

ATTACHMENT 4
PUBLIC LIGHTING NETWORK REGISTRY

1. INTRODUCTION

The purpose of this ATTACHMENT is to present the guidelines to be followed by the CONCESSIONAIRE for the preparation and updating of the REGISTRY throughout the CONCESSION TERM.

2. REFERENTIAL QUANTITATIVE OF PUBLIC LIGHTING POINTS

The REFERENTIAL QUANTITATIVE OF PUBLIC LIGHTING POINTS gives the following quantitative for each GROUP OF PUBLIC LIGHTNING POINTS:

- Group 1.1: PUBLIC LIGHTING POINTS on ROADS WITH TELEMAGEMENT: 15,937 (fifteen thousand nine hundred and thirty-seven);
- Group 1.2: PUBLIC LIGHTING POINTS on other roads, squares, parks, etc.: 42,826 (forty-two thousand eight hundred and twenty-six).

3. GUIDELINES FOR REGISTRY BY THE CONCESSIONAIRE

The REGISTRY shall be prepared by means of physical inventory and based on the guidelines expressed in this ATTACHMENT and on the deadline established in the CONTRACT.

The REGISTRY, after approval by the INDEPENDENT VERIFIER, according to the guidelines in item 14.1 of ATTACHMENT 5 (SERVICES SPECIFICATIONS), shall be an integral part of the CONTRACT.

The CONCESSIONAIRE shall undertake full responsibility for the preparation, conservation and updating of the REGISTRY during the CONCESSION TERM, and shall integrate it with the other operating systems that will integrate the OPERATION CONTROL CENTER (CCO), so that the CONCESSION AUTHORITY and the CONCESSIONAIRE have access, in real time, to the same REGISTRY.

The REGISTRY, permanently updated, shall ensure an efficient and integrated management and shall serve as base information for the elaboration of MODERNIZATION AND STREAMLINING ENERGY projects, SPECIAL LIGHTING, implementation of the TELEMAGEMENT SYSTEM and COMPLEMENTARY SERVICES. In addition, it must subsidize the calculation of the amounts

presented in the electric energy consumption invoices and the elaboration of consumption simulations for inspection by the CONCESSION AUTHORITY of the ENERGY SUPPLY AGREEMENT.

The SERVICES related to the REGISTRY include the collection, REGISTRY, maintenance, correction and updating of data related to the identification, characteristics, quantification and individualized geographical positioning of all PUBLIC LIGHTING POINTS, command boards, transformers and other components that make up the MUNICIPAL PUBLIC LIGHTING NETWORK, with the respective locations and physical, technical and operational characteristics.

The management of the REGISTRY must allow the CONCESSION AUTHORITY and the INDEPENDENT VERIFIER to monitor online and in full information about the MUNICIPAL PUBLIC LIGHTING NETWORK, ensuring, at least:

- The availability of a wide range of consultation and reporting options, including the issuance of maps at various scales, ensuring the full monitoring of the MUNICIPAL PUBLIC LIGHTING NETWORK and the evolving activities;
- The direct import and export of data from/to commercial applications of CAD, GIS, databases and for the production of documents in MS-Office, CSV and other formats compatible with those used by the CONCESSION AUTHORITY.

The CONCESSIONAIRE shall submit, upon request, the REGISTRY to the DISTRIBUTION COMPANY, to the INDEPENDENT VERIFIER and to the CONCESSION AUTHORITY.

The CONCESSIONAIRE shall also prepare Standard Operating Procedures (SOPs) and technical instructions for the SERVICES described in this ATTACHMENT.

