



MUNICIPALITY OF SAN VINCENZO LA COSTA

Province of Cosenza



POR Calabria
2014-2020
Fesr-Fse

AXIS 4 - ENERGY EFFICIENCY AND MOBILITY
SUSTAINABLE
PUBLIC NOTICE FOR THE FINANCING OF INTERVENTIONS
TO IMPROVE THE EFFICIENCY OF NETWORKS
PUBLIC LIGHTING OF MUNICIPALITIES



EXECUTIVE PROJECT

Object:

**INTERVENTIONS TO IMPROVE THE NETWORK EFFICIENCY
MUNICIPAL PUBLIC LIGHTING**

Elaborated Code:

REL.01

Title of the work:

GENERAL REPORT

The Designer

The Only Person Responsible for the Procedure

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1. PREMISE

The present technical report concerns the "Interventions to improve the efficiency of the network Public lighting of the municipality of San Vincenzo la Costa".

It is an integral part, together with the graphic documents, of the project documentation, to allow the construction of all the required systems in compliance with the rules of the art and with the laws and regulations current techniques.

This report therefore describes the aspects and characteristics of the lighting system municipal public, highlighting its critical issues from an environmental, construction and under- the safety aspect.

The objectives to be pursued through this design are:

- a. Physical and psychological safety of people, with the definition of areas and environments defined lighting, to discourage any criminal actions;
- b. Optimization of operating and maintenance costs with the use of measures adequate;
- c. Daytime and nighttime visual integration with other existing systems in the municipal area;
- d. Containment of light pollution with the choice of devices and methods of appropriate installation, non-invasive use of light with the choice of appropriate devices and lamps;
- e. energy saving with the use of latest generation sources (LED sources);
- f. improvement of aesthetics and of light and energy efficiency with the replacement of lighting fixtures.

The project was created in order to obtain levels of illumination and uniformity compliant with the laws in force on the matter.

The areas covered by the project are subject to motorized traffic for which UNI regulations regarding particular levels of illumination or luminance are binding or coercive.

Class II lighting fixtures will be installed in order to avoid the construction of an earthing system with consequent maintenance and certification costs to be managed by the Municipal Administration (approval).

2. TERRITORIAL FRAMEWORK

The municipal territory of San Vincenzo la Costa belongs to the Province of Cosenza and the Calabria Region; its extension is equal to 18.42 square kilometers with an average altitude of 493 m above sea level.



for the Municipality of San Vincenzo la Costa, as during the night hours it directly influences the level of usability of the urban fabric.

Good lighting also helps to increase the level of safety of road traffic and prevent the occurrence of criminal phenomena to the detriment of citizens.

On the basis of these assumptions, the Municipal Administration, in acknowledging the non-optimal state of conservation in which the systems are currently found, has planned to carry out a modernization and restructuring intervention of the entire public lighting system throughout the municipal territory, in order to safeguard public safety by avoiding all dangerous situations that could materialize such as electrocutions, falling corroded poles or falling damaged electrical equipment.

The same intervention will allow to reach a level of energy efficiency such as to contain electricity consumption, modernizing the system with the installation of more efficient and performing equipment from the point of view of management and energy consumption.

3. ANALYSIS OF THE STATUS OF FACTS OF THE PLANT

In order to better define the design guidelines for a safety intervention and energy efficiency of the public lighting system, we proceeded to review the current characteristics of the entire public lighting system, through the implementation of a census, with visual and instrumental surveys, of the main components of the same, such as:

- Lighting fixtures;
- Supports;
- Paintings;
- Delivery points;
- Distribution lines (as far as possible to detect)

Furthermore, all data relating to the power used, the power actually used, and energy consumption were quantified, as per the documentary data currently available to the Municipality.

The census carried out revealed that the lighting of municipal roads, excluding contents recent redevelopment interventions, is carried out with obsolete appliances and often with greater power than is actually necessary.

Following the surveys, the following critical issues were found:

1. the light sources used (Mercury Vapour, High Pressure Sodium, Metal Halide and Halogen) are not always suitable for the lighting category of the roads in which they were used (the luminance and uniformity values are not respected);
2. the type of devices and the resulting lighting must be considered, in their current state, not compliant with the UNI 11248 and EN 13201 standards currently in force;
3. the main streets of the municipality are unevenly illuminated due to unsuitable use appropriate for the lighting fixtures (type of optics, installation height, inclination, etc.);
4. some points, especially in the hamlets, are derived individually from the Enel Distribuzione line and controlled by a twilight probe installed punctually on each individual lighting fixture (electrical promiscuity).

The individual constituent elements of the system are reported in detail below, highlighting for each each of them the critical issues detected during the census phase.

