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TECHNOLOGY NEWS 6 August 2014

Massive smart light lab tests tech to slash emissions

Copenhagen is the site for a huge experiment in smart lighting that could save money, cut carbon emissions and even alert police to suspicious activity



You light up my life

(Image: Thierry Ardouin/Tendance Floue)

HUNDREDS of lights are being erected in a Danish industrial park in a suburb of Copenhagen. When ordinary citizens pass through the area, they'll be taking part in a massive experiment to work out how we should light our cities in the future.

Street lamps can be a major drain on resources: lighting accounts for around 6 per cent of global greenhouse emissions. In 2009, for example, Los Angeles spent around \$15 million and pumped out 111,000 tonnes of carbon to light up its streets. No wonder councils want to find ways of making lighting smarter and more efficient.

To test all the options, Copenhagen is setting up the Danish Outdoor Lighting Lab (DOLL) in a suburb called Albertslund, which will open to the public on 18 September. There, engineers will have freedom to toy with the different products, while foreign officials who are curious about the technology can comparison-shop for their hometown. DOLL is also part of a long vision for Copenhagen itself: the city hopes to install smart lights as part of a quest to become carbon-neutral by 2025, and one of the lights exhibited at the lighting lab will probably be chosen for the job.

The street lamps will be installed along 9.2 kilometres of road in Albertslund, covering about 1.5 square kilometres in total. So far, 25 companies have reserved space for their products in parcels of land 300 metres square. Every lamp will be assigned a separate IP address so they can be monitored remotely. The city will be testing smart lamps that dim if it is sunny, brighten if a few people pass by at night, or automatically alert the city when something isn't working.

For example, Dutch firm Tvilight will be testing street lamps that can adjust their brightness based on nearby movement. And the Technical University of Denmark will be trying the CopenHybrid – a mast that powers a street lamp by a combination of wind and solar energy.

Sensors that track traffic density, air quality, noise, weather conditions and UV radiation will also be fitted throughout the site to see what sort of environment the lights are operating in. All this will help work out which lights are making the biggest difference in terms of lowering costs and emissions.

Several cities around the world are already investigating smart street lighting. Last year, in the biggest project of its kind to date, Los Angeles swapped its entire system for LED lamps – along with a pilot remote control system made by General Electric. The Spanish city of Barcelona, too, is rolling out lights that can detect motion and weather conditions. DOLL wants to encourage more cities to make the change by demonstrating what different types of lamps can do.

“You can say that we are an instrument of the green transition,” says Flemming Madsen, who is managing the project at DOLL.

Visitors will be able to run tests on the system by using sample data from their own city. Madsen says they are already planning for a visit from Chinese and Taiwanese officials later this year. “We have a huge urban playground,” he says.

In the future, DOLL hopes to incorporate other types of [smart city services](#) into their living lab. The same network that monitors miles of lighting can be configured to manage parking spaces or water meters.

“People don’t want to solve one issue and then having to do a major investment again to solve the next issue and the next and the next,” says John Baekelmans of Cisco, a project partner. “There is a variety of technologies which you need to tie together in a way to make it a seamless experience.”

Fitting street lamps with complex sensors – and hooking them up to a larger network that controls the city will have implications far outside of lighting, says Robert Karlicek, director of the Smart Lighting Engineering Research Center at Rensselaer Polytechnic Institute in New York. If a street lamp senses a sudden rush of people in an area that’s usually deserted at night, police could be tipped off to go check the area out.

“Really smart street light systems are going to be much more about the sensors the street lights have, than the LEDs that happen to be in them. The technology is getting very mature very quickly,” Karlicek says.

This article appeared in print under the headline “Bright lights, smart city”

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Magazine issue 2981 published 9 August 2014