How Smart Lamps Improve City-wide Efficiency

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Urban energy efficiency may soon receive a boost from the development of smart lamps that are capable of responding intelligently to environmental and traffic conditions by means of sensors.

Reducing energy consumption by replacing conventional light bulbs with more economic technology, such as LED lamps, has already become a well-known and commonplace means of improving the efficiency levels of built environments.

The development of sensor-equipped smart lamps is the next stage in illumination efficiency, marking a major advance beyond merely cutting down on bulb energy consumption by conferring lighting devices with the ability to respond automatically to environmental conditions.

Albertslund, an industrial suburb situated in the Danish capital of Copenhagen, is a leading example of new initiatives to raise urban energy efficiency via the creation of intelligent lighting systems.

The Danish Outdoor Lighting Lab (DOLL) initiative has seen a total of over 20 different developers install their own smart lamp products along a 9.2-kilometre stretch of road in Alberslund, covering an area of approximately 1.5 square kilometres, in order to provide a concentrated testing ground for their performance in real world conditions.

Some of the smart lamps, such as those developed by Dutch company Tvilight, can adjust their intensity in response to nearby movement and become brighter as pedestrians approach them, while others go on the wane while daylight levels are still sufficient.

Other lamps, such as the CopenHybrid developed by the Technical University, are capable of powering themselves independently of the grid by using a mix of solar and wind energy.

DOLL's managers have described the project as a "huge urban playground" which will provide developers and engineers with ample opportunity to experiment with a broad range of pioneering technologies, as well as permit urban planners from abroad to see smart lamps in action.

Copenhagen is far from the only major urban centre to adopt smart lighting systems in a bid to improve city-wide energy efficiency. Barcelona's Smart City programme saw the development of a master plan

in 2012 for a smart lighting system that includes the remote control of 50 per cent of Barcelona's lighting power, as well as the conversion of 1,155 lamp posts on a total of 50 streets to LED technology.

San Diego in California, Phoenix in Arizona and the Hungarian capital of Budapest have all installed smart LED street lamps that are capable of adjusting their intensity automatically in response to environmental conditions.

These initiatives have proved to be of major benefit for municipal budgets, with the popular Hungarian resort town of Balatonfured slashing energy costs by more than half via the replacement of conventional, fixed-intensity street lights with smart lamps.

In addition to reducing lighting-related energy consumption levels, smart lamps could also play a critical role in the creation of the much-vaunted "smart city," given the ubiquity of the fixtures in urban environments and their unique dimensions, which make them ideal points for the collection of environmental data.

The sensors installed on smart lamps in Albertslund, for example, gather data on traffic density, air quality and noise pollution levels, in addition to information on weather conditions and solar radiation. These enormous

batches of data can subsequently be analysed and used by urban planners to improve efficiency in other key areas, such as traffic and transportation.

"We have computation power that is unprecedented," said Agostino Renna, president and CEO of GE Lighting for Europe, Middle East and Africa. "By virtue of software and analytics, you're able to take reams and reams of data, extract from that data insight and transform that data into action - whether that's automated action or action drive by people that in turn drives productivity."