3.1 Connection points to the distribution network

The entire municipal public lighting system consists of 22 electrical panels, located throughout the territory. A detailed survey was carried out on the territory and it was possible carry out a census of all connection points to energy distribution networks and the following results were recorded:

ELECTRIC PANELS			
ELEMENT ID	VOLTAGE OF POWER SUPPLY [Volts]	LOCATION	CURRENT STATUS
PICTURE 1	400	39°21'31.7"N 16°08'03.3"E	To be brought into compliance with Wardrobe replacement
PICTURE 2	400	39°21'28.5"N 16°08'05.0"E	To be brought up to standard
PICTURE 3	400	39°22'18.8"N 16°07'53.9"E	To be brought into compliance with Wardrobe replacement
PICTURE 4	400	39°21'48.8"N 16°08'33.3"E	To be brought into compliance with Wardrobe replacement
PICTURE 5	400	39°22'00.6"N 16°08'56.4"E	To be brought up to standard
PICTURE 6	400	39°22'14.6"N 16°08'59.4"E	To be brought up to standard
PICTURE 7	400	39°21'53.8"N 16°09'06.0"E	To be brought up to standard
PICTURE 8	400	39°21'49.8"N 16°09'07.2"E	To be brought up to standard
PICTURE 9	400	39°21'23.3"N 16°08'31.2"E	To be brought up to standard
PICTURE 10	400	39°21'57.1"N 16°09'42.5"E	To be brought up to standard
PICTURE 11	400	39°21'58.3"N 16°10'57.8"E	To be brought up to standard
PICTURE 12	400	39°22'22.6"N 16°10'47.5"E	To be brought into compliance with Wardrobe replacement
PICTURE 13	400	39°22'26.7"N 16°10'02.9"E	To be brought up to standard
PICTURE 14	400	39°22'41.0"N 16°09'02.8"E	To be brought up to standard
PICTURE 15	400	39°22'49.8"N 16°09'12.0"E	To be brought up to standard
PICTURE 16	400	39°22'59.1"N 16°09'51.3"E	To be brought into compliance with Wardrobe replacement
PICTURE 17	400	39°23'18.0"N 16°09'25.5"E	To be brought up to standard
PICTURE 18	400	39°22'51.9"N 16°09'24.4"E	To be brought into compliance with Wardrobe replacement
PICTURE 19	230	39°22'41.3"N 16°09'47.5"E	To be brought up to standard
PICTURE 20	400	39°22'39.7"N 16°10'05.0"E	To be brought up to standard
PICTURE 21	230	39°22'32.7"N 16°10'22.8"E	To be brought up to standard
PICTURE 22	400	39°22'36.8"N 16°10'37.1"E	To be brought up to standard

The maintenance of the public lighting system is currently carried out by a company that deals with interventions limited to the replacement of lamps and electronic equipment that from time to time become necessary.

Extraordinary maintenance or replacement of system parts (poles, underground or overhead lines, etc.) are agreed with the Administration based on pressing needs.

The management and operation of the entire plant, including energy consumption costs, is entirely in charge of the Administration, which owns the entire plant. From the survey phase it emerged that no line constituting the entire public plant lighting is equipped with flow regulators, potentially capable of stabilizing and regulating the supply voltage of the light sources.

Furthermore, failure to replace the capacitors associated with the lighting power supply system causes high cost coefficients recorded on the consumption of each system, determining a greater expense for reactive energy consumption, to be charged as per law to the end user, as well as an unnecessary overloading of the power lines, with consequent reduction in lifespan.

The power and control systems are housed inside street cabinets, which are mostly made of fiberglass, with the remaining parts made of iron. The iron cabinets require painting as they are in a very corroded state and some of them have irregular closures, so much so that they cannot guarantee public safety in the event of accidental openings.

Even the state of conservation of the electrical equipment itself is, for some panels, in such a state as to require immediate replacement with new components.





Fig.2. Types of paintings present in the territory

3.2 Types of supports

From the census activity carried out it emerged that there are a total of 744 supports, they were distinguished in relation to the various types of materials they are made of, and according to their conformation, in order to highlight as much as possible am the construction typology of the system. Specifically, the supports are made up as follows:

Conformation of the supports	Amount
Poles	584
Arms and Shelves	154
Other	6
TOTAL	744

Type of supports	Amount
Iron Poles	134
Galvanized Steel Poles	364
Painted Steel Poles	84
Cast Iron Arms and Brackets	97
Iron Arms	60
Other	5
TOTAL	744

The above highlights how the municipal public lighting system is essentially configured with pole-type supports, the other typologies being present in much smaller quantities, and limited to certain urban areas (e.g. the historic centre and city hamlets).

At present there are parts of the supports that appear to be in a serious state of degradation, with corroded parts. Furthermore, there are 3 pole-type supports that appear to be in a precarious state of equilibrium and with the possibility of causing damage to public safety. It also emerged that there are 60 iron arms with road reinforcements that do not comply with current ones. regulations and not appropriately inserted into the urban context in which they are located (Historic Centre).



