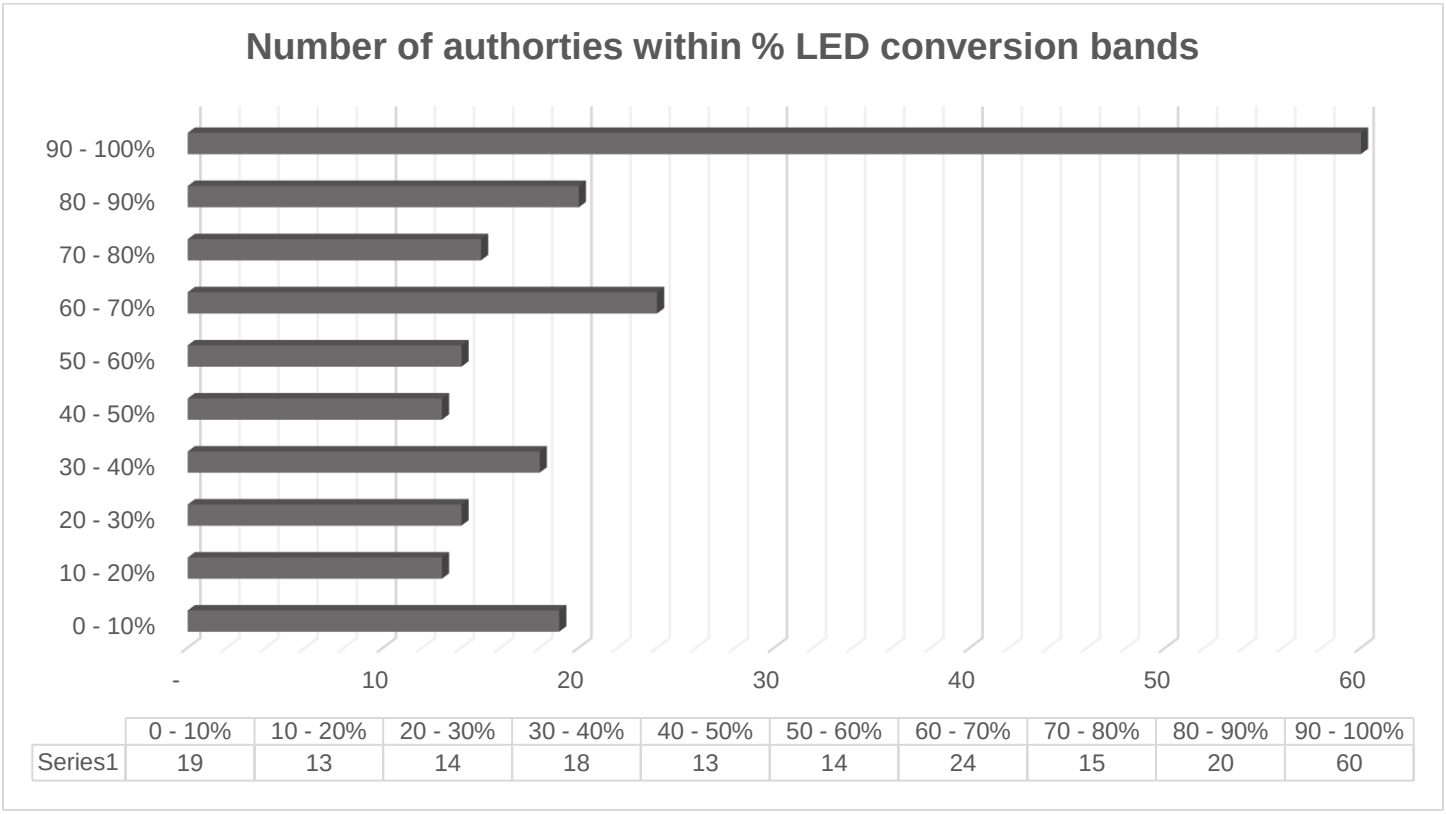


LED Lantern Conversion Progress by Geographical Area

The graph below highlights the wide range of progress being made in the conversion to LEDs across the various UK regions with the North of England having made considerable advances. Using information from the ILP survey in 2019, the conversions rate to LEDs appears to have slowed to less than 200,000 since last year, representing only a 3% LED conversion rate per annum.



