Lighting the way

Revolutionising Street Lighting Maintenance and Luminary Switchover

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Geo Data Driven Insights

Introduction

They seem like simple structures, but street lighting is vital to public infrastructure. The 56 million street lights across Europe help keep road users and the public safe and secure after sunset. Moreover, street light poles are becoming even more critical in our modern, technology-driven world.

Street lighting companies who own and maintain this infrastructure are critical players in developing modern, energy-efficient street lighting, to meet EU guidelines. In the US and Europe, some are even implementing connected street lighting platforms and using Central Management Systems to improve customer services and meet energy and emission goals within local areas. All of this while improving their bottom line, thanks to lower maintenance costs.

Switching to LED lighting can mean higher installation costs, but LED lights last longer and use between 50-80% less energy, leading to substantial cost and Co^2 reductions in the long term.

Additionally, their presence across all areas of towns and cities makes them ideal for hosting smart city and connectivity technology such as small cells, Electric Vehicles (EV) charge points and air quality sensors. Maintaining them has therefore become even more important.

How can maintenance and upgrades be managed more efficiently?

This eBook explores the importance of street lighting across Europe and the UK, the challenges of improving their use and sustainability, and how technology can help manage the changes. We'll also explore success stories of how utility companies have used technology to transform their street lighting projects while maximising ROI.

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Market view: shining light on safety, sustainability, and public costs

Street lighting has played an essential part in the development of roads, towns, and cities around the world for centuries. Firstly, they help road users and pedestrians see where they're going at night.

Secondly, they deter criminal activities that will otherwise thrive under the cover of darkness, improving public safety and reassuring communities.

However, utility companies, contractors and local governments responsible for installing and maintaining street lighting face substantial environmental and cost challenges. At a time when companies are under budgetary pressure while they are also expected to reduce their environmental impact. These two elements shouldn't be underestimated.

Municipalities that still use old and inefficient lighting systems find that they account for up to half of all their electricity consumption. As a result, switching to LED lighting can help to cut costs by between 50-80% and relieve pressure on night-time energy supplies. The switch also provides more reliable lighting and reduces light pollution and maintenance costs.

According to the European Commission, artificial lighting around the world uses 16.5% of all electricity production.

This means reducing energy consumption of street lights can make a significant difference in the fight to cut carbon emissions and combat climate change.

The new role of Street Lighting

Street lighting is no longer just a way to illuminate roads and paths, it has become a crucial element for deploying smart technologies. That's because the humble street light is already stationed near every home, street, road, and city. Their integrated presence makes them ideal hosts for innovation and smart technologies.

These technologies can include (and are not limited to):

- **Grid communications** that reduce expensive field operations while providing real-time outage notifications
- **Smart metering** for utilities such as water
- **5G small cell deployments**, enabling fast internet connections and communications for everyone within a community, and better delivery of digital public services
- **Internet of Things (IoT)** devices like smart lights, Air sensors, and security cameras, can collect and analyse data on public activity and inform future improvements
- **EV** charge points promote the further rollout of sustainable transportation, especially for people in apartment blocks that don't have private access to charging facilities

According to Sharing Cities, transitioning to smart street lighting across the EU could save taxpayers more than €2 billion a year.

Furthermore, sensors on street lighting that measure traffic levels can help inform drivers and local authorities and ease congestion that costs EU member states €100 billion a year.

Giessen, in Germany, has replaced traditional street lighting with LEDs. The results so far? 370.000 euros saved, 1.000 tons of CO^2 emissions averted, and 1.6 million kilowatt-hours conserved.

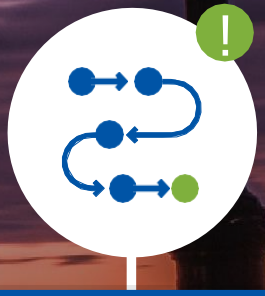
The three key challenges to street lighting transformation

The previous section clarified the benefits of transforming and modernising urban street lighting. But achieving this as efficiently and cost-effectively as possible is easier said than done.

Three challenges stand out:

Data quality

Project efficiency



Manual processes

Data quality

In any transformation project, data is critical. But in a project of this nature and scale, where there are a vast number of street lights to be worked on, understanding each lighting unit's attributes makes all the difference.

