

EFFICIENT PUBLIC LIGHTING

VILA NOVA DE GAIA (Portugal)

Public lighting in urban areas represents a high cost to the municipalities in all Europe. In this field, the available technology of lamps, mainly the development of high-pressure sodium lamps and the flux control systems are two attractive options to reduce energy consumption in the cities.

THE CITY

Vila Nova de Gaia is one of the major cities of Portugal. Located on the left bank of the Douro river, Gaia is the Port Wine capital.

Gaia is renowned for its commercial and industrial importance. With a notable coastline and riverbank, and a lovely downtown area, Gaia is the biggest municipality of the Porto district (171 km²), with 300 thousand inhabitants.

Gaia is strategically located between the two largest congress parks in the country: "Exponor" (Matosinhos) to the North and "Europarque" (Santa Maria da Feira) to the South.



CONTEXT

ENERGAIA – the Energy Agency of Vila Nova Gaia, started her activities in 1999, to promote the rational use of energy in the municipality. The public lighting system soon has been identified as one of the biggest consumers of energy.

Along the 171 km² of the municipally area, the public lighting system is still growing with the correspondent increase of maintenance and energy costs.

The public lighting system of Vila Nova de Gaia has an energy consumption of 23 GWh/year, which is greater than all the other consumptions under the responsibility of the City Council. Actually this consumption represents a cost for the municipality greater than 2 million euros per year.

With this in mind, ENERGAIA has developed a study in order to reduce the public lighting consumption. In result of that study, it has been started an installation of flux control systems in 10 points of Gaia.

Although, the electric distribution company (EDP Distribuição), which is responsible for the maintenance of the public lighting system (lamps, electric circuits, control system), has gathered some data that was very useful for the public lighting efficient action, there is still very few information about the configuration and the status of the public lighting system.

DESCRIPTION OF THE PROJECT

ENERGAIA has conducted a study in order to identify the status of the public lighting system. This has been accomplished with the cooperation of the City Council and the electrical company.

The main objective was to evaluate the equipment used in public lighting, namely the lamps technology and the control strategies. The energy consumption and the maintenance procedures were also analyzed.



Based on this work, and due to the complexity and dimension of the public lighting system of Gaia, the strategy adopted to increase the energy efficiency was to act in a small set of circuits one at a time, replacing inefficient lamps, installing a flux control system and collecting and organizing all the necessary data.

The pilot installation

To demonstrate to the local authorities the feasibility of this project, it has been installed a pilot test in a strategic public lighting circuit in order to gather some experimental data.

The main idea was to confirm and adjust the study estimative and to identify the practical constrains or barriers of installing flux control systems.

In cooperation with a local company it has been installed a flux control system in one of the chosen circuits. That system was installed in one morning and has been tested during some weeks. The energy consumption of that circuit has been measured before, after and during the test. It has been proved that the flux control could reduce approximately 40% of the present energy consumption of the analyzed circuit.

It also has been assured that the equipment required is easy to install and the flux reduction does not affect the citizens.

Results

After the promised results of the study and of the pilot installation, it has been decided to increase the energy efficiency, in a first phase, of 10 public lighting circuits.

The control flux systems in the chosen public lighting circuits will educe the energy consume in 315 MWh per year. This amount of energy savings represents in avoided CO₂ equivalent emissions of 166 tons/year.

Based on the flux control system suppliers data, it has been estimated an increase of 30% of the lamps life span. The equipment investment for the 10 chosen lighting circuits varies between €7.000 and €14.000.

The energy savings and the increase life span of the lamps will result in €30.000 of economical savings per year.

In average, the energy and maintenance savings will reword the financial investment with a payback shorter than 4 years.



EVALUATION AND OUTLOOK

The global results obtained with this action were very positive. The local authorities became aware of the economic and environmental impacts of the public lighting in the municipality.



With this first action on this field, the energy agency has developed methodologies to collect and analyse the relevant information, which it will permit in the future to replicate these kinds of actions. The energy agency and the municipality will improve gradually the energy efficiency in the public lighting system by repeating these actions in other lighting circuits.

The environmental concerns are becoming more and more important in the European society and therefore this kind of energy savings action, developed by the municipality, are also very important to raise awareness in the public.

In a near future, the municipality of Vila Nova de Gaia will try to expand the public lighting efficiency project to the European Green Light program.

FOR FURTHER INFORMATION

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