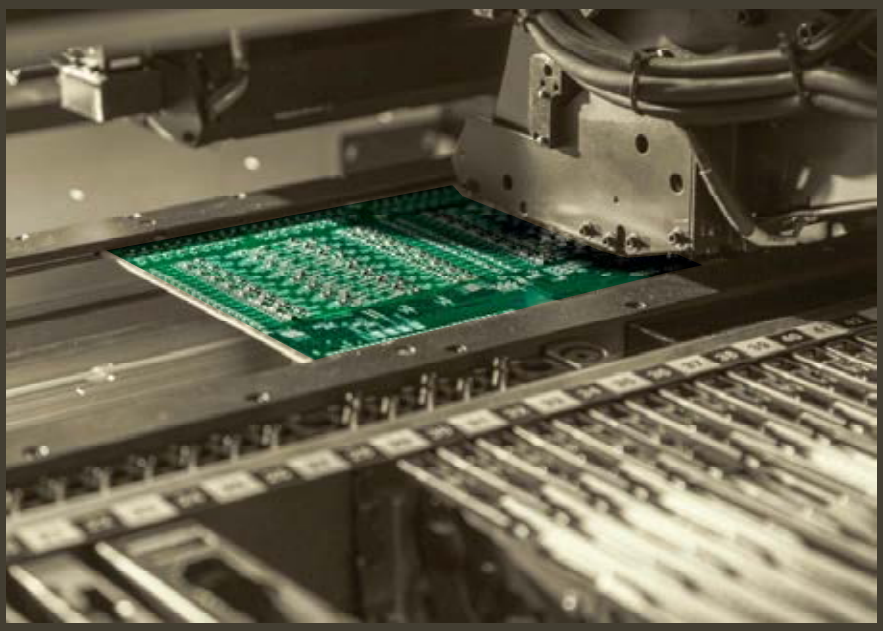
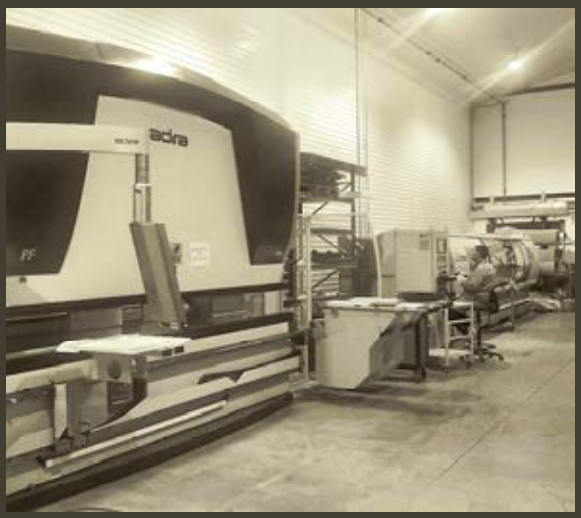
# Lighting PUBLIC & INFRASTRUCTURES

lightenjin

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lightenjin

Public lighting is the generic name for the lighting system of roads and public areas.

Public lighting is essential to safety and quality of life both in urban centers and in secondary and rural roads.

**Public lighting** is synonymous with: public safety for pedestrians; crime prevention; creating more value of monuments, buildings and landscapes; making road traffic simpler; route marking.

In short, it acts as an instrument of citizenship, allowing inhabitants to enjoy public spaces during the night.

The improvement of quality of public lighting systems translates into greater comfort and safety of cities themselves, bolstering tourism, commerce and nightlife, expanding the culture of efficient and rational use of electric energy, thus contributing to the social and economic development of the population.

Lightenjin presents itself to the market of public lighting to serve citizens in their needs of night safety and lighting with adequate comfort, based on LED technology, energy efficiency, reduction of maintenance costs, easy implementation and effective reduction of $CO_2$ that the system managers intend.

With Lightenjin as its starting point, public lighting and infrastructures offer many opportunities for improvement in order to create smart cities.

## SMART CITIES

*Smart Cities is a concept that aims to convey the effective integration of physical, digital and human systems in the environment in order to promote a prosperous, sustainable and inclusive future for its citizens.*

Source: BSI PAS 180:2014 (The British Standards Institution)

An intelligent city is a platform capable of promoting digital transformation. This implies changes:

**Community** in work methods, public participation, health care and openness to the outside (tourists, students, migrants);

**Economy** through new business models, new forms of logistics, digitization, shared economy and circular economy;

**Urban Space** by regeneration and rