direct e-mail: **metering@circutor.es**

Joan Brossa

Quality & metering division

CIRLAMP

Smart street lighting management system

CirLamp

Continuous increases in the price of electrical energy mean that one of the main objectives for all major consumers is improved energy efficiency.

In terms of energy consumption, the objective of being more efficient not only affects industrial installations but also street lighting, in most cases managed by city councils, and is one of the major forms of consumption where it is possible to become more efficient.

Since its creation in 1973, **CIRCUTOR** has specialised in designing, manufacturing and marketing products aimed at achieving energy efficiency. Drawing on its extensive experience in this sector, **CIRCUTOR** has developed a range of products for smart street lighting management, obtaining significant advantages at all levels:

- **Energy saving**
- **Reduced maintenance costs**
- **Reduced CO_2 emissions**
- **Better management of exterior street lighting to benefit the user**

The solution developed by **CIRCUTOR** based on **CirLamp**, enables smart street lighting management, to improve efficiency and reduce energy consumption.

The possibility of remotely controlling the working of each lighting point offers numerous advantages over alternatives that propose single head-end control.

The **CirLamp** system provides both the flexibility of point-to-point control and ease of maintenance management, having a direct impact on electrical energy consumption and user satisfaction.

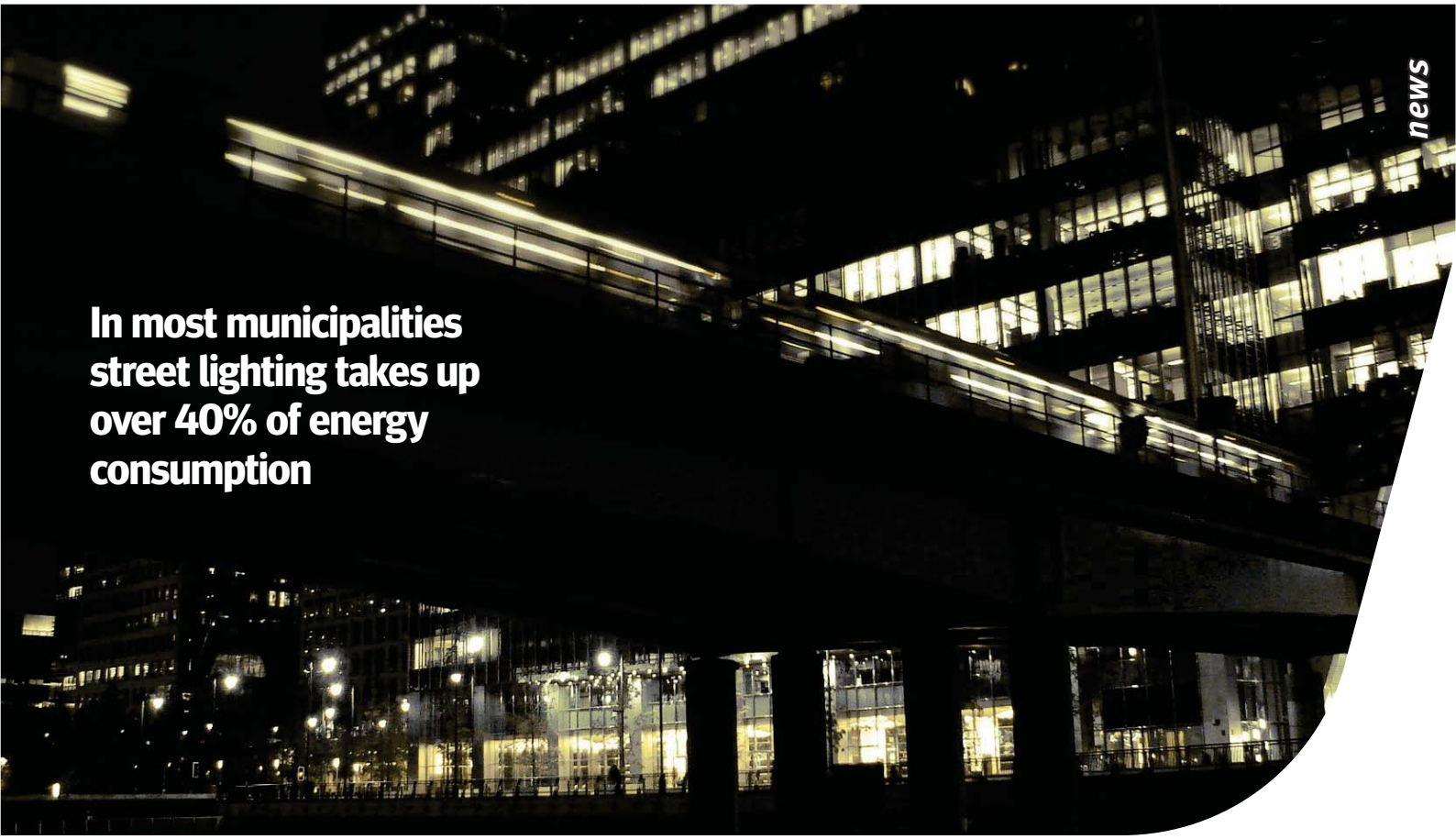
Why do we need a smart street lighting management system?

