

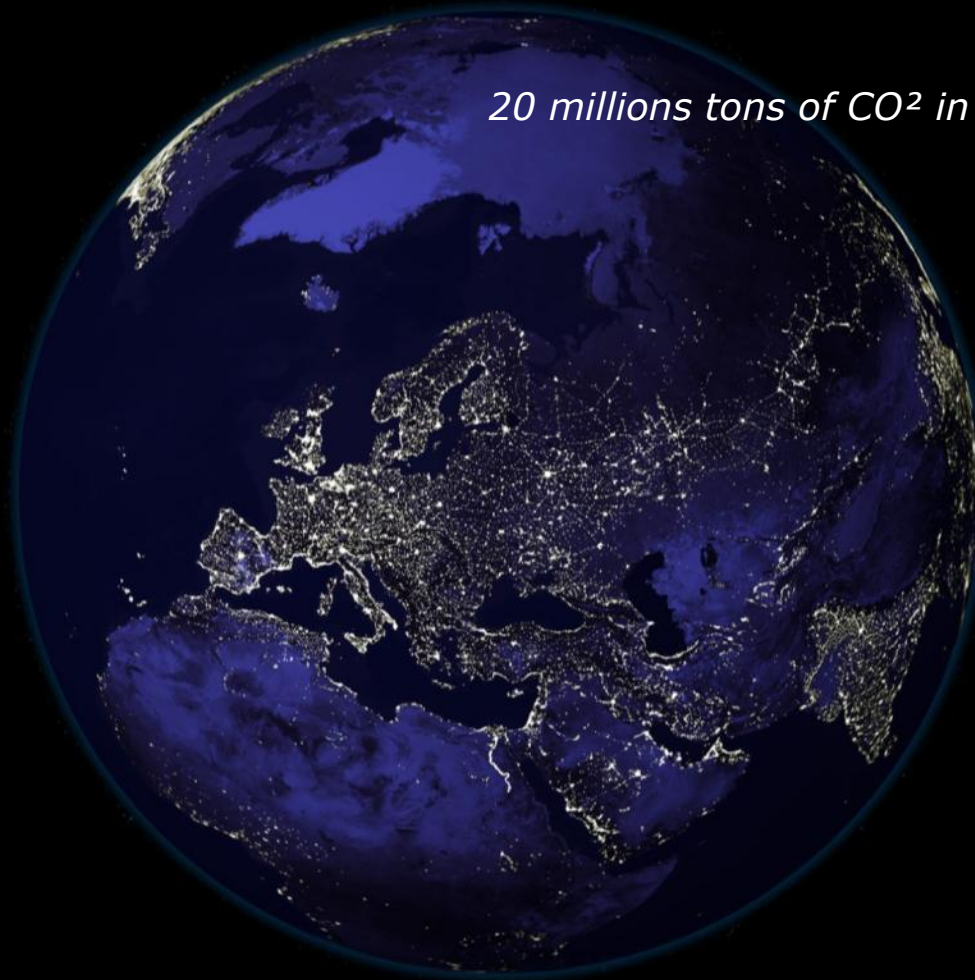
Dolphin Streetlight Telemanagement

Wolfgang Stripf
Senior Consultant R&D
Karlsruhe, October 12th 2012

Context

90 million streetlights in Europe

*... are responsible for
20 millions tons of CO² in the atmosphere each year*



*Each streetlight consumes an average of 615 KWH per year
contributing to emit 220 KG of CO² each year !*

Comfort & control in the city

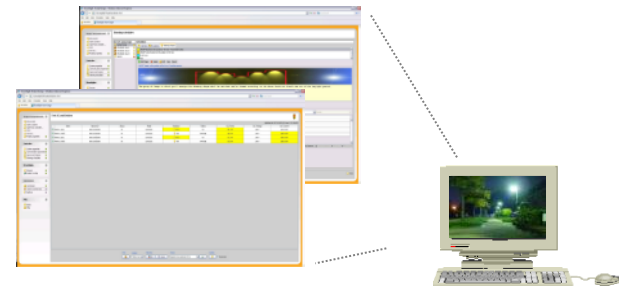


- **Lighting is a way of city beautification**
- **It brings comfort and safety for all citizen**
- **Street-lighting management allows a global energy consumption control**

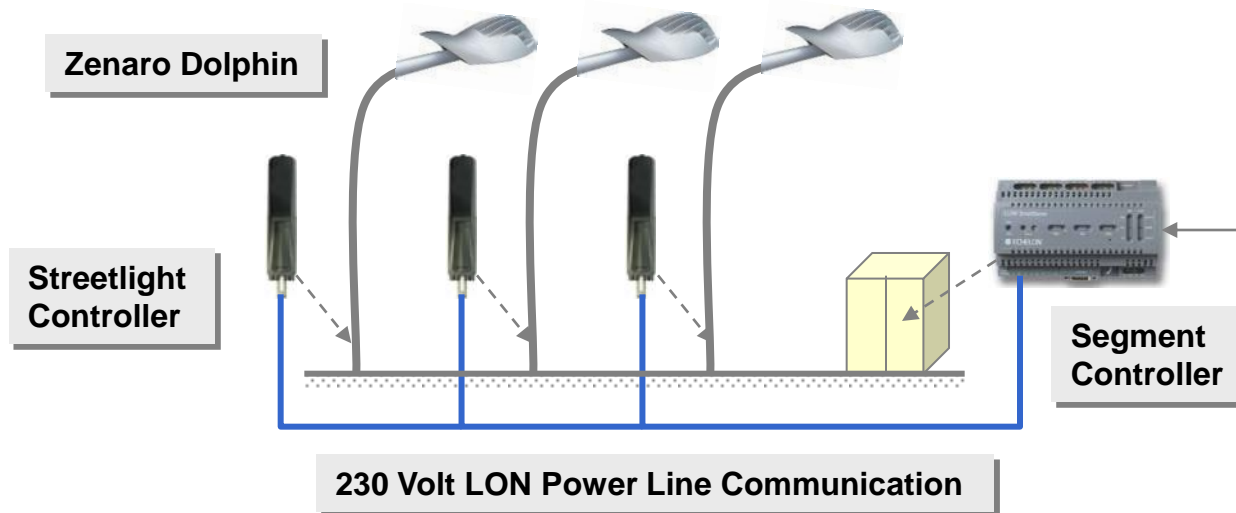
Concept of Telemangement (segment)

Centralized city streetlight monitoring & control:

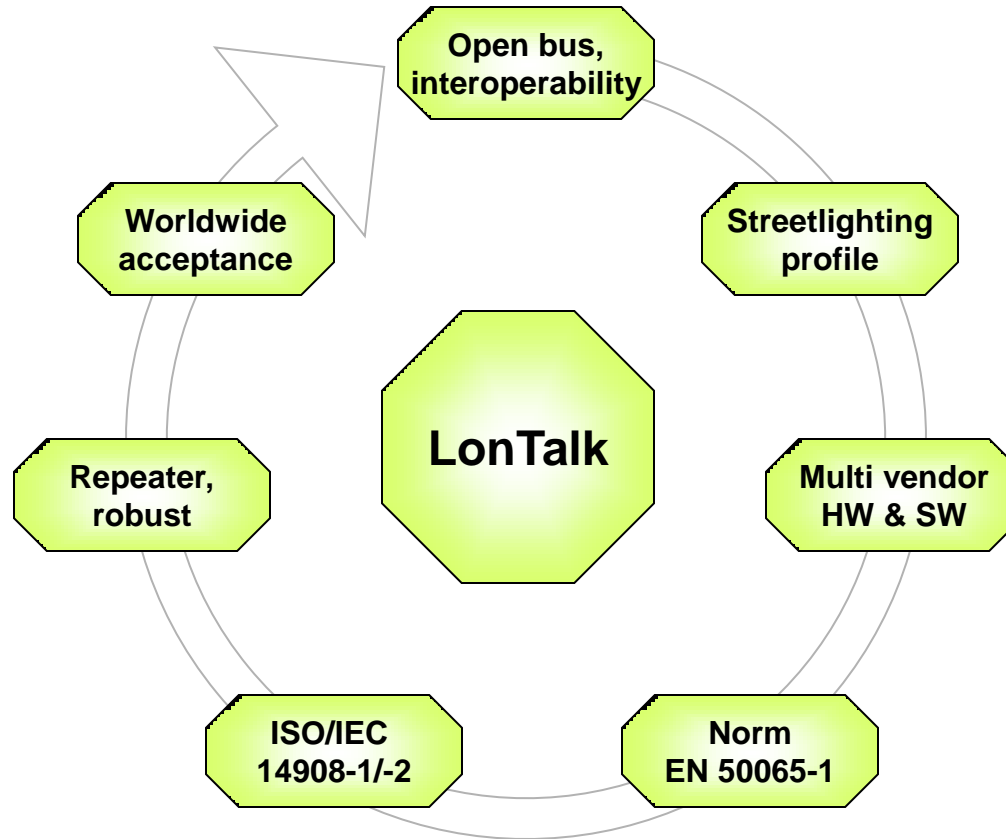
- Configuration of streetlights
- Scheduling of ON/OFF and dimming phases
- Status reports:
 - On/off, dimming degree, failures
 - Power consumption
 - Power-on hours
- Alarms in case of failures



Telephone,
GPRS,
Wireless,
Internet



Media and protocol (LonTalk)



EN 50065-1:

ISO/IEC 14908-1/-2:

Signalling on low-voltage electrical installations in the frequency range 3 kHz to 148,5 kHz

Open Data Communication in Building Automation, Controls and Building Management -- Control Network Protocol

Media and protocol (LonWorks)

Media: Power Line Communication (PLC)

- Information exchange via the existing electrical power network (110 – 230 V)
- Street lighting market in favor of the LonWorks® network technology
 - Proven-in-use and trusted technology
 - Open, manufacturer independent protocol specification: IEC 14908-1/2, EN 50065-1
 - Interoperability of network devices via application profiles, such as "street lighting"
 - Large number of sensors, actuators and infrastructure components available (e.g. wireless, routers)
- LonWorks guarantees robust communication between the partners
 - Segment Controller (SC), preferably the "SmartServer" and
 - Street Lighting Controllers (SLC) such as Citylone SL42 through
 - Low speed transmission channels (frequencies) and a repeater option within SLCs
- Echelons SC "SmartServer" builds up an intelligent gateway to web oriented
 - Data acquisition,
 - Monitoring, and
 - Control systems,
 - Based on modern Java and XML software technologies, and
 - Office communication such as GPRS (modem) and Ethernet/Internet (wired/wireless)

Streetlight controller SL42 (Citylone)

Version SL42-ED-1T



Streetlight controller SL42: On/Off

Functional specifications

- Safety first: Light is ON at module power ON (default)
- Parametric Algorithms function of lamps type, ballast types and power.
- Safety cooling timer before next switch ON.
- Real time metering (current, $\cos \varphi$,...)
- Total power consumption and bulb hours record.
- Alarm "voltage" or "current" if out of range
- Alarm "lamp failure" (based on power metering).

