Smart street lighting

Smart solution 5
Smart lighting, lampposts and traffic posts as hubs for communication

Measured impacts

31%
reduction in CO_2 emissions

21%
reduction in CO_2 emissions

25%
reduction in CO_2 emissions

Stockholm

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What is it?

Smart street lighting aims to deploy the most successful technology(-ies) for controlling a city´s lighting program in order to provide optimal lighting for residents while still lowering the energy usage and CO_2 emissions.

What did GrowSmarter do?

Three approaches to smart street lighting were tested:

Motion sensor controlled LED lighting for pedestrian and bicycle paths to enable the lights to provide more light (100% and three lamps ahead when someone approaches). If there was no activity in the area, the light level automatically returned to an optimized minimum of 40%.

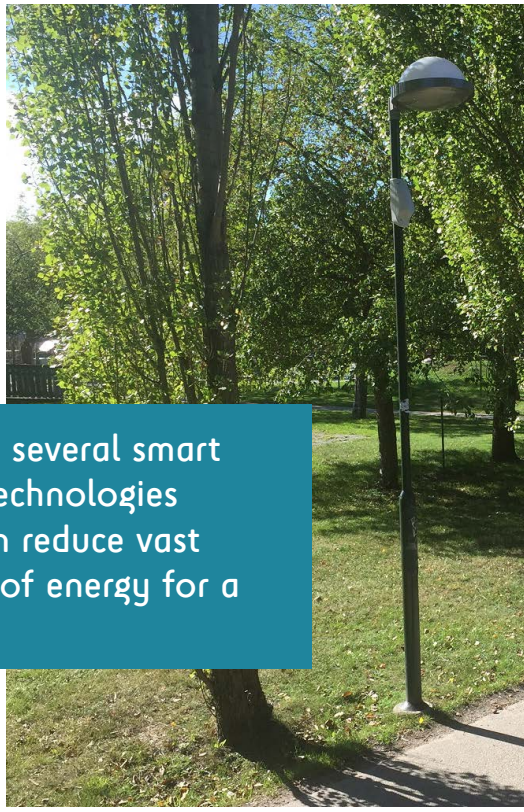
Self-controlled LED street lighting dimming down in the later phase of the night. Each individual light fitting recorded when it was turned on and off and used those times to calculate the middle point. From this point, light was lowered to 66% for 6 hours, or until it was turned off.

Remotely controlled LED street lighting set at different light-levels throughout the night. At sunset, lighting was on at 100%, at 10 PM at 67%, at 1 AM at 50%, at 5 AM at 67% again, at 6 AM to 100% before turning off at sunrise. This solution requires a constant power feed, which is unusual for a lighting installation that normally breaks the power supply during daylight hours.

Stakeholders for this measure are the citizens, the city traffic department and contractors. The city of Stockholm tested the different technologies in the project period at lampposts where light dimming could potentially allow for energy savings.

The three technologies delivered energy savings of varying size:

- The sensor controlled LED lighting resulted in up to 31% savings.
- The self-controlled LED street lighting provided up to 21% savings.
- The remotely controlled LED street lighting delivered up to 25% savings.



There are several smart lighting technologies which can reduce vast amounts of energy for a city.

Lessons learnt

The reliability of the data is not always guaranteed. Standardization in various ways could help speed up permitting or reduce the prices for material. It is important to evaluate whether to choose a small or large pilot area (or mock-up) for manageable implementation. The feeling of safety is important when establishing the level of light that satisfies pedestrians. Maintenance of these smart street lights could become more challenging with evolving technologies. This measure could potentially offer many job opportunities.

Upscaling & replication potential

Street lighting is generic to all cities and the technical feasibility is very good since all European cities have similar amounts of hours requiring street lighting when viewed on a yearly basis.

How did the measure work?

Technical feasibility

The measure is technically feasible. Maintenance will become increasingly challenging as technology evolves fast. Standardization may help with the implementation.

Economic feasibility

Due to the very low electricity prices in Sweden the solutions are not economically sustainable and have long pay-back times. The solutions would be economically feasible in countries with higher electricity prices or with lower prices for hardware and deployment costs. Furthermore, it could also be socially desirable if we take into account the increase in quality of life through perception of greater safety.

Replication potential

This measure is possible to replicate in cities with similar infrastructure requirements & conversion potential within the lamp posts.

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