These are some of the reasons that justify using a smart street lighting management system:

- Street lighting consumption which exceeds that indicated in the annual electricity cost per inhabitant is more than 118 kWh in Spain. In France it is approximately 25% less and in Germany, where there are fewer daylight hours per year, it is no more than 40% of Spain's consumption.
- In most municipalities street lighting takes up over 40% of energy consumption.
- 40% is wasted as light pollution.
- 50% of street lighting use time could be controlled.

Street lighting management system elements

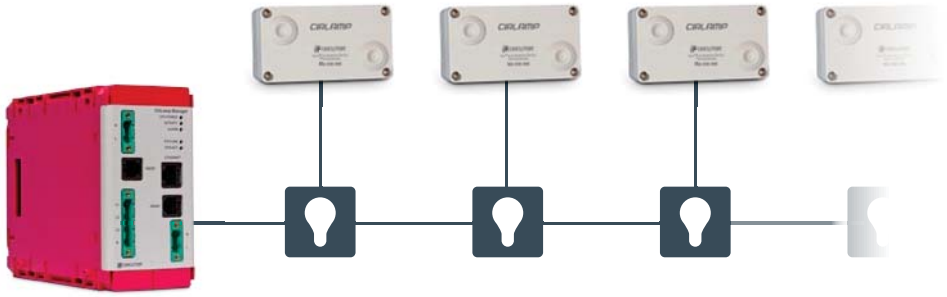
The efficient street lighting management system consists of **CirLamp** modules installed at the lighting points and the **CirLamp Manager** which is responsible for managing the entire network of units and is installed in the electrical cabinet.



In most municipalities street lighting takes up over 40% of energy consumption

Where can we use this system?

There are many types of installations where a **CirLamp** system can lead to significant savings. These range from street lighting installations to lighting control in tunnels, and include any type of industrial application.



Objectives of using a street lighting management system

Reduced electrical energy consumption:

There are two types of actions for reducing consumption, firstly replacing old mercury vapour lamps with more energy efficient ones, such as leds, and secondly through more efficient management of the lighting points with the help of the **CirLamp** system.

Reduced maintenance costs:

Thanks to **CIRCUTOR**'s smart street lighting control system, the time it takes to resolve any incident can be reduced because there is real time information on the status of the installation. Thanks to the information it provides, preventive maintenance work on the lighting points can be done.

Reduced pollution:

By achieving more efficient energy consumption, we can reduce CO_2 emissions that cause the greenhouse effect which affect the global climate.

We also reduce light pollution through a more efficient use of street lighting.

How does a street lighting management system work?

There is an extensive low voltage network which enables all street lighting points to be reached, but do not forget that the electrical network was designed to deliver energy and is not to be used as a means of communication.

CIRCUTOR has extensive experience in communications that use the electrical network itself. These systems are being applied with excellent results in the telemanagement of smart energy meters, enabling, since it is a two-way system, both the capture of information generated and the possibility of sending them orders.

The electrical signals used for communication are low frequency and energy, which means there is no interference with the working of other units.

The system uses DCSK modulation, especially designed for communications through the electrical network that uses the entire bandwidth permitted by the standard, making it resistant to frequency tones in the electrical network.

This modulation system complies with the **CENELEC EN 50065-1** European standard and uses the B band consisting of frequencies between 95 and 125 kHz. ◗

Cirlamp lighting point controller

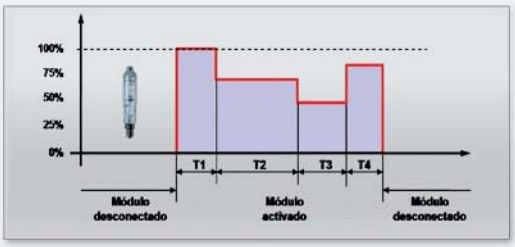
The **CirLamp** module is the unit installed at each lighting point and is responsible for smart control of the street light. This unit performs two major functions:

Efficient lighting management

Through dual level or 1-10 V_{dc} outputs, it can control any ballast or driver on the market with the aim of switching on or off and adjusting the current level.

Maintenance management:

The **CirLamp** provides information on the status of each lighting point, enabling efficient fault detection and reporting the exact location of incidents. Preventive maintenance is also possible thanks to information on operating hours.