Hardware specifications

- Insulated output for an auxiliary elements or a second lamp. Max 500W - 3A – 230V.
- RJ9 Input (accessory running test plug after installing)
- Grey box / Cover translucent

Streetlight controller SL42: On/Off

Lamp failure detection (option)

- Allows failure detection on the auxiliary output
- The nodes signal which lamp on the pole is failing
- The two lamps can provide status
- Maximum power on the auxiliary output 500 W – 3A – 230V

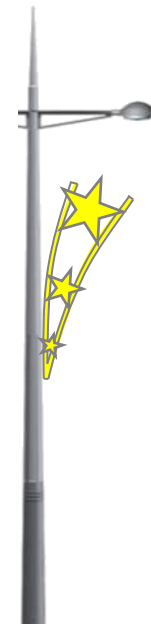
Only one node for two lamps

Streetlight controller SL42: 0-10V (Dimming)

Applications:



1 lamp 0-10V + 1 lamp ON / OFF
at the auxiliary output



1 lamp 0-10V
+ Christmass lighting

Streetlight controller SL42: 0-10V (Dimming)

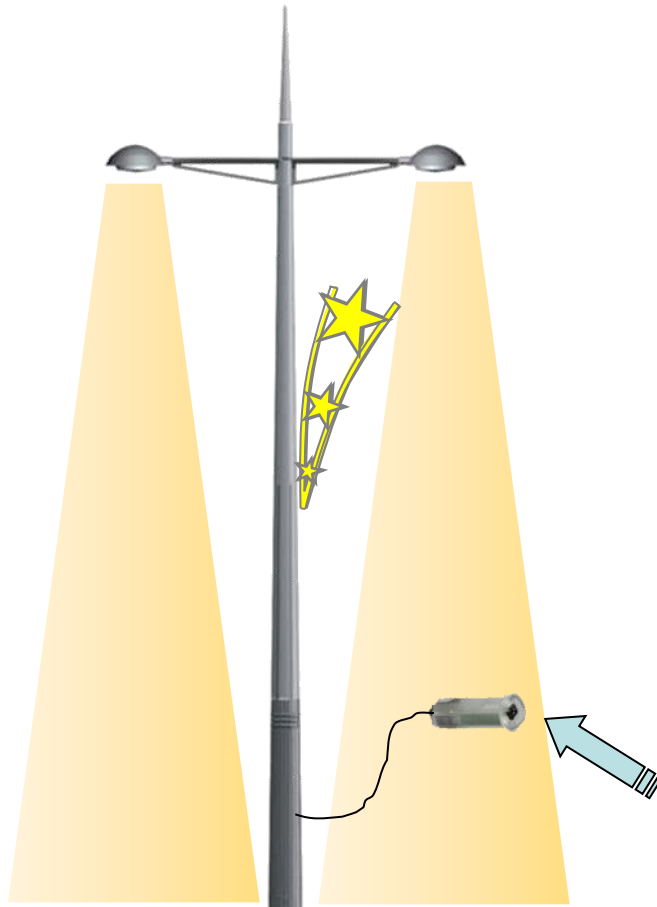
Functional specifications

- Same characteristic of the ON/OFF node
- Dimming command from 0 to 100% of the parametered dimmer time range.
- Dimming orders are applied progressively according to a parametered ramp (except 0% and 100% orders which are applied immediately)

Hardware specifications

- 1-10 volt output, ballast power supplying by the node
- Grey box / Cover translucent
- Auxiliary output max : 3A – 230V - 500W

Streetlight controller SL42: Accessories



**Test accessory
after installation**



Segment Controller



Key features

- Realtime Operating System
- Realtime clock that get synchronized automatically
- Astronomical clock to determine dawn and dusk from GPS positioning
- Easy programming of the ON, OFF and DIMMING commands at fixed time or time related to dawn and/or dusk.
- Supports up to 150 LonWorks-enabled Streetlight Controllers
- Sends data records on alarm, once a day or on event
- Upstream Communication through a GPRS modem, Wi-Fi network, ADSL network or Radio modem
- Records up to several months of historical data in case of non-communication
- Web Software for the configuration of the Segment Controller and the Test of each Streetlight Controller in real-time



Segment Controller (details)



ON/OFF switch, dimming

- Sunrise or sunset related time with delays, or
- Fixed times
- Single lamps or group of lamps

Automatic data collect

- Local data log up to months (30 MB)
- Automatic data collect (no manual polling)
- GPRS cost optimization (UMTS not necessary)
- Local and centralized alarms

Inputs for measurements and Outputs to control

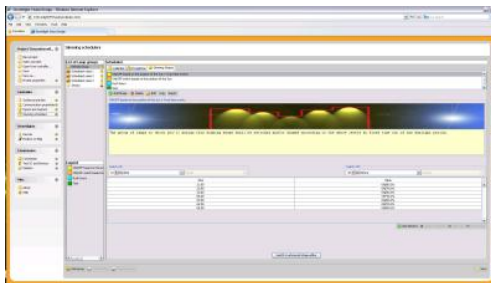
- Integrated I/Os for door open, main supply control, photo cell
- MODBUS extensions for additional data measurement

