

Illuminating cities with sustainable smart lighting systems

Lights that switch off automatically when streets are empty and allow city residents to create their own mood lighting

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Imagine a city centre where street lights are not only smart, turning themselves off when nobody is there, but also provide atmosphere, changing colour according to residents' preferences. That city already exists (almost). On Friday, Dutch city Eindhoven will introduce a city-lighting system that's both sustainable and fun.

"We want to make Eindhoven as comfortable as possible for every resident", says the city's lighting project manager Rik van Stiphout. "We're still investing in regular lighting as well, but our new LED lighting system can be controlled by computers, which means that each streetlight can be controlled individually."

That means that a street lantern can switch on and off depending on how busy the street is: if nobody is there, they dim, but as soon as a car, bike or pedestrian approaches, they turn themselves on and accompany the vehicle or person on his way. "They can even remember your regular walks", explains van Stiphout. "For example, if you have a regular walk with your dog, the lights will even guide you."

LED street lights, already in use in several dozen cities around the world, though in a less innovative fashion than in Eindhoven, save energy costs compared to regular street lights, though the up-front cost is more expensive. Of course, having street lights that automatically switch themselves off when the street is empty further reduces costs and CO2 emissions.

Tvilight, a startup based in the Dutch university city of Groningen, offers similar light systems with dimming lights that turn themselves on as residents move about. They're now being implemented in German, Irish and Dutch cities.

"Having street lights automatically dim when nobody is around wouldn't have been possible five years ago", notes CEO Chintan Shah. "You need a combination of wireless and sensors."

European and American cities, Shah adds, are usually quite empty after 10pm, yet providing light to those on them remains essential for security. Both in Eindhoven's new

initiative and in the cities working with Twilight, the street lights provide a small glow to empty streets, giving residents the feeling that the street is fully illuminated, while in reality the lights only turn on fully as a person approaches.

On 14 March, Eindhoven will switch on its first batch of computer-controlled LED lights. "All the lights contain colour, though that doesn't mean that we're creating completely blue streets or anything like that", says Serge van den Berg of the energy sustainability firm Het Energie Bureau, who's in charge of the light installation. "But we're adding a bit of green and blue to enhance residents' feeling of well-being."

The setup also means the street lanterns can be adapted to fit the weather, even flashing red to warn residents of approaching storms or floods. But they can also be remotely adjusted - using wireless technology - down to areas as small as a street or a corner of a city square in order to provide a particular ambience to that area. An Italian restaurant will, for example, be able to adjust the street lanterns around it to create a more Italian atmosphere, and residents will be able to decide their respective streets' illumination look, initially for a couple of hours each night. "Residents are the real customers of light, and we tend to forget that", explains van den Berg. "A sustainable environment is one that's not just energy-efficient but also one where people enjoy being."

Using street illumination in yet another shape, Eindhoven has even installed illuminated pedestrian crossings, where sensor-equipped white stripes illuminate to tell pedestrians it's safe to cross. Twilight has a similar solution.

The Dutch artist Daan Roosegaarde, meanwhile, has created an innovative plan for highway illumination, making the dreary sector seem like fertile ground for sustainable innovation. His Smart Highway, currently in a pilot phase in the Netherlands, features giant snowflakes and flowers that, painted in illuminating paint onto the road surface, light up to tell drivers the outside temperature and provide interactive traffic directions. There's even a lane that automatically recharges electric cars.

Other concepts include highway roadside lights resembling white flowers that automatically turn themselves on as a car approaches. "Roads are often pushed aside and treated like junk space, but when you look at a city, you notice the roads, not the cars", Roosegaarde tells Guardian Sustainable Business. "I'm a hippie with a business plan. My goal is to make sustainable roads, where the connection between the car and the road is more intrinsic."

Being accompanied by shining snowflakes on long drives, and arriving in a city bathing in a cosy orange gleam, does sound rather appealing.

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