Retrofitting smart street lighting: a unique challenge for cities

Cities everywhere are racing toward smarter, greener, more efficient public services - and street lighting is often the first major step.

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BRASOV, ROMANIA, May 21, 2025 /EINPresswire.com/ -- Upgrading traditional lighting infrastructure can be complex. For many cities, the thought of major civil works, visible add-ons, or changing the historical or architectural look of their streets is a major concern.

And when older LED streetlamps are already in place, there's a common question: can we still adopt smart street lighting without replacing everything? Retrofitting becomes essential here - upgrading existing infrastructure to make it smart, without unnecessary costs or disruption.

The retrofitting challenge: balancing innovation and urban aesthetics

Unlike new developments, retrofitting demands a balance between innovation and preservation, a task often underestimated during early project planning.

Upgrading legacy street lighting presents several challenges:

- Infrastructure limitations, such as non-standard luminaires without NEMA or Zhaga interfaces
- Architectural preservation requirements in historic city centers
- Budget constraints, demanding cost-effective and low-disruption installations
- Varied lighting types across different areas of the city.

Pole-mounted smart controllers: a practical approach

Unlike standardized external nodes, pole-mounted controllers are designed to be installed inside the lighting pole or embedded directly into the luminaire during manufacturing.

This method provides several benefits:

- Minimal visual impact, preserving the aesthetic of the street environment,
- Simplified installation, reducing the need for pole replacements or disruptive works,
- Compatibility with a wide variety of pole designs, including older or customized models,
- IP66 rating, ensuring the controller can withstand dust, heavy rain, and harsh outdoor conditions for long-term reliability and reduced maintenance needs.

Pole-mounted controllers enable cities to pursue smart lighting strategies without compromising architectural integrity, a critical factor for areas where maintaining historical charm is as important as achieving technological progress.

inteliLIGHT pole-mounted controllers

Upgrading existing street lighting systems to smart infrastructure often encounters challenges related to pole and luminaire design, connectivity, and visual impact. Recognizing these real-world constraints, Flashnet developed its inteliLIGHT pole-mounted, a solution specifically intended to simplify smart lighting deployments without extensive modifications to the existing infrastructure.

Rather than requiring standardized connectors (such as NEMA or Zhaga), Flashnet's pole mounted controllers are designed for maximum installation flexibility. Their compact dimensions allow them to fit inside the body of most traditional lighting poles, making upgrades possible even when infrastructure is decades old or highly customized.

Alternatively, the controllers can be embedded directly into luminaires during manufacturing, allowing lighting manufacturers to deliver fully smart-ready fixtures without changing the external appearance.

Several key design aspects make the inteliLIGHT pole mounted controllers suited for retrofit projects:

- Compact form factor, ensuring compatibility with a wide range of pole types and minimizing visual impact,
- IP66-rated environmental protection, enabling reliable operation under demanding outdoor conditions,
- Support for multiple LPWAN communication technologies (LoRaWAN™, NB-IoT, LTE-M), offering flexibility for diverse urban connectivity strategies,
- Edge computing capabilities, allowing local execution of schedules and commands even during

temporary network outages.

Flashnet's solution aligns with the broader need for non-intrusive modernization: upgrades can be completed without external attachments, without replacing poles and without requiring major civil works. This dramatically lowers the barriers to deployment - in terms of cost, regulatory approval and project disruption - compared to more visible or invasive alternatives.

Who benefits the most from pole-mounted smart controllers?

Pole-mounted smart controllers are an ideal fit for:

- Historic urban centers aiming to protect their architectural aesthetics
- Cities with diverse lighting infrastructures requiring a versatile retrofit solution
- Municipalities with budget-conscious projects, seeking to minimize civil works and installation disruptions
- Lighting manufacturers, integrating controllers directly into luminaires to offer smart-ready products.

In projects where a balance between innovation, speed and visual discretion is critical, pole-mounted controllers offer a practical pathway toward smart lighting transformation.

Real-world examples: cities adopting pole-mounted smart lighting

Several smart city projects have already demonstrated the real-world value of Flashnet's discreet, pole-mounted controller approach:

Cyprus: smart lighting as part of a national infrastructure strategy

Cyprus is embracing smart lighting not just as a way to modernize urban infrastructure, but as a cornerstone for a more integrated and sustainable future. In a nationwide project led by CYTA and the Electricity Authority of Cyprus (EAC), over 32,000 inteliLIGHT® pole-mounted controllers (FRE-220-P-NB1-GSM) are being deployed across the island.

The controllers, connected via NB-IoT and 2G networks, are managed through the inteliLIGHT CMS and hosted locally in EAC's datacenters. What makes this project stand out is the system's ability to go beyond street lighting, by enabling real-time control of photovoltaic panels, storage heating, water pumps and other loads. This not only ensures a faster response to energy fluctuations but positions street lighting infrastructure as the backbone of a broader smart grid strategy.

Greece: Smart highway lighting upgrade with inteliLIGHT® pole-mounted controllers

Together with partner Sirecled, we brought smart lighting to one of Greece's most important infrastructures: the Athens–Thessaloniki Highway.

Over 4,300 LED street lighting fixtures, equipped with inteliLIGHT® pole-mounted controllers, were deployed along more than 300 km of roadway. By using the LoRaWAN® communication technology, managed through the inteliLIGHT® Streetlight Control Software, the project provides remote monitoring, segment-level control and real-time failure alerts, crucial for a highway stretched across varied and remote terrains.

This large-scale deployment shows how pole-mounted controllers and private LoRaWAN® networks can deliver reliable, energy-efficient and cost-effective smart lighting even across challenging environments.

The port of Casablanca: Smart lighting for industrial efficiency

In Casablanca, Morocco's largest port, Flashnet and partner Optimum Light are implementing a smart lighting upgrade tailored to the port's demanding operational needs. As part of the project, 1,174 pole-mounted were installed, enabling autonomous operation and real-time control via NB-IoT communication.

The port, after a major transition to LED lighting, chose inteliLIGHT® for its ability to adapt to specific high-power lighting requirements (950W fixtures) and provide detailed electrical measurements. Through dynamic dimming and remote control, the system not only optimizes energy consumption and reduces the carbon footprint but also improves visibility and safety in key operational areas, like the port's rail tracks and container zones.

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