



REDUCE ENERGY USAGE BY 62%

### Key Benefits

- Energy consumption has been reduced by 62%
- Improved lighting quality
- Lower maintenance costs

In a typical northern European city, an outdoor lighting system can account for as much as 38 percent of the city's total energy use. In an effort to save energy, a European law requires that street lighting systems use electronic ballasts. The city of Oslo, Norway, sought a solution that would satisfy this law, along with various European and worldwide directives to reduce energy use and carbon dioxide emissions. The Norwegian capital also wanted the system to reduce streetlight operating costs, ensure driver and pedestrian safety, and allow remote monitoring and control.

Oslo chose an Echelon intelligent street lighting system based on LONWORKS technology, an open, extensible architecture that lets control devices from multiple manufacturers interact with each other. The project—the first large-scale implementation of a LONWORKS-based control network in a street lighting application—includes replacing older, inefficient mechani-

cal ballasts in the city's 55,000 streetlights with electronic ballasts from SELC Ireland Ltd. that communicate over existing power lines using Echelon's power line technology.

The system was integrated by Kongsberg Analogic AS, which specializes in LONWORKS-based energy management solutions, and Philips Lighting, a leading lighting solutions company.

### Controlling Light Levels Remotely

Echelon's SmartServers, which act as segment controllers, manage the streetlights and use the mobile telephone data network to communicate with the city's monitoring center. The SmartServers log and report how much energy the streetlights use and how long they run, collect information from traffic and weather sensors, and use an internal astronomical clock to calculate the availability of natural light from the sun and

moon. This data is used to automatically dim some or all of the streetlights. Controlling light levels this way not only saves significant amounts of energy, but also extends lamp life, thus lowering replacement costs.

City employees use Streetlight.Vision's enterprise monitoring software to remotely control the lamps, analyze their behavior, and identify any lamp failures. They also use Philips' StarSense software and Streetlight.Vision's Streetlight Suite software to measure and display energy use.

Hafslund ASA, Norway's largest generator and supplier of electric power and security products, is implementing Oslo's street lighting system. The company operates and maintains the city's system as a full-service provider.

"In the past, residents or roving maintenance trucks had to report lamp failures," says Eirik Bjelland, Hafslund senior advisor. "LONWORKS technology lets you remotely identify lamp failures and, in many instances, fix them before residents notice them.

"Reducing lamp downtime can significantly affect driver and pedestrian safety," he says. "It also makes repair crews more efficient by providing predictive failure analyses based on a comparison of actual running hours versus expected lamp life."

## Significant Savings

So far, the City of Oslo has reduced energy use by 62 percent: About two thirds of that is due to installation changes and the rest to reduced lamp burning hours. As the public acclimates to the changing light levels, Oslo expects to save an additional 10 to 15 percent in energy use.

"We expect that this savings will pay for the new system, with an overall return on investment within five years," says Tom Kristoffersen, head of section operations and maintenance for the City of Oslo.

Hafslund is considering using LONWORKS as the basis for other systems to which it provides service, which include more than 100,000 streetlights. The company also supplies energy to more than 250,000 streetlights in its grid; those lights might also make use of the infrastructure being built today.

"Echelon's technology and products in the Oslo project provide a very stable infrastructure for street lighting management," says Bjelland. "The system gives us the flexibility we need as a service provider to maximize energy savings and maintain safety while fulfilling all our customers' needs."

LONWORKS based control networks are changing the way we think of and interact with the devices that surround us. Learn how you can benefit from LONWORKS technology: Visit [www.echelon.com](http://www.echelon.com), call 1 888 ECHELON, or contact your local Echelon sales office or distributor.

## The Customer

City of Oslo  
Oslo, Norway  
[www.oslo.kommune.no](http://www.oslo.kommune.no)

## The Integrators

Kongsberg Analogic AS  
Kongsberg, Norway  
[www.analogic.no](http://www.analogic.no)  
Philips Lighting  
Oslo, Norway  
[www.philips.no/index.html](http://www.philips.no/index.html)

## The Challenge

The city of Oslo needed a street lighting solution to satisfy European and worldwide directives to reduce energy use and carbon dioxide emissions. The Norwegian capital also wanted to lower streetlight operating costs, ensure driver and pedestrian safety, and allow remote monitoring and control.

## The Solution

As part of its new intelligent outdoor lighting system, Oslo is replacing mechanical ballasts in its 55,000 streetlights with electronic ballasts that communicate over existing power lines using Echelon's power line technology. The system remotely monitors and controls the lights, dimming them based on traffic, weather, and available light. It also analyzes lamp behavior and identifies lamp failures.