Configuration and remote control

- Realtime through standardized protocol
- Streetlight.Vision DESIGN software
- Streetlight.Vision DATA COLLECT and WEB PORTAL software

Powerline Interface

- EIA709 (LonWorks) is standardized in EU, USA, China
- > 40 million devices communicating via LonWorks and PL
- Bi-directional comm. for Data Collect, Alarms, Remote Control



GPRS: General Packet Radio Service (packet oriented mobile data service for Internet and point-to-point protocol; > 200 countries)
UMTS: Universal Mobile Telecommunications System (3rd generation = 3G)

Simple installation process, step 1: install node

*Install the SmartNode
in the luminaires or in the pole*

SmartNode ID on a sticker



Contact : Cyril Bacque - 01.60.91.29.39 - 06.25.82.12.08

Date : 25 Février 2008

Référence du Lampadaire	Référence de l'armoire	Coller le "sticker" du Nœud dans cette colonne	Adresse	Position PS	Puissance de la lampe	Type	
T0321	COLZA			E2.51280	N48.63365	150	SON
T0322	COLZA			E2.51303	N48.63379	150	SON
	COLZA			E2.51306	N48.63404	150	SON
T0324	COLZA			E2.51279	N48.63418	150	SON

Ballast/Node stickers are placed here by installer

Simple installation process, step 2: configure

Easy configuration, Import list of Lamp/Nodes from EXCEL, prepare dimming regimes, commissioning into the Streetlight Segment Controller and test from list or from map

The screenshot displays the Streetlight Vision Design software interface. The main window shows a list of luminaires with columns for Nom, Neuron ID, Type, Lampe, Zone Géo, Groupe, Lat., and Long. The list includes various Philips Stansense II V... and SON 150w, dim 1-10V lamps. A configuration window for 'Commandes horaires' is open, showing a calendar and a graph of light intensity over time. The graph shows a peak at sunset and a dip at sunrise. The configuration window also includes a table for 'Commandes horaires' with columns for 'Allumer' and 'Eteindre'.

Nom	Neuron ID	Type	Lampe	Zone Géo	Groupe	Lat.	Long.
T0392	0501A0000007	PHILIPS Stansense II V...	SON 150w, dim 1-10V	Fossés Neufs	Segment 1	2.5062	48.63381
T0391	0501A0000008	PHILIPS Stansense II V...	SON 150w, dim 1-10V	Fossés Neufs	Segment 1	2.50676	48.63366
T0390	0501A0000009	PHILIPS Stansense II V...	SON 150w, dim 1-10V	Fossés Neufs	Segment 1	2.50733	48.63354
T0389	0501A0000010	PHILIPS Stansense II V...	SON 150w, dim 1-10V	Fossés Neufs	Segment 1	2.50793	48.63343
T0388	0501A0000011	PHILIPS Stansense II V...	SON 150w, dim 1-10V	Fossés Neufs	Segment 1	2.50853	48.63338
T0387	0501A0000012	PHILIPS Stansense II V...	SON 150w, dim 1-10V	Fossés Neufs	Segment 1	2.50912	48.63334
T0386	0501A0000013	PHILIPS Stansense II V...	SON 150w, dim 1-10V	Fossés Neufs	Segment 1	2.50972	48.63332
T0385	0501A0000014	PHILIPS Stansense II V...	SON 150w, dim 1-10V	Fossés Neufs	Segment 1	2.51037	48.63333
T0384	0501A0000015	PHILIPS Stansense II V...	SON 150w, dim 1-10V	Fossés Neufs	Segment 1	2.51099	48.63334
T0383	0501A0000016	PHILIPS Stansense II V...	SON 150w, dim 1-10V	Fossés Neufs	Segment 1	2.51154	48.63335
T0382	0501A0000017	PHILIPS Stansense II V...	SON 150w, dim 1-10V	Fossés Neufs	Segment 1	2.51219	48.63365
T0326	0501A0000018	PHILIPS Stansense II V...	SON 150w, dim 1-10V	Fossés Neufs	Segment 2	2.51224	48.63416
T0327	0501A0000019	PHILIPS Stansense II V...	SON 150w, dim 1-10V	Fossés Neufs	Segment 2	2.51199	48.63425
T0328	0501A0000020	PHILIPS Stansense II V...	SON 150w, dim 1-10V	Fossés Neufs	Segment 2	2.51174	48.63433
T0329	0501A0000021	PHILIPS Stansense II V...	SON 150w, dim 1-10V	Fossés Neufs	Segment 2	2.51148	48.63441
T0330	0501A0000022	INTRON Smart Node	SON 150w, dim 1-10V	Fossés Neufs	Segment 2	2.51121	48.63445
T0331	0501A0000023	LowNak VI	SON 150w, dim 1-10V	Fossés Neufs	Segment 2	2.51097	48.63459
T0332	0501A0000024	PHILIPS Stansense II	SON 150w, dim 1-10V	Fossés Neufs	Segment 2	2.51067	48.63466
T0333	0501A0000025	PHILIPS Stansense II	SON 150w, dim 1-10V	Fossés Neufs	Segment 2	2.51042	48.63471
T0334	0501A0000026	PHILIPS Stansense II	SON 150w, dim 1-10V	Fossés Neufs	Segment 2	2.51013	48.63477
T0335	0501A0000027	SECE	SON 150w, dim 1-10V	Fossés Neufs	Segment 2	2.50984	48.6348
T0336	0501A0000028	SELIC 2000	SON 150w, dim 1-10V	Fossés Neufs	Segment 2	2.50961	48.63488
T0337	0501A0000029	SELIC 3000	SON 150w, dim 1-10V	Fossés Neufs	Segment 2	2.5093	48.63487
T0338	0501A0000030	PHILIPS Stansense II V...	SON 150w, dim 1-10V	Fossés Neufs	Segment 2	2.50899	48.63491
T0339	0501A0000031	PHILIPS Stansense II V...	SON 150w, dim 1-10V	Fossés Neufs	Segment 2	2.50873	48.63484