Project teams need to know where exactly each unit is, its current condition, the nature of the environment around it, and whether any homes, businesses or other infrastructure might be affected by the work. Of course, this also applies to any new units that need to be installed.

Without reliable georeferenced data and detailed visual insight into the environment of each unit, costly re-work and additional pressure on budgets become more likely.

Project efficiency

There are many different areas in which a street lighting project can be unnecessarily delayed. Good planning at the initial stage is therefore crucial to setting the project off in the right way. Ideally, this involves optimum route planning and cost calculations as early as possible. Based on detailed assessments of the locations involved, the work required, permits needed and any disruption it may cause.

A street lighting transformation project can easily cover many kilometres of the road network and thousands of lighting units. Manually inspecting each existing unit in turn - or the sites of each proposed new unit - can be highly time-consuming, and carbon-heavy. It's also prone to human error, as the work can become repetitive and tiring.

Manual processes

Manual site assessments are often difficult to conduct due to the vast scale and the continued shortage of workers. As a result, projects can suffer substantial delays and spiralling costs.

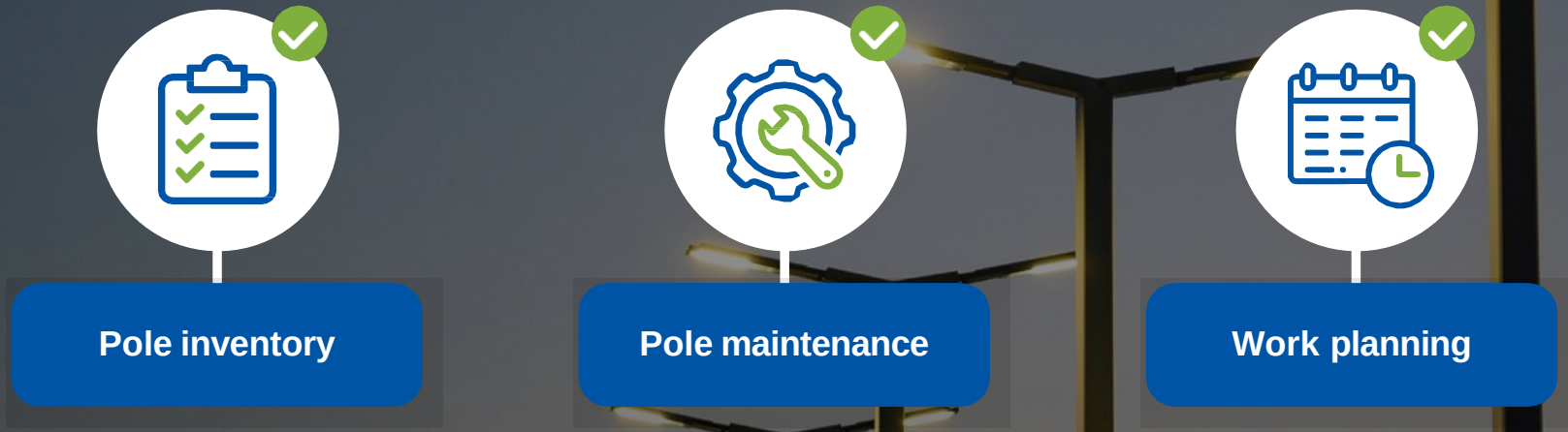
Parallel to this, all projects need to ensure they are conducted in full compliance with all relevant regulations and legislation. These can include (and are not limited to): road closures and traffic diversion, construction safety when conducting the work, electrical safety when connecting to urban infrastructure, and securing all data and information relating to the project.

How technology and innovation enable change faster

Technology is the answer to all three challenges highlighted in the previous section.
In particular, imaging software combined with data and real-world intelligence allows detailed analysis and remote assessment of street lighting locations supplied by vendors like Cyclomedia.

Some solutions combine accurate, 360° street-level images with robust geospatial data and artificial intelligence. This level of insight makes it possible to automatically detect and classify assets while remotely verifying the location and condition of existing lights or proposed sites for new units. All in a matter of minutes.
The same principles can be applied to identify maintenance issues so teams can resolve any problems before they become critical and therefore cause unnecessary disruption and expense.