The CONCESSIONAIRE shall enter at least the following data in its REGISTRY:

I. Characterization of the location of the PUBLIC LIGHTING POINT:

- Type of public address (street, avenue, square, park, bicycle path);
- Address of the address of the PUBLIC LIGHTING POINT, and for point with address without identification, the closest address to the point must be registered;
- Neighborhood;
- Macro region of the municipality (urban or rural area);

- CEP;
- Number of the PUBLIC LIGHTING POINT;
- Georeferenced position (latitude, longitude);
- Photographic record of the PUBLIC LIGHTING POINT;
- Definition of PUBLIC LIGHTING POINT (Conventional, TERMINAL PUBLIC LIGHT POINT, ISOLATED PUBLIC LIGHT POINT), as defined in the CONTRACT;
- Transformer code, even if it is an asset of the DISTRIBUTION COMPANY, to which the PUBLIC LIGHTING POINT is connected.

II. Characterization of the road:

- Road class (Fast, Arterial, Collector or Local Transit);
- Vehicle road lightning class (V1, V2, V3, V4 and V5);
- Pedestrian road lighting class (P1, P2, P3 or P4);
- Vehicle road width where the PUBLIC LIGHTING POINT is located;
- Pedestrian road width where the PUBLIC LIGHTING POINT is located;
- Indication of the existence of afforestation with the potential to obstruct the distribution of the luminous flux of the PUBLIC LIGHTNING POINT.

III. Lamp and LUMINAIRE:

- Purpose of lighting (road, pedestrian, bicycle path, historical, squares, parks, footbridge, prominence or tunnels);
- Lamp and LUMINAIRE lighting technology;
- LUMINAIRE Color Rendering Index (CRI), only for MODERNIZED PUBLIC LIGHTING POINTS;
- Color Temperature (CRT) of the LUMINAIRE, only for MODERNIZED PUBLIC LIGHTNING POINTS;
- Manufacturer and model of LUMINAIRE, only for MODERNIZED PUBLIC LIGHTNING POINTS;
- Date of installation of the Lamp and LUMINAIRE, only for MODERNIZED PUBLIC LIGHTNING POINTS;
- LUMINAIRE life estimated by manufacturer, in hours, only for MODERNIZED PUBLIC LIGHTNING POINTS;
- Type of LUMINAIRE (road standard, decorative, spotlight, built-in the ground, marker or other types);
- Lamp power or LUMINAIRE [W];
- Type of auxiliary power equipment (external reactor, internal reactor, driver, dimmable driver, etc.);

- Manufacturer and model of auxiliary power equipment (if any);
- Date of installation of auxiliary power equipment (if any);
- Total power loss of auxiliary equipment [W], if applicable;
- Total power of PUBLIC LIGHTNING POINT [W].

IV. Pole and Arm:

- For PUBLIC LIGHTNING POINTS installed on vehicle roads: Pole Topology (unilateral, bilateral front, bilateral alternate, highway median strip);
- Type of pole with information regarding the nature of its composition (concrete, steel or wood), and for the exclusive poles, the date of installation, if any, should be stated, in addition to the manufacturer's indication;
- Type of pole or standard in case the concessionaire normalizes (continuous conical, teleconic, tubular, inclined, curved, etc.), only for the exclusive poles of PUBLIC LIGHTNING;
- Type of installation (flanged or embedded), only for poles exclusive to PUBLIC LIGHTNING;
- Useful pole height (meters, from ground level to the point of connection with the luminaire's support device), only for poles exclusive to PUBLIC LIGHTNING;
- Horizontal projection of the LUMINAIRE [m];
- Installation height of the LUMINAIRE [m];
- Pole installation date (exclusive for the exclusive poles, when possible);
- Number of LUMINAIRES on the pole;
- Luminaire supporting device model (single bracket, double bracket, triple bracket, short arm, medium arm, long arm, prime arm etc.). The concessionaire may adopt nomenclatures to refer to models of arms that it may standardize, as long as there is technical documentation of these standards;
- Date of arm installation (when possible);
- Exclusivity or not of the pole to the MUNICIPAL PUBLIC LIGHTNING NETWORK, indicating, in cases of non-exclusivity, the pole owner;
- Distance between the pole and the curb (mm);
- Distances between the public lighting point and adjacent poles;
- REGISTRY and identification, if any, of third party assets currently installed in the pole (e.g. antennas, routers, meters, sensors, etc.), when exclusive to PUBLIC LIGHTNING.