Simple installation process, step 3: subscribe

The screenshot shows the Citylone telemanagement interface for public lighting. At the top left is the Citylone logo, and to its right is the text "Telemanagement of public lighting". A city skyline silhouette is visible in the top right corner. Below the header is a navigation bar with a home icon. The main content area features six feature cards arranged in a 2x3 grid:

- Real-time control**: Control and monitoring of your streetlights in real-time according to your schedules.
- Fault analysis**: Fault detection and alarm analysis within your public streetlight network.
- Alarms**: Display and acknowledgement of actual alarms within your public streetlight network.
- Energy**: Display of consumptions and savings of energy and CO2.
- Energy savings**: Display of energy savings per geographical zone within the last months.
- Life times**: Indication of those lamps that need to be exchanged prior to their failure.

At the bottom right, there is a logo for Streetlight.Vision with the text "Powered by Streetlight.Vision".

Simple installation process, step 4: test

The screenshot displays the Streetlight.Vision Web Portal in a Windows Internet Explorer browser. The address bar shows the URL <http://www.streetlightmonitoring.com:8080/reports/index.jsp>. The page header features the Duke Energy logo and the text "Streetlight Monitoring Center".

The main content area is titled "Real-Time Monitoring" and includes a navigation tree on the left with the following structure:

- Duke Energy
 - Kentucky
 - North Carolina
 - Charlotte
 - Duke Pilot Site
 - Ohio
 - South Carolina

Lamp4

Dimming Control

100% Automatic

80% Manual

Min Refresh

Off

Informations

Address

Metering

Energy	31Kwh
RunHours	140h
Temperature	51deg C
Voltage	115V
Current	2A
Power	262W
PowerFactor	1

Failures

<input checked="" type="checkbox"/> High mains voltage	<input checked="" type="checkbox"/> Low mains voltage	<input checked="" type="checkbox"/> High mains current
<input checked="" type="checkbox"/> Low mains current	<input checked="" type="checkbox"/> Zero mains current	<input checked="" type="checkbox"/> High lamp temperature
<input checked="" type="checkbox"/> High ballast temperature	<input checked="" type="checkbox"/> Old lamp	<input checked="" type="checkbox"/> Burned out lamp
<input type="checkbox"/> Lost Node		

Failures OK No information

Duke Pilot Site Values read in 2,488 ms. 16:24:50

Powered by Streetlight.Vision

Streetlight.Vision Web Portal - Version 4.00 Build R200804252041

Terminé

Internet | Mode protégé : désactivé

Simple installation process, step 5: diagnose

Streetlight Failure Identification and Analysis

The screenshot displays the Streetlight.Vision software interface, which is used for monitoring and diagnosing streetlights. The main window shows a 'Failures Report' for a specific zone, 'Almeria Adderley Boulevard'. The report lists several failures, including 'Ballast Comm', 'Ballast Fault', 'Blinking Lamp', 'Brown Out', 'Critical Error', 'DefaultLastNode', 'DefaultNight', 'High RMS Voltage', 'High Voltage', and 'Lamp Fault'. Each failure is accompanied by a status indicator (green or red) and a timestamp.

Below the failure list, there is a 'Failures Report' table with columns for Name, Address, GeoZone, Warnings, Failure, and Runhours. The table shows 8 entries for 'Almeria Adderley' at 'Adderley Boulevard', with various failure status indicators.

On the right side, there are two detailed views of a specific lamp, 'Lampe1' and 'Lamp10'. The 'Lampe1' view shows attributes such as Name, Address, Geo Zone, Reference, Type, Brand, Customer, Controller, Provider, and Power. It also displays a 'Failures' list and a 'Graph Only' view showing the 'Lamp Level' over time.

The 'Lamp10' view shows similar attributes and a 'Failures' list. It also displays a 'Graph Only' view showing the 'Mains voltage of Lamp10' over time, with a peak value of 120.0 V on 25/04/2008 at 04:40:21.

The interface includes a 'GeoZones' tree on the left, a 'Customers' list, and a 'Device List' table. The bottom of the interface shows the 'Powered by Streetlight.Vision' logo and the 'Terminé' status.