There are three specific areas where this technology like this makes the most significant difference:



Pole inventory

An image-based solution makes it faster and easier for project planners to answer vital questions around each pole or site they need to work on. For example, they can check the height of each pole; their type and specification; the type of lighting installed; their location in relation to the road, pavement, or other street furniture; and the presence of any equipment already attached to them.

This up-to-date information can help create or update asset management records, which can then be used to plan and budget works with the highest possible accuracy. Furthermore, it means the amount of time, money and skilled workers required for this assessment process can be reduced drastically. This is because there is no longer any need for staff to travel and assess poles in person.

With Cyclomedia, unproductive travel times are eliminated, time for the documentation of on-site appointments is not required and, in addition, you are also doing something for the environment.

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Pole maintenance

The imagery and data within remote imaging solutions are constantly updated. The recency and accuracy give users the clearest, fullest, and most current information regarding the pole's location and condition. It also gives teams the ability to compare current with historic data points. All of which are instrumental in aiding the timely and cost-effective maintenance of poles.

The up-to-date imagery allows visual inspections to occur virtually, including assessing the structure's health and any lean or angle it may have developed over time. Similarly, it's also possible to monitor the progressive encroachment of any vegetation in the area and assess how this may affect the function and viability of poles over the years.

The result is the ability to implement cost-effective preventative maintenance by detecting any problems, ground movement or deterioration early and resolving any issues before they have any impact.

Works planning

Imaging data can play a leading role in the accurate, timely preparations of high-level project designs. These project designs can include luminary replacements, vegetation cuts, replacement routes, and requirements for equipment and access.

Of course, the best solution integrates with your existing design tools to make the process even easier. For example, accurate street-level images and LiDAR point clouds enable the identification of sites, route optimisation and risk management.

The result is the removal of in-person site surveys, a reduction in the number of meetings required to formulate work plans, and considerable savings in travel time throughout the project. All this contributes to a planning process that is far faster, smoother, and cost-effective. Ultimately requiring a smaller level of human resources.

Success stories of tech-led street utility projects

Across Europe and beyond, utility businesses and local authorities are already using remote imaging technology to transform their street lighting improvement works:

How Giessen, Germany used technology to speed up the change to LED street lights

Giessen in Germany has replaced traditional street lighting with LEDs to reduce CO^2 emissions. The first step was to determine the number of street lights. Then, panoramic images provided information about the exact location, the type of street light, and the direct surroundings, which were added to the database of assets.

At the time of writing, 4.000 lights in Giessen have already been converted to LED technology, with the remaining street lights scheduled for replacement. What were the initial results? 370.000 euros saved, 1.000 tons of CO^2 emissions averted, and 1.6 million kilowatt-hours conserved.

Inventory and condition analysis

Utility providers continuously invest in technologies to ensure greater performance and reliability while enabling digital transformation. One critical component of a digital transformation programme is high-quality, accurate network asset data. However, most network operators struggle to keep their infrastructure inventory up-to-date with poles and equipment spanning long distances while undergoing constant upgrades and maintenance. Sending teams out into the field to collect and inventory data is costly, both in time and money and can create additional risks for field personnel.

Cyclomedia has developed a solution that combines the world's most accurate georeferenced 360° images with LiDAR point clouds and artificial intelligence to help network operators tackle large-scale, network-wide asset inventory projects much faster and without the need for site visits. The insights derived from an accurate and complete asset inventory are proven to help organisations make data-driven decisions that enable proactive maintenance and allow faster time to market.

On street EV charge point selection

EV charge point installation is a top priority worldwide, creating unique challenges, especially when selecting the best installation sites at pace.

Charge points can, of course, also be integrated into street lighting. So, understanding where the poles and existing power sources are located, their height, material and orientation, together with the location of public parking and housing types, can be a time-consuming process often prone to human error.

But with the help of accurate data and reliable technology, site selection can be made much faster.

Charge point providers can remotly review poles, parking areas and surronding infrastrucutre, before making a site selection.

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About Cyclomedia

Cyclomedia captures geospatial data from the real world and transforms it into valuable insights, enabling you to understand the complexities of the environment around you.

We collect and provide the world's most accurate 360° street-level visualisations, enhanced by innovative AI-powered analytics.
That way, we can deliver actionable insights that you can use today to build a better tomorrow.

Find out more on our technology at
www.cyclomedia.com

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