Global Street Lighting Challenges...

A lot of energy is needed...
A lot of energy is wasted...
Global lighting challenges...

Light Pollution...
## Estimated costs of powering street lights ...

<table>
<thead>
<tr>
<th>Country</th>
<th>Street Lights</th>
<th>Annual Energy Bill</th>
<th>Annual CO₂ Emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>the Netherlands</td>
<td>2.8 million</td>
<td>€ 101 million</td>
<td>675.000 tons</td>
</tr>
<tr>
<td>Belgium</td>
<td>1.8 million</td>
<td>€ 96 million</td>
<td>368.000 tons</td>
</tr>
<tr>
<td>France</td>
<td>11 million</td>
<td>€ 382 million</td>
<td>800.000 tons</td>
</tr>
<tr>
<td><strong>Europe</strong></td>
<td><strong>91 million</strong></td>
<td>~ € 10 billion</td>
<td>~ 35.000.000 tons</td>
</tr>
</tbody>
</table>

*Street lights account for over 40% of a municipality’s electricity budget*

Assumptions: street lights per person (1/6 in NL/BE/FR and 1/9 in Europe), wattage per street light (NL = 80W; BE/FR = 120W; Europe = 180W), burning hours (4150 per year), electricity price per kWh (NL/BE = €0.11; FR = €0.07; Europe = €0.15), CO₂ emission per kWh (580g)

Data from EU commission research: [www.e-streetlight.com](http://www.e-streetlight.com)
Other challenges...

Insensitive to environment

Lacks failure warning

Illuminates empty streets
Solution: Intelligent Lighting
Remote Asset Management Tool

CityManager
User friendly software to help you manage your street lighting infrastructure with ease.
Recent Projects
Example: Outdoor Parking
Example: Residential area
Example: Roadway/ Main road
Example: Industrial areas
Benefits: Intelligent Lighting

- Reduces the energy usage by up to 80%
- Reduces the maintenance costs by up to 50%
- Energy monitoring and control
- Lowers light pollution and CO₂ emissions
- Combines savings while maintaining public safety and security
- Enables interactive user-experience
“We wanted to accomplish two things, namely reducing light pollution for people living in the area, but at the same time giving passengers the light they need. Tvilight was our solution.”

Eelco Krakau – Contract manager Dutch Railways

“Outdoor lighting accounts for over one-third of our total energy usage. We want to reduce our energy bill and lower our maintenance costs.”

Harry van der Wal – Energy manager, City of Groningen

“Tvilight’s adaptive lighting control is an excellent solution: it has allowed us to save energy as well as manage the street lights remotely. I truly believe that this is the future.”

Robin Brekelmans – Project leader, Municipality of Nuenen
Interactive user experience

Enhanced feeling of safety – a pleasant interactive experience

“My girlfriend now even offers to walk the dog at night, because she feels safer in the streets!”

“This system feels safer, because you always know when someone is approaching you; the lights go on.”

“The new lighting is a modern piece of a nostalgic whole.”
Intelligent Lighting & Smart Cities
Smart Traffic Management
Smart Traffic Management
Interactive Information Systems
Emergency Assistance
Low-Cost Internet
Low-Cost Internet
Smart Parking
Smart Parking
Environment Monitoring

2012 MANHATTAN

NOISE COMPLAINTS
Environment Monitoring
Electric Car-Charging
Vehicle-to-Vehicle communication
Vehicle-to-Vehicle communication
New Opportunities > New Business Models
Questions / Next Steps

STREETLIGHT EVOLUTION

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ELECTRIC LUMINARY
MODERN LUMINARY
INTELLIGENT STREET LIGHTS

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**System Architecture**

- **CITYMANAGER**
- **Internet**
- **Gateway**
- **SKYLITE**
  - Wireless Mesh Network
- **CITYSENSE**
  - Presence Based Lighting

Diagram shows a network model with various components: a computer (www), a gateway, and streetlights connected through a wireless mesh network.
Market Applications

- Business parks
- Open parking spaces
- Bicycle paths
- University campuses
- Towns/ Villages
- Suburban areas
- Secondary roads
- Fuel stations
- Ports and harbors