

## LED technology in traffic lights - Porto, Portugal

### Key words

*LED Lighting*

*Energy efficiency*

*Traffic lights*



### Objectives

The City Council of Porto replaced the traditional traffic light with LEDs (light emitting diodes) throughout the entire city, thus putting into practice the defined strategy in the Sustainable Energy Action Plan, submitted under the Covenant of Mayors.

This action's objectives were to reduce energy use of the traffic lights system of the City of Porto while also contributing to road safety, reducing operation costs (both in energy use and required maintenance) resulting in reducing the related CO<sub>2</sub> emissions.

### Description

During the period between February 2010 and February 2014, the City Council of Porto proceeded to the replacement of incandescent bulbs with LED technology for all the traffic lights. This replacement happened progressively, following maintenance operations, under the maintenance contract the City Council held with a third party company, representing no implementation costs for the City Council.

Although traffic light control technology had advanced towards lower energy use, the lamps were still incandescent (mainly 100, 60 and 40 W lamps) in a system operating 8.760 hours/year. This document values the energy-environmental issues of the rehabilitated buildings striving for improvement of comfort conditions from well-judged intervention at the constructive conditions level, pointing solutions resulting in less CO<sub>2</sub> emissions, and also by energy vector shift (e.g. thermal solar and natural gas for heating purposes), while respecting the cultural values of an area classified by UNESCO as World Heritage.

### Achievements

As LED technology evolved and the replacement took place, the City Council lowered the installed power by around 90%, resulting in equivalent energy use and CO<sub>2</sub> emission reductions. This means a reduction of around 375.000 € in energy costs, 2.700.000 kWh in energy use and 1.000 tonCO<sub>2</sub> emissions since full implementation.

LED lamps have an average lifespan of over 20.000 hours, which compares to the 1.000 hours of the incandescent lamps. This means a reduction in maintenance contract costs of around 400.000 € per year.

Road safety was also increased since, in parallel to lower energy use, longer lifespan and lower operating temperature ensure a longer availability meaning less system unavailability. Another advantage is better light quality, resulting in brighter colors and reducing the false impression that, when in direct sunlight, a light is turned on when actually it is not.

### **Advice for replication**

Replacement of incandescent lamps by LED lamps during usual maintenance operations significantly lowers the implementation costs.

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