

Better light, lower energy, **pathway to smart city**

Interconnected applications use open systems to unlock value for citizens

The situation

Los Angeles has always dared to try new things. The city has pioneered the use of digital, connected lighting by converting 140,000 of its 215,000 street lights to LED, and intelligently monitoring and managing 110,000 of them with the Philips CityTouch connected lighting management system. Together, these innovations have reduced the city's energy usage for street lighting by over 63%, saving at least US\$9.5 million annually in operational and maintenance costs.

The promise

As impressive as these results are, they're only the beginning. Together with Philips Lighting, Los Angeles is shaping

the future by exploring new smart city applications that build on the connected lighting infrastructure to realize additional value beyond illumination. The ability to add new applications and data streams to the digital ecosystem demonstrates the power of open systems. Smart city infrastructures that employ an open systems approach use defined interfaces and de facto standards to integrate a wide range of smart devices, gathering and analyzing data from them to support new initiatives.

The pilots

Philips Lighting created a pilot program that uses an open systems approach to leverage the city's connected street lighting infrastructure:

- Lighting power grid monitoring uses the connectivity offered by CityTouch to allow the public lighting department to continuously assess the quality of the lighting network's power supply.

- Environmental noise monitoring uses an acoustic noise sensor (microphone) that builds on the smart city ecosystem, including the CityTouch connector nodes already deployed throughout Los Angeles. Now the Bureau of Street Lighting can actively monitor sound levels on the street to understand activity levels, check compliance with regulations, and support the well-being of citizens.

“There is a lot more that can be achieved using the street lighting infrastructure, in addition to providing lighting for the citizens.”

Ed Ebrahimian, Director,
Bureau of Street Lighting,
City of Los Angeles



Key smart city value spaces:

- Public safety
- Environmental sensing
- Long-term planning decisions
- Traffic monitoring
- Citywide connectivity

Lighting power grid monitoring

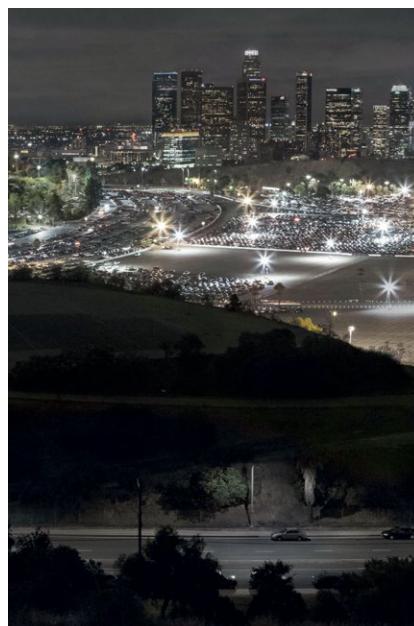
Network complexity, increasing power demand, and lack of effective fault monitoring increase the risk of power grid issues. Light poles equipped with CityTouch connector nodes and additional equipment acquire key power quality parameters continuously and at an unprecedented scale, supporting the Bureau of Street Lighting to assess the quality of the power supply to its lighting network. Exposing this data to other city departments and utilities will enable grid managers to be quickly informed of outages. In this way, faults can be restored faster, benefiting both residents and local businesses. In addition, tracking power quality over a luminaire's lifetime alerts street lighting managers about upcoming maintenance needs, making planning more efficient and lowering operational costs.



Environmental noise monitoring

Raucous neighbors, loud music, and heavy traffic: noise nuisance ranks among the most common citizen complaints in cities. But excessive noise is more than an inconvenience. Scientists, including researchers at the World Health Institute, identify noise pollution as a leading environmental cause of serious health problems, second only to poor air quality.

The city of Los Angeles is leveraging their connected street lighting infrastructure to actively monitor and manage noise levels on the streets. Using existing connected street lights, the city has installed microphones to collect noise data at the street level. Visualization software creates realtime and historical timelines using this data, along with map and list views of code violations and alerts. Such visualizations help the city to maintain code compliance, assess urban policy, and respond adequately to noise complaints. Sharing noise data with the public raises awareness about noise pollution and provides quantitative evidence for the city's mitigation efforts



What's next?

The lighting power grid and noise monitoring pilots in Los Angeles are two examples of how cities can leverage open systems and the connected street lighting infrastructure to acquire more data about operations, both of the lighting grid and beyond. Since the data is available via the cloud, the city can visualize insights rapidly and facilitate additional dialog with internal and external domain experts. Philips Lighting is exploring many additional value spaces that leverage ubiquitous connected public lighting systems to yield new information and insights. With an open systems approach, cities like Los Angeles can add sensors and other smart devices to the public lighting infrastructure, creating a rich conduit for data that can support high-level decision making, city leadership, and quality of life for the people who live there.

The smart city ecosystem:

Front end

- Modular digital lighting infrastructure
- Sensors on street lights using standard sockets
- Connectivity via CityTouch connector node
- Edge intelligence

Back end

- Cloud-based intelligence
- Visualization software for better decision making with data
- Software dashboards/data analytics for actionable insights
- Application partners augment with additional data sources

“To be successful in the smart city ecosystem, partnering is essential. We’re teaming up with industry leaders, startups, and centers of academic excellence to combine capabilities and competencies, and deliver the most value to our customers.”

Remco Muijs, Senior Research Scientist
Philips Lighting

