

Lisbon City Hall Square with smart street lighting system

Municipality of Lisbon

GOALS

EDP Distribuição (a subsidiary company of EDP, the Portuguese electric utilities company) developed the InovCity concept of an intelligent city, based on the InovGrid smart grid project. Smart grids enhance energy efficiency and constitute a fundamental pillar of sustainable development.

The Lisbon City Hall Square (*Praça do Município de Lisboa*) is an emblematic and historic place of the city therefore it was a key stone to preserve the historical lanterns while replacing the traditional street lighting with LED technology, as a measure of energy efficiency and reduction of energy consumption in street lighting. Thus, the project had a technological conversion component maintaining and preserving existing equipment by retrofitting, respecting the architectural design of the space.

The intervention also included the installation of motion sensors and the development of a management system that can be controlled remotely with additional resources of reduction of luminous flux, associated to the pedestrian or road movement, and a supervisory center that can establish consumption profiles for each LED lamp.

The street lighting system is of extreme importance for the city of Lisbon, not only because of the annual energy and maintenance costs it represents in the budget, but also because it is an important safety factor for the inhabitants and tourists who visit the city.

InovCity project

It consists of providing the electrical grids with information and equipment capable of management automation, improving service quality, lowering operating costs, promoting energy efficiency and environmental sustainability, and enhancing the penetration of renewable energies.



Project implemented in 2014.

INSTALLED SOLUTION

The project included the replacement of traditional street lighting (high pressure sodium) in 26 luminaires of three different types.

The main assumptions of the project were to maintain similar levels of correlated color temperature (CCT) and luminous flux, reducing energy consumption.

In order to respond to the requirements of the existing equipment, three specific modules were developed, which made it possible to replace the current lamps and ballasts with LED units. These modules are comprised of LED modules, power supply adapter and control board. The luminaire body was maintained by replacing the interior with the custom designed module so that the result from the point of view of the light distribution was identical to that which existed.

This is the implementation of an innovative solution that provides "smart grid" ability capable of dynamically responding to the requirements of use and in which each luminaire communicates via Power Line Communication (PLC).

SMART MANAGEMENT SYSTEM

In addition to the LED lamps, the project also included the installation of pedestrian motion sensors and a bidirectional management system - ArquiGest (the predecessor of ECCOS CITY) - that can be controlled remotely.

The luminaires operate real time fashion, in a network environment, reacting to motion sensing in the surrounding environment and according to the pre-configuration. The management and monitoring are performed by a single gateway that keeps the network system active and that provides the user with remote access to all the functionalities via web that allows access through any browser compatible with the FlashPlayer plugin.



The user can manage each luminaire in real time, retrieve data collection and configure the default settings.

These features enable significant energy savings by reducing light flux based on setup time, optimized maintenance through remote monitoring and optimization of resources through motion detection.



The motion sensors were implemented in two different groups of luminaires: the lanterns: the historical luminaires installed on the walls of the building and the luminaires installed on poles located on the sidewalk of the central square.

Each group of luminaires operates homogeneously within the group in which it is inserted and according to the various motion sensors distributed in some luminaires.

When motion is detected, only the group of luminaires associated with it responds to the pre-programmed light level.

The implemented solution makes it possible to:

• remote management and monitoring: the street lighting management software, allows an overview of all luminaires. It is possible to view in real time the energy that is being consumed in a group of luminaires or in each one individually, as well as the luminance flux profile. It also allows control of the luminaires in real time. For example, it allows to mitigate the damage of a lamp, changing the luminous flux of other active lamps.

• automatic fault detection: the system provides instant information about interruptions, notifications of other occurrences or alarms. With this functionality, it will be possible to filter false alarms, have a more accurate knowledge of areas that are experiencing malfunctions and have more efficient repair teams in detecting failures and restoring the service, leading to higher levels of citizen satisfaction.

• regulation of luminous flux and motion sensors: the luminosity levels of LED lamps can be reduced up to 20% with a minimum of compromise in the regulated levels. In addition, the luminaires can be programmed to decrease the luminous flux depending on the circumstances, for example, during off-peak hours. With the addition of motion sensors to the luminous flux regulation system, it is possible to reduce the energy consumption of the lamps by more than 50%.

ADVANTAGES

The implementation of the Smart Lighting System at Lisbon City Hall Square translates into several advantages, such as:

• to view in real time the energy being consumed in a group of luminaires or in each one individually, as well as to control the luminaires in real time;

- reducing CO₂ emissions;
- reducing operation costs;
- improving the sense of comfort and safety for citizens and tourists;
- improving road safety.



ARQUILED

Arquiled is a general LED lighting manufacturer, specialized in professional luminaires for street lighting, systems and services.

Headquartered in Mora-Alentejo, is a Portuguese industrial company, pioneering the market since 2005, that designs and develops its own products and solutions.

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ARQUILED is committed to develop smart management solutions focused on reducing energy consumption and decarbonization, contributing to sustainable urban clusters.

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