A more detailed analysis of the number of authorities falling within stratified 10% LED conversion bands indicates that there are still 46 local authorities with less than 30% and who still have to commence a substantial LED conversion programme, despite 40 of these local authorities declaring a climate change emergency more than 18 month ago.



	0 - 10%	10 - 20%	20 - 30%	30 - 40%	40 - 50%	50 - 60%	60 - 70%	70 - 80%	80 - 90%	90 - 100%
Series1	19	13	14	18	13	14	24	15	20	60

PART NIGHT AND DIMMING

The design requirements in BS 5489 allow road lighting levels to be lowered during periods of low traffic volumes (e.g. early hours of morning) and almost all new LED lanterns are supplied with programable dimming facilities at little or no extra cost. This presents an opportunity for local authorities to optimize their lighting levels.

The analysis of the 5.1m non-CMS streetlights shows that 1.95m operate either with a part night dimming profile or are switched off for a portion of the night (part night). 116 or 55% of Councils across the UK operate a part night policy affecting 362,353 streetlights and 198 (or nearly all) operate some form of part night dimming affecting 1.6m lights.

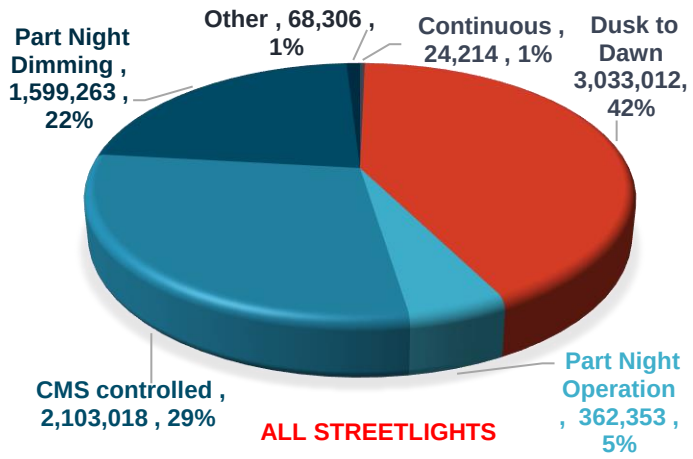
These results differ from the 2019 ILP partial survey which reported only 19% of local authorities ran part-night profiles, with 52% of local authorities running some form of dimming.

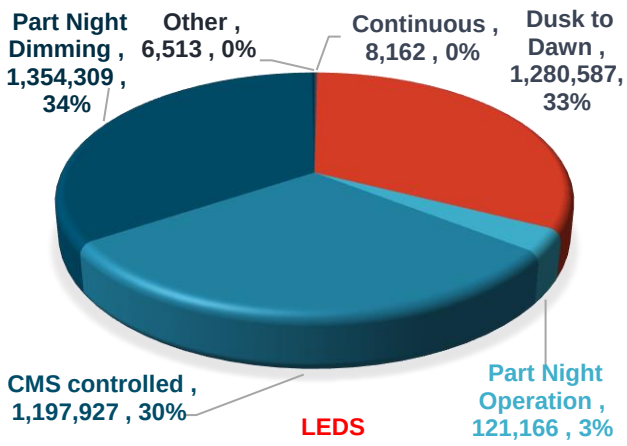
Due to research constraints and the way Central Management Systems (CMS) process operational information for electricity settlement, it was not possible to collect and analysis how the individual 2.1m streetlights controlled by CMS operate.

It is estimated that there are additional savings of c.£30m per annum that could be achieved if all new conversions adopted some form of part night dimming.

A summary of how the UK's streetlights operate is provided below.

Operating Profiles





Analysis of the regime codes for part night operation and part night dimming shows that there is a wide spread of profiles used to manage lantern operation and no specific profile dominates across the UK.

INVESTMENT OPPORTUNITY

With 55% of the UK's Streetlighting inventory being LED lanterns, there are still over 3.2m lanterns that would benefit from replacement to more cost effective, energy efficient and longer lasting LED lanterns.

The UK inventory data was taken and incorporated into the commonly used national streetlighting toolkit developed by Scottish Futures Trust as part of the Scottish Government Street Lighting Energy Efficiency Programme. Appropriate LED equivalent lantern replacements using appropriate lantern and installation costs were used to estimate the investment requirement and corresponding cost and potential CO_2 emission savings.