Simple installation process, step 6: control

The screenshot displays the 'StreetLight.Vision - Portail Web' interface in Microsoft Internet Explorer. The browser address bar shows 'https://ctn.spie.com/reports/'. The page header includes the SPIE logo and the text 'CTN - PORTAIL DE GESTION ENERGETIQUE ET TECHNIQUE'. Below the header is a red navigation bar with the text 'Contrôle & commande des lampadaires'. The main content area is titled 'Contrôle des lampadaires sur leur Zone Géo' and features a satellite map of a city with numerous yellow lightbulb icons representing streetlights. Each icon is labeled with a percentage value, such as 95%, 96%, 97%, 98%, 99%, and 100%. A detailed control panel for a specific streetlight (ID 132) is overlaid on the map. This panel includes a lightbulb icon, a 'Propriétés' section with fields for 'Address' (Impasse Forbin), 'Energy' (45.7), and 'RunningHours' (1952.0). It also has a 'Niveau d'éclairage' section with a vertical bar and buttons for 'Allumé', '80%', '60%', and 'Eteint'. A 'Défauts' section lists various error types with green status indicators, including Ballast Comm, Temperature, Unknown, Weak Lamp, Photocell Fault, Critical Error, Runhouse Alarm, High RMS Voltage, Lamp Fault, Brown Out, Ballast Fault, and Lost Node. At the bottom of the panel, there are 'On', 'Off', and 'Indéterminé' buttons. The map title 'Les Couregants' and a 'Read: 881 ms' status are visible. The footer of the browser window shows 'Powered by DotVision', 'Applet ViewerApplet started', and 'StreetLight.Vision - Sept 2008'.

Real-time control on City Maps

Simple installation process, step 7: statistics

STREETLIGHTMONITORING.COM - Portail Web - Windows Internet Explorer

http://www.streetlightmonitoring.com:8080/reports/

Energy Saving Analysis Impact on the Environment (KWh and CO²)

STREETLIGHTMONITORING.COM
ONLINE SECURED 24/7 MONITORING OF YOUR STREETLIGHTS

Energy Analysis

GeoZones Customers

Streetlight.Vision Worldwide

- Belgium
 - North of Belgium
 - Antwerpen
 - Genk
 - Lommel
 - Mechelen
 - Turnhout
 - South of Belgium
- England
 - East of England
 - Barnet
 - London
 - Milton Keynes
 - Norwich
 - North of England
 - Knowsley
 - Leeds
 - Liverpool
 - Manchester
 - South of England
 - West of England
 - Birmingham
 - Bristol
- France
- Germany

Select date: From: 2006-10-18 To: 2007-01-18

Energy Analysis

Date: 18/01/2007 00:11
Zone: England

Efficient Streetlight (KWH/SL/year)

- <= 150 A
- 151 - 300 B
- 301 - 450 C
- 451 - 600 D
- 601 - 750 E
- 751 - 900 F
- >= 901 G

Unefficient Streetlight

Low CO2 emission (KG/SL/year)

- <= 45 A
- 46 - 90 B
- 91 - 150 C
- 151 - 200 D
- 201 - 250 E
- 251 - 300 F
- >= 301 G

High CO2 emission

Name	Mesurée (kwh)	Avant (kwh)	Economie d énergie (%)	Economie pollution (tonnes de CO2)
East of England	2224,1	3872	42,56%	1,055
North of England	4448,3	7744	42,56%	2,109
South of England	0,0	0	?	?
West of England	0,0	0	?	?
England	6672,4	11616	42,56%	3,164