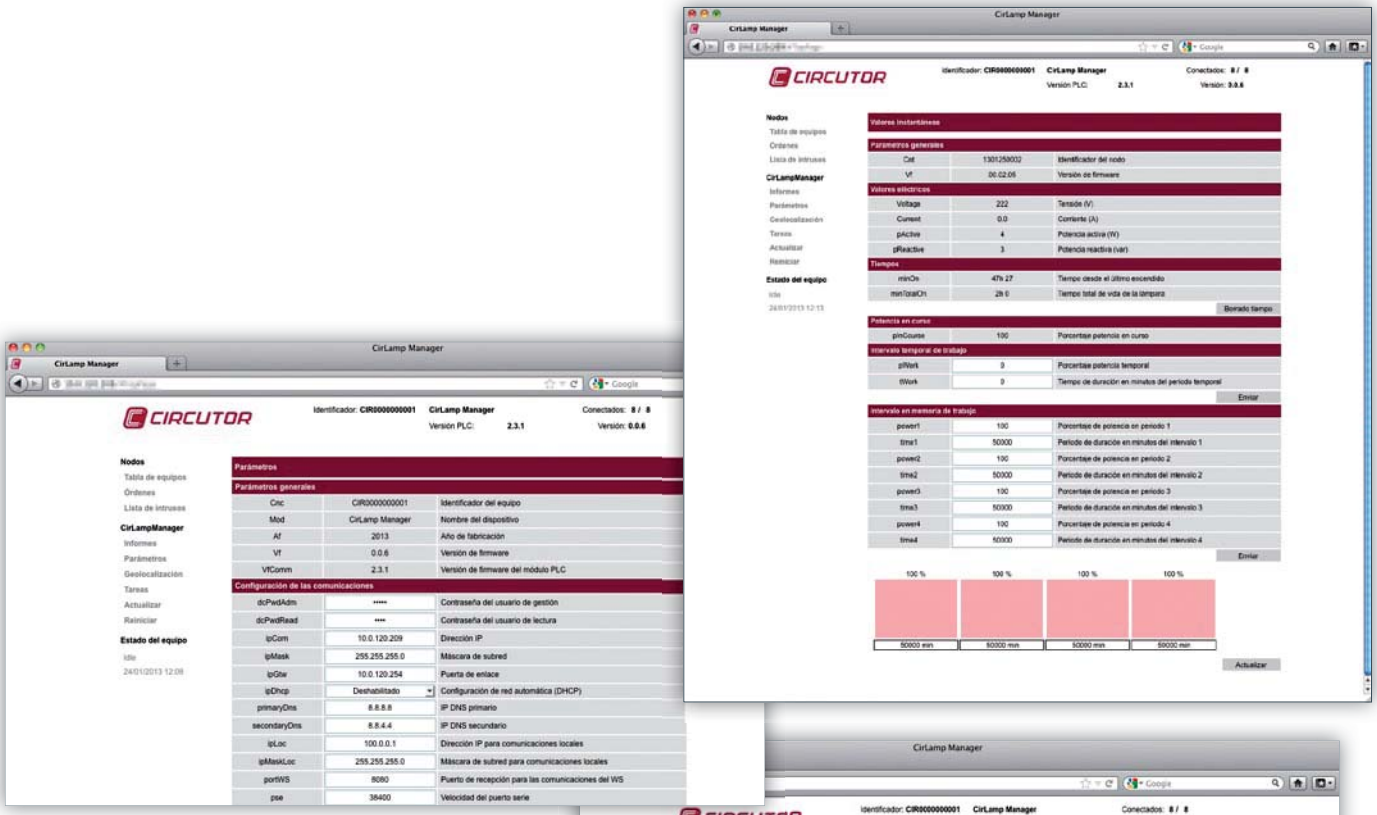
4 separate time intervals (minutes) and the output power for each period (%) can be configured:

- In the dual level module there is an output with an ON/OFF control via a 10 A @ 250 V AC relay and a dual level control for the ballast, via a 3 A @ 250 V AC relay.

- In the 1-10V module an analogue output of between 1 and 10 V DC is applied for regulating the ballast or LED lamp driver.

The **CirLamp** module can work independently. When voltage is applied, it starts to run the sequence programmed in its memory. Once this is finished, it is maintained at the value of the last period until the voltage is disconnected.

So, if there is any communication problem with the **CirLamp Manager**, the unit responsible for managing the network, the module installed at each lighting point will be able to run the sequence configured.



CirLamp Manager

The **CirLamp Manager** is the unit responsible for managing the CirLamp nodes through PLC communications: Plug & Play system, repeater function, active search for the path, etc. With **CirLamp Manager** we can:

- Allows monitoring of status of lamps
- Manages errors to facilitate both active and preventive maintenance

This solution allows the customer to have a more visual and interactive control of the installation through SOAP (XML) messages and the web site.

- **Manages the orders:** Modification of the configuration parameters of any node
- **Manages tasks:** Reading of the electrical parameters of any node.

Web site management:

- Overview of **status of nodes** in the network.
- **Instantaneous** values.
- **Firmware** upgrade.
- **Configuration** of parameters.
- Configuration of **tasks**.
- Modification of work **intervals**.
- Configuration of **alarms**.
- Reading of **reports**.