V. Command and Power:

- Type of Command (group or individual);
- Type of Command and Control Device (TELEMANAGEMENT SYSTEM or relay);

- If group command, group code;
- Type of power supply network (overhead or underground);
- Owner of the network;
- Form of measurement of consumption (estimated or measured);
- Number of the DISTRIBUTION COMPANY meter (for measured cases);
- Georeferenced position (latitude, longitude) of the meter (if any);
- Supply voltage [V];
- Manufacturer and device model of the PUBLIC LIGHTING POINT TELEMAGEMENT SYSTEM (if any);
- Date of installation of device of PUBLIC LIGHTING POINT TELEMAGEMENT SYSTEM (if any);
- Manufacturer and model of the photoelectronic relay (if any), only for MODERNIZED PUBLIC LIGHTNING POINTS;
- Date of installation of the photoelectronic relay (if any), only for MODERNIZED PUBLIC LIGHTNING POINTS.

VI. Transformers exclusive to the MUNICIPAL PUBLIC LIGHTING NETWORK:

- Transformer power;
- Assembly or installation (pedestal or sheltered) and transformer installation date, if any.

The REGISTRY shall present all the above information for all PUBLIC LIGHTING POINTS, except for those for which it is necessary and impossible to identify, in local inspection, construction, manufacturing, efficiency and installation date data of the PUBLIC LIGHTING POINT.

The CONCESSIONAIRE must implant until the end of PHASE II (two) of the CONCESSION power label and physical identification plate with numerical code of the PUBLIC LIGHTING POINT, which can be applied both in the arm of the LUMINAIRE and in the LUMINAIRE itself, in order to guarantee the easy visualization of the numbering by any person who is located at ground level.

The CONCESSIONAIRE must present models of the identification plate and the power label of the PUBLIC LIGHTING POINTS to the CONCESSION AUTHORITY for approval, being able to use the same standard existing in the MUNICIPAL PUBLIC LIGHTING NETWORK, provided that in common agreement between the PARTIES. The implementation of the identification plates must observe the following guidelines:

- i. Installation of an aluminum or stainless steel plate with adequate dimensions to guarantee the easy visualization of the numbering by any person who is located at ground level;
- ii. Adoption of a single standard for the identification plate and the way of fixing it on the PUBLIC LIGHTNING POINTS;
- iii. The fixing of the plates should minimally guarantee the identification of the LUMINAIRE'S power for maintenance purposes;
- iv. The identification plates for SPECIAL LIGHTING should not compromise the physical and aesthetic structure, aiming at not disfiguring the cultural asset.

Data integration and communication tools may be developed between the information technology systems of the CONCESSIONAIRE and the DISTRIBUTION COMPANY and between the information technology systems of the CONCESSIONAIRE and the DISTRIBUTION COMPANY, in order to allow the updating of REGISTRY data to transit in an agile and secure way.

Regardless of the implementation of system integration between the PARTIES, the CONCESSIONAIRE is not exempt from submitting an update report of the REGISTRY within the period established in the CONTRACT, which may be issued by the integrated system.

The update of the REGISTRY, during the CONCESSION TERM, shall be the responsibility of the CONCESSIONAIRE and shall be performed for the elements already registered and that have their characteristics altered for any services performed, as well as the complete REGISTRY of each new item installed in the MUNICIPAL PUBLIC LIGHTING NETWORK, including when there is an expansion of the MUNICIPAL PUBLIC LIGHTING NETWORK by third parties or by the CONCESSIONAIRE, in the form established in the CONTRACT.

Updates from the SERVICES of expansion and maintenance, operation, MODERNIZATION AND STREAMLINING ENERGY shall be registered in the REGISTRY in order to have a history of changes of the SERVICES performed and materials applied in each PUBLIC LIGHTING POINT.