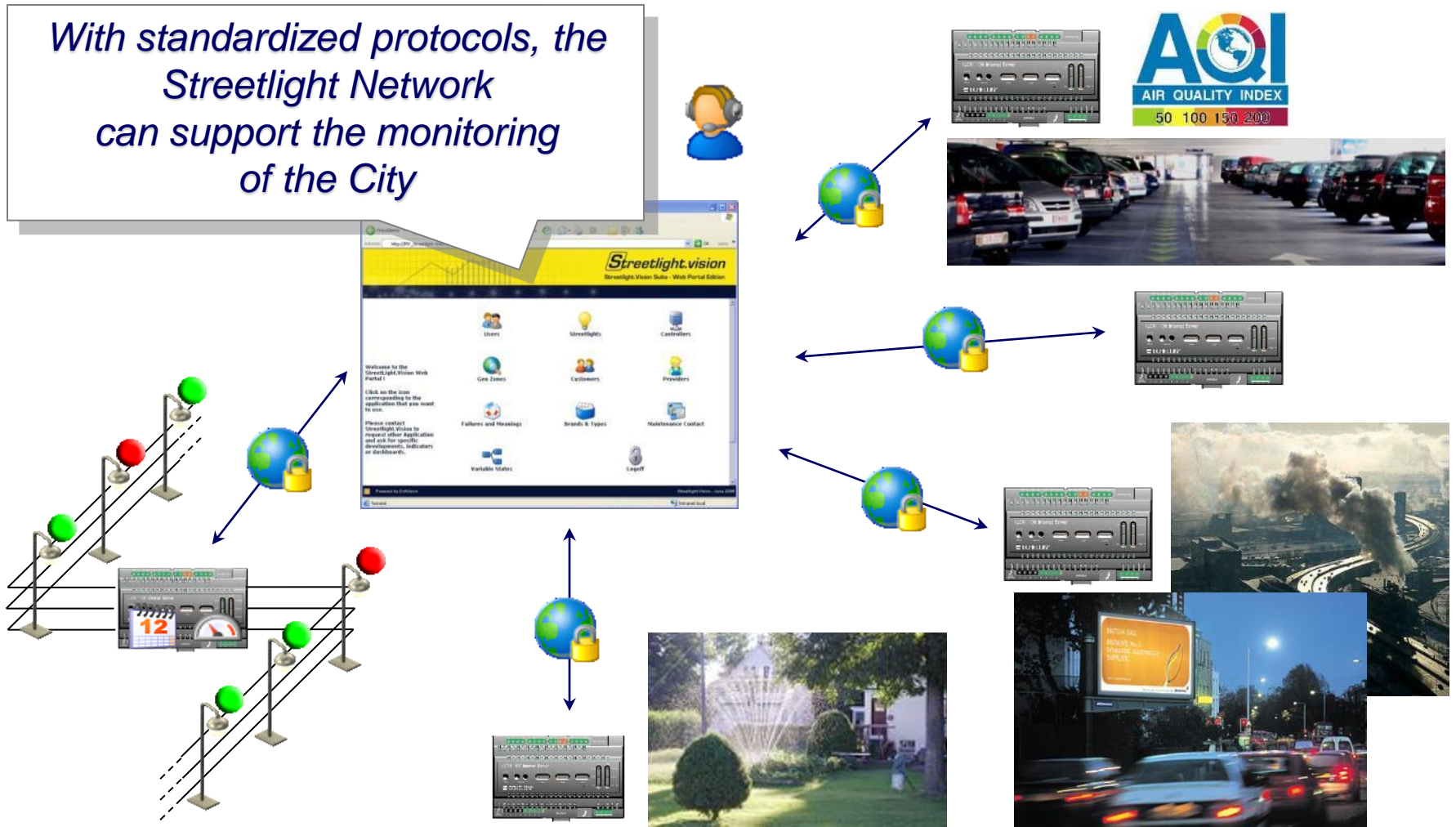
Powered by Streetlight.Vision

STREETLIGHTMONITORING.COM - DEC 2006

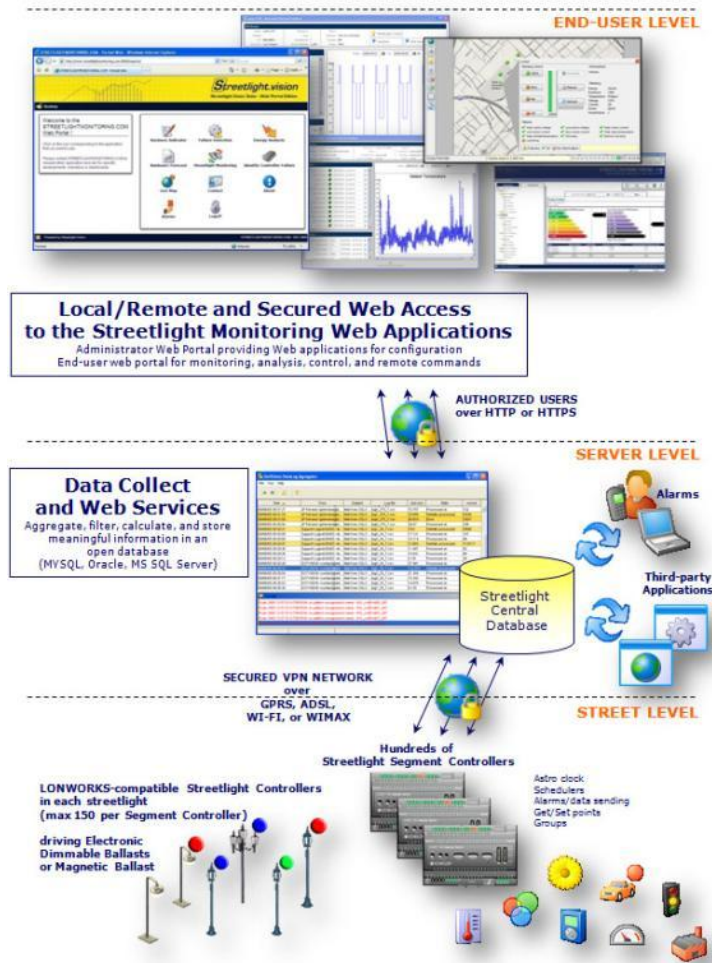
Internet 100%

Next steps: Opportunities

With standardized protocols, the Streetlight Network can support the monitoring of the City



Summary



Key benefits:

- Up to 50% of Energy and associated CO² Savings (dimming)
- Remove Night Patrols (automatic identification)
- Reduced number of incoming calls from unsatisfied citizens (anticipate failures)
- Increased urban security and safety (fast repair)
- Reduced light pollution (dimming)
- Reduced liability issue (recording)
- Reduced installation costs (simple, fast)
- Less onsite trips to reduce maintenance costs and associated CO² emissions (remote monitoring)
- Be under control anytime (web server access)
- A multi-brand solution (no dependency)
- Get ready for the future (standards: LON, WEB)
- Integrated into your existing Information System

Possible Streetlight Controllers (SLC)



Key features

- Can be installed at the bottom of the pole (SCS, Philips, Citylone, SELC 3000, Intron)
- Can be installed only in the luminaire (SELC 2000, Philips, Romlight, SCS, Intron, Citylone)
- Remote control : ON and OFF (all)
- Lamp failure automatic identification (all)
- High/Low mains Voltage alarms (SELC, Philips, Romlight, Citylone)
- High/Low main Current alarm (SELC, Philips, Romlight, Citylone)
- Temperature measurement and alarm (SELC, Romlight)
- Measures Voltage, Current, Power, Power Factor (Philips, Romlight, Citylone)
- Measures main Voltage and lamp Voltage (SELC)
- Measures cumulated Energy consumption (SELC, Philips, Romlight, Citylone)
- Measures cumulated number of burning hours (SELC, Philips, Romlight, Citylone)
- Measures cumulated Energy consumption (SELC, Philips, Romlight, Citylone)