Other financial benefits include a net present value of £2.3bn for the investment (using a Green Book nominal discount rate of 6.09%), representing an exceptional return of £3.10 for every £1 of capital invested, and an internal rate of return of c.15% post financing costs for the programme.

The UK investment case for converting the LED lantern replacements has a short payback period of 5-6 years. The significant annual electricity saving of £125m along with lower estimated maintenance costs of £60m each year would significantly assist Local Authorities fund much needed street lighting infrastructure replacements such as structurally defective lighting columns and underground cable networks which have reach the end of their asset life.

LED lantern replacement provides a strong value for money proposition for local authorities with an abatement cost of c. £146 / tonne CO_2, and hence a cost-effective and value for money route to generate emission savings compared with other CO_2 reduction projects.

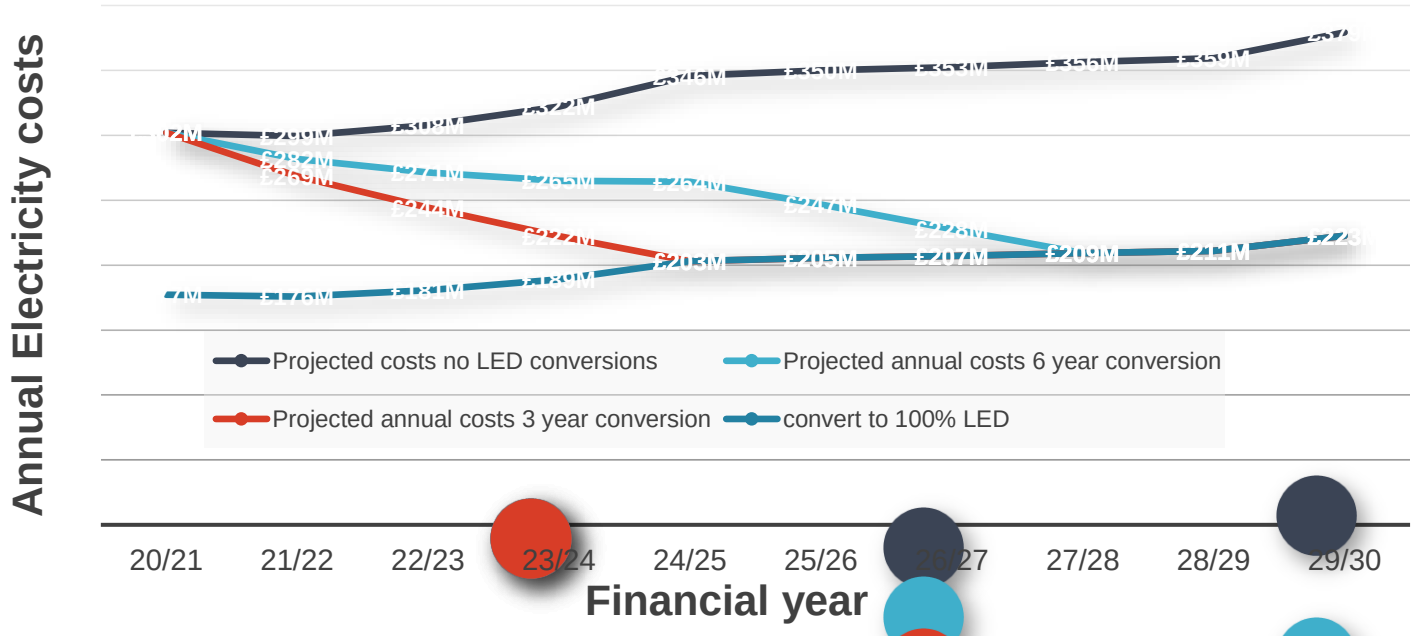
IMPACT OF ACCELERATING INVESTMENT

The graph below shows the existing street lighting annual electricity running costs of £302m. Converting the remaining 3.2m non-LED streetlights overnight would reduce these costs by £125m to £177m.

Using the Department for Business & Industrial Strategy conservative projected increases in electricity costs, annual street lighting electricity costs are expected to rise to £379m by 2030 assuming no further streetlights were converted to LED. Converting the remaining street lighting estate to LED would see this cost reduce to £223m.