Fig.3. Types of supports present in the territory

3.3 Types of lighting fixtures

As for the supports, a census was carried out of all the lighting fixtures used for the public lighting system, then distinguished in relation to the various types of devices and lamps used, with their relative power; this is to better highlight the construction typology of the plant.

At present we have:

Type of lighting fixtures						
Lamp	Power [W]	Lantern	Road	Globes	Projectors	Heads
Halogen	150	-	-	-	1	-
Iodides metallic	150	-	-	-	2	-
	250	-	-	-	1	-
	400	-	-	-	5	-
Led	54	-	84	-	-	-
Vapors of mercury	125	114	392	18	-	2
High sodium pressure	70	11	68	1	-	-
	100	-	43	-	-	-
	150	8	35	-	1	-
	250	-	-	-	1	-
TOTAL LAMPS	787					

The public lighting system features, as specified in the table above of LED lighting fixtures, the following project does NOT intervene on these lighting fixtures as they are already made up of latest generation lamps, however it should be noted that they have obsolete or poorly maintained fittings and for these reasons do not allow for correct street lighting.



Fig.4. Types of lighting fixtures present in the territory

5. DEFINITION OF THE MAIN LINES OF INTERVENTION

Based on the findings and above, and with the intent to pursue the objectives above recalled, the main lines of intervention are identified for the purpose of making the site safe and efficient energy management of the system (object of the project) ettazione), identified as follows:

1. Interventions to make the system safe and rationalise it:

- Total remake of panels, consisting in the complete removal of existing cabinets and installation of new street cabinets, appropriately protected with shock-proof systems and containing all the electrical and auxiliary equipment necessary for the protection of the lines and end users, as well as systems capable of allowing punctual supervision of the systems
- Bringing it into compliance with paintings, by inserting special protection devices electrical devices such as differential circuit breakers, surge arresters, sectional switches, etc.;
- Insertion of astronomical relay for all panels to ensure correct ignition and system shutdown;
- Insertion of specific point-to-point dimmable flow regulators, with direct installation on the lighting fixtures, in order to obtain an improvement in the quality of the lamp supply voltage and to standardise the daily switching on method of the systems;

2. Replacement of 703 existing light fixtures with new LED fixtures , this intervention of greater consistency than the others described, will allow to obtain many of the advantages stated above, as it will allow to reduce the energy costs of the system (being LED equipment capable of guaranteeing greater efficiency compared to traditional sources), of abbato direct the light emission above the lighting fixtures, to improve current lighting performance, through the use of lenses capable of distributing the light flow where actually necessary (reducing debilitating glare, illumination invasive in private areas, etc.), to reduce current maintenance costs, thanks to the lifespan of such innovative equipment (estimated lifespan between 60,000-80,000 hours of operation, even more reliable if served by flow regulation systems, capable of prolonging the useful working life). This intervention includes the replacement of 538 road armor,the replacement of 133 of typeartistic (which oneslanternspresent in the historic centre of the municipality, and in the hamlets of Gesuiti and San Sisto dei Valdesi), but also the replacement of 19 armors on globesand of 12 armors divided between projectors and tensioned armatures. The new equipment will be of the double-insulated type, therefore it will not be necessary ,It is forbidden to connect them to the earthing system, with obvious advantages in terms of system management.

3. Replacement of n°3 existing poles with new ones in galvanized steel , of such dimensions and shape as to achieve the best lighting results on the road served;

4. Painting of n°230 supports which are in a highly corroded state using anti-corrosive oil-

synthetic enamel;

5. installation of new artistic shelves , aesthetically similar to those already existing in place of the non-artistic arms present in the historic centre and in the hamlets of Gesuiti and San Sisto dei Valdesi.

6. Installation of equipment with a view to optimising and maximising the use of the “lighting system” infrastructure for the provision of services “oriented towards smart cities” , through the creation of a video surveillance system.

6. RESULTS AND PURPOSE

By implementing the interventions described in this report, we intend to achieve significant energy savings, while at the same time reducing carbon dioxide emissions into the atmosphere.

With reference to this last aspect, the projects presented in this report are inspired by the guidelines that the European Community indicates for the achievement of one of the main objectives of all community policy: energy sustainability.

In this perspective the ricbear lighting systems with LED technology represent choices projects that allow the reduction of CO emissions²for energy production, as well as significant savings in terms of energy consumption.

The use of this technology arises from the need to combine:

- compatibility with architectural and environmental protection
- requirements; no noise pollution;
- a saving of fossil fuels;
- electricity production without polluting emissions.

For anything not better specified, and for the details of the technical design characteristics of the For the interventions mentioned above, please refer to the specific specialist report of the interventions, attached to the present executive project.