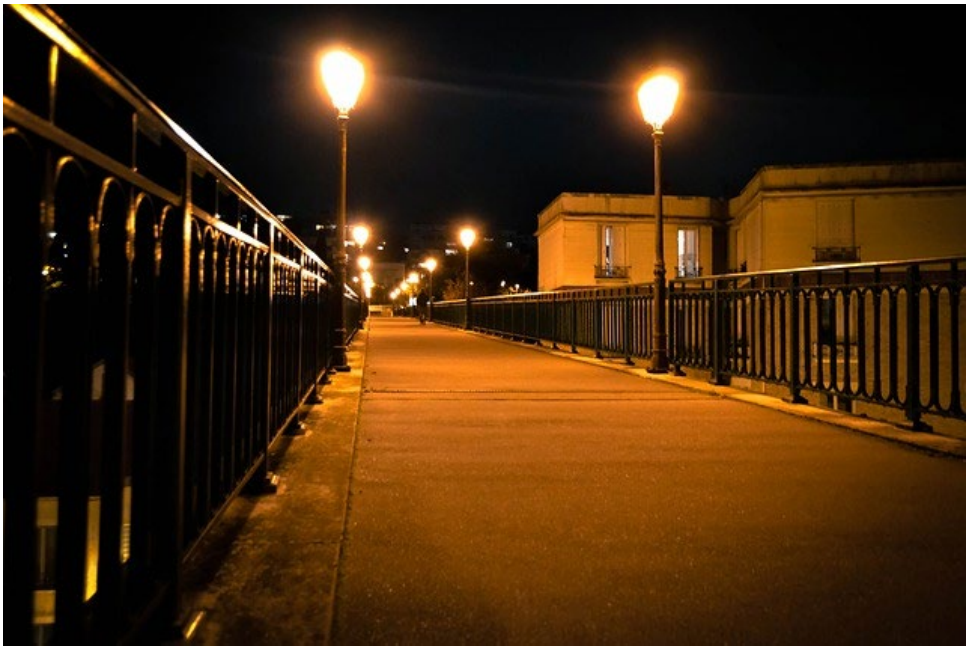
GrowSmarter
Transforming cities for a smart, sustainable Europe

FACTSHEET

Smart outdoor lighting

PART OF SMART SOLUTION 5: SMART LIGHTING, LAMPOSTS AND TRAFFIC POSTS AS HUBS FOR COMMUNICATIONS



- Real time feedback reduces downtime and cuts maintenance costs
- Major energy savings without reduced traffic safety and comfort
- Less light pollution at times or in areas with low traffic-intensity

INTEGRATED
INFRASTRUCTURES

Stockholm

Partners involved:

- City of Stockholm
- SilverSpring Networks

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What is the solution?

The lighting installation calibrates itself for potential energy and cost savings by using a modern control system that allows adaptable dimming curves and real time feedback for maintenance. **Three** different solutions are tested for comparison:

1. Standalone system with automatic dimming during 6 hours of the night,

2. Adjustable dimming curve set in a Central Management System (CMS),

3. Presence detection system which raise the lighting levels for a number of lamps on detection.

One aspect of the investigation is to test different manufacturers, technologies and CMS in the same system, which previously has been difficult due to proprietary issues.

How does it work?

Three models of investigation for energy consumption are in use:

1. Each individual light fitting records when it is turned on and off and uses those times to calculate the middle point. From that middle point, the effect islowered to 66% for a duration of 6 hours, or until it is turned off.

2. All lamps are connected to a Central Management System where a dimming schedule is run. In the dimming schedule, lighting levels are set according to sunset/sunrise and specific times during the night.

The lighting is turned on at sunset to 100%, at 10 PM it is dimmed to 67%, at 1 AM it is dimmed to 50%, at 5 AM it dims up to 67% again, at 6 AM to 100% and it is turned off again at sunrise. Dim steps are equal to changing one lighting class in the road safety standard.
This solution requires a constant power feed, which is not custom for a lighting installation that usually breaks the power supply during daylight hours.

Also, the CMS communicates with two different technologies; one group of light fittings are connected to a Mesh net while the other group is using powerline communication.

3. A bicycle lane or pedestrian street might have several hours without usage. During that time the lighting is dimmed to 40%.

When a person is approaching the street a sensor reacts and dims up the lighting to 100% on the detecting lamp and three luminaries ahead. After a pre-set interval the lighting is dimmed down to 40% again.

Business model used

The standalone and presence detection installations are purchased and owned by the city. The CMS and its connected gateway and light fittings are leased

through the company which owns the CMS software and communication hardware. The lease is a price/unit/year model.

Expected Impact

There are potentially several positive impacts from investigating smart lighting systems. Similar tests on presence detection for pedestrian streets have shown an energy reduction on about 50%.

The comparison between the CMS and the standalone solutions is expected to show that a smarter dimming profile can further reduce energy consumption at the same time as it better supports the citizen's needs. One of the key questions to discuss is whether or not the increased complexity and material costs is motivated by the energy savings and future potential of such a system?

For future implementation of a smart city lighting system it is expected that the GrowSmarter project will raise and solve several questions and concerns regarding usage of several proprietary systems within a single overall CMS.

Potential for replication

The potential for replication is high. With the support of the system provider, consultants and contractors this investigation would be reasonably easy to replicate.

However, there are several technologies available on the market today and for a test like this to be useful some strategic goals should be set. For example, which communication technologies are feasible in this specific area? Are we considering adding functionality in the future, Internet of Things capabilities for example?

There are a few specific competences which are useful in investigating a system like this: lighting management, software/CMS design, hardware, data communication and security. It is also important to consider the maintenance contractors' capabilities in maintaining a smart system.