Street Light Luminares and Power Supply

Dolphin
48W – 120W




Sylph
48W – 60W



Street Light Dolphin



Key features

- Unique Design 
- Several Power Consumptions, 48W, 60W, 90W and 120W
- Night time energy saving mode by step dimming
- Continuous dimming integrated with 1-10V interface
- Three different optics, optimized for Street Lighting
- Light Color 3000K and 5000K
- Integrated overheating protection
- Long lifetime > 50.000h(L70)
- 5 years warranty
- No UV or IR radiation

Street Light Sylph




Key features

- Slim and cost effective Design
- Several Power Consumptions, 48W and 60W
- Night time energy saving mode by step dimming
- Continuous dimming integrated with 1-10V interface
- Three different optics, optimized for Street Lighting
- Light Color 3000K and 5000K
- Integrated overheating protection
- Long lifetime > 50.000h(L70)
- 5 years warranty
- No UV or IR radiation

Street Light Power Supply Unit



Key features

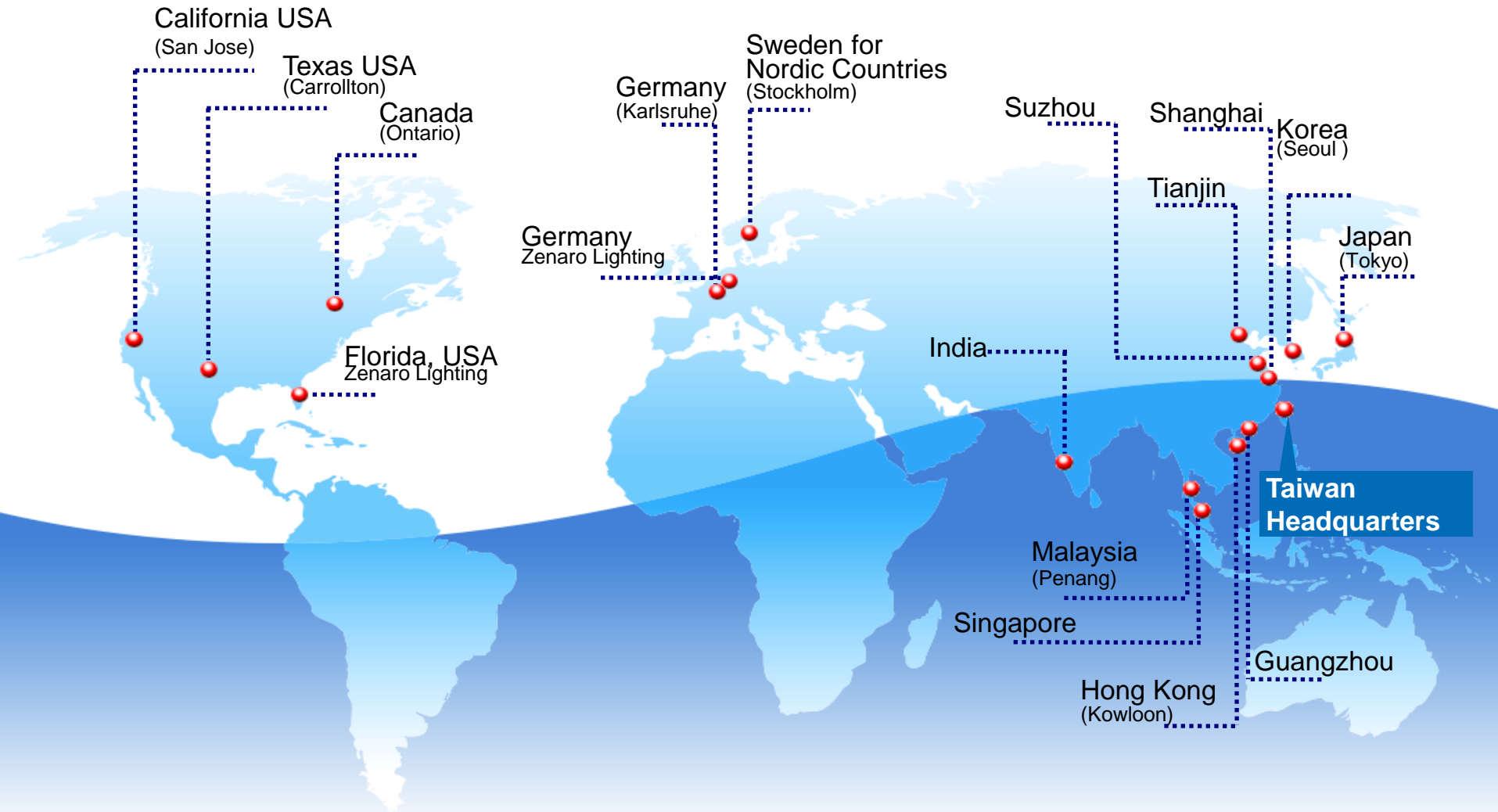
- Several Power Consumptions, 48W, 60W, 90W and 120W
- High Efficiency > 92%
- Night time energy saving mode by step dimming
- Continuous dimming integrated with 1-10V interface
- IP65 Housing
- 
- Integrated overheating protection
- Long lifetime > 80.000h
- 5 years warranty
- Made in Germany

Everlight Overview

Founded	➔	1983
IPO	➔	1997
Business Focus	➔	Design, Manufacture & Marketing of Optoelectronics Components and Modules
Headquarters	➔	New Taipei City, Taiwan
Employees	➔	>6,400 globally
Plants	➔	Tucheng (Taiwan) Miao-Li (Taiwan) Su-Zhou (China) Zhong-Shan (China)



Global Network



**Thank You
For
Your
Attention**

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