

Energy Efficient Public Lighting in Vila Nova de Gaia

ENERGAIA – Energy Management Agency of Gaia, Portugal

Summary

ENERGAIA is supporting and promoting the reduction of public lighting energy consumption in Gaia municipality. In the preliminary study it was found that the best technical solution is the installation of flux control systems. Typically, flux control systems can save up to 20% to 30% of energy, and also increase the life span of the lamps up to 30%.

In a first stage of the project it is planned the installation of 30 flux control equipments that will induce energy savings up to € 50.000,00 per year. The total investment is about € 250.000,00 that will lead to a payback of 5 years without considering savings in maintenance costs.

End-user area	Target Audience	Technical
<input type="checkbox"/> New buildings	<input type="checkbox"/> Citizens	<input type="checkbox"/> Energy efficiency
<input type="checkbox"/> Refurbishment of buildings	<input type="checkbox"/> Households	<input type="checkbox"/> Heating
<input type="checkbox"/> Transport and mobility	<input type="checkbox"/> Property owners	<input type="checkbox"/> Cooling
<input type="checkbox"/> Financial instruments	<input type="checkbox"/> Schools and universities	<input type="checkbox"/> Appliances
<input type="checkbox"/> Industry	<input type="checkbox"/> Decision makers	<input checked="" type="checkbox"/> Lighting
<input type="checkbox"/> Legal initiatives (municipal regulations, directives, etc)	<input checked="" type="checkbox"/> Local and regional authorities	<input type="checkbox"/> CHP
<input type="checkbox"/> Planning issues	<input type="checkbox"/> Transport companies	<input type="checkbox"/> District Heating
<input type="checkbox"/> Sustainable communities	<input type="checkbox"/> Utilities	<input type="checkbox"/> Solar energy
<input type="checkbox"/> User behaviour	<input type="checkbox"/> ESCOs	<input type="checkbox"/> Biomass
<input type="checkbox"/> Education	<input type="checkbox"/> Architects and engineers	<input type="checkbox"/> Wind
<input type="checkbox"/> Other	<input type="checkbox"/> Financial institutions	<input type="checkbox"/> Geothermal
	<input type="checkbox"/> Other	<input type="checkbox"/> Hydro power
		<input type="checkbox"/> Other

Context

Public lighting in urban areas represents a high cost to the municipalities in all Europe. High-pressure sodium lamps and flux control systems are two attractive options to reduce electricity consumption for lighting in urban areas.

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.

ENERGAIA – the Energy Agency of Vila Nova Gaia, started her activities in 1999, to promote the rational use of energy in the municipality. Gaia’s public lighting system it is one of the major energy uses, responsible for 2% of the city total electricity consumption. Along the 171 km² of the municipality 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 corresponds to a significant share of the City Council expense budget, about 2 million euro per year.

Objectives

The main objective is to reduce energy consumption in public lighting and to promote efficient methodologies for monitoring and management of lighting circuits.

Process

The project was divided in four different phases. First phase: evaluate Gaia public lighting actual conditions and the available technologies to promote energy efficient; Second phase: develop a pilot project to confirm the theoretical results of flux control systems. Third phase: develop the financial model for the project implementation; Fourth phase: implementation of the project in a third party financing model, and launch of a communication campaign in order to disseminate the information on the project.

The first phase was been conducted between September of 2001 and May of 2002. The tests and results evaluation of the pilot installation were conducted between June and September 2002. The study of the financial model for the project implementation was recently concluded. In 2003 and 2004 implementation and dissemination.

Lighting flux regulation is performed by specific equipment installed in public lighting electric circuits, named flux control system. This equipment can be configured to work in a specific time period with reduced input voltage by a maximum of 50 volt (between 180 to 230V). Reducing input voltage in certain night periods, when there is less need for lighting, will allow considerable energy savings (typically 40% during the low voltage period).

Together with the installation of the flux control system it will be installed an energy monitoring equipment. This equipment will conduct the acquisition of electricity consumption data. This data is essential to quantify savings and improve initial estimates, but also detect faults in equipment operation.

Data will be sent through modem and stored in a central computer that will be located in ENERGAIA's office. Here the data will be handled and cost-savings accurately calculated.

Financial resources and partners

In a first stage of the project it is planned the installation of 30 flux control equipments that will induce energy savings up to € 50.000,00 per year. The total investment is about € 250.000,00 that will lead to a payback of 5 years without considering savings in maintenance costs

Results

In the first year (2003) it is expected 330 MWh savings and in the second year (2004), after the installation of the 30 flux control systems, 650 MWh savings. It is expected for the first year an economic savings of € 25.000,00 and for the second year (2004) a saving of nearly € 50.000,00. With a reduction of 650 MWh per year ENERGAIA will avoid the emission of 320 tonnes of CO₂ per year.

Lessons learned and repeatability

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 analyze the relevant information, which will permit in the future to replicate these kinds of actions. The energy management 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 public awareness.

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

The problems encountered are the lack of information of the system status and the lack of awareness in the municipality to energy savings in public lighting.

This project has a large potential for replication in other areas of Gaia and other urban areas around the world.

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Other contacts:
Host organisation: Câmara Municipal de Vila Nova de Gaia
Equipment manufacturers: TEV
Financial organisations: ENERGAIA – Energy Management Agency of Gaia (third party)
MAPE/POE – (national funding)