Accelerating the rate of conversions from say 6 to 3 years would result in UK Local Authorities sharing in an additional £200m of electricity cost savings over 6 years.

This clearly states the case for accelerating the investment in LEDs, or worse, the forecast cost of not doing so.



CAPTURING THE OPPORTUNITY

There remains a significant opportunity for Local Authorities to capture the benefits of implementing an LED lantern replacement programme, but progress across the UK has been varied.

From our development of numerous business cases and discussions across many local authorities, we have identified some of the key barriers and reasons for lack of progress:

- **Resource constraints within local authorities** - the casualisation, outsourcing and contracting-out of roles and responsibilities, as well as rationalisation of roles through retirement or redundancy has seen the specialist skills of streetlighting engineers disappear from certain local authorities and so removed the awareness of this opportunity, or the skills to hand to deliver it.
- **Lack of full skill set to create and deliver a business case** – development of a business case requires combinations of various skill sets that include financing, technical, design, as well as procurement and again skills gaps can inhibit the creation and delivery of a robust business case.
- **Removal of centrally provided support** –Streetlighting programmes supported by governments in Scotland and England through BEIS and Local Partnerships have largely been removed and this has resulted in fewer projects being developed. For instance, in 2018 Scottish Government removed direct project support and subsequently the rate of annual LED conversions has fallen by 30% with 6 councils not undertaking any conversions and a further 5 with less than 5% conversions annually. No new business cases have been created since this support was withdrawn.

GREEN ECONOMIC RECOVERY

The COVID-19 Pandemic has had a devastating impact on the UK wide economy, and as we approach the end of 2020, there would seem to be no better time to re-invigorate, drive forward and accelerate the replacement of the remaining lanterns in the UK with LED equivalents. It would create a win-win situation for local authorities and their communities.

- Local authorities can make substantial savings on existing budgets, allowing financial resources to be either saved or re-allocated to other critical front-line delivery areas which have either been impacted or require much needed support arising from the Covid pandemic.
- There is a £755m tried and tested capital infrastructure investment opportunity that, if centrally supported with relatively modest resource, could provide very positive signaling to the extended industry supply chain, from manufacturers to designers, as well as installers and other service contractors.
- The impact of COVID in the workplace is uncertain, but streetlighting installation can be very easily and effectively managed to minimize the risk of spreading infection and can support the continuity of businesses and employment for many thousands of people.
- UK Governments as well as local authorities have made statutory commitments to deliver extremely challenging CO2 emission reduction targets and the use of LED lanterns would appear to be an easy opportunity to significantly contribute to these targets.
- As the Internet of Things (‘IoT’) and digital technology begins to transform our communities through ‘Smart Cities’ initiatives, streetlights are a primary asset to facilitate these changes and LED conversion provides a chance to future proof the use of these assets to accommodate future changes.

NEXT STEPS

The data gathered from the survey has allowed us to ascertain a precise position of the nation's electricity consumption and carbon footprint and progress in the conversion to LED. As noted in the Institution of Lighting Professionals June 2019 survey, there is more that can be done to capture additional energy saving initiatives such as dimming and part-night regimes.

Processes and procedures have now been established to capture the UK's streetlighting data, and therefore, regular ongoing surveys would provide useful information on the rate of growth of LED replacements.

District and Parish Council street lighting assets were not included in this research and it would be sensible to consider adding these to future surveys.

It would also be useful to link the data collected with existing road traffic casualty data and street crime to be able to model impact over time of changes to street lighting on the safety of the community at large.

All this information can be usefully employed by the industry to lobby UK and devolved governments to reinvigorate specific streetlighting support initiatives for local authorities in developing and delivering business cases and programmes for converting their remaining estate. Not only would this contribute to a green recovery and carbon emission reductions, but it would also provide useful signalling to the manufacturing and installation markets of future opportunities.

The Department of Business Energy and Industrial Strategy recently launched set up to support their £1bn grant scheme for the decarbonisation of Public Sector Buildings in England. However, the scheme has excluded street lighting projects from being supported by the fund, but it is evident from this report that providing targeted support to Local Authorities is crucial now to support a green recovery and Council's to meet their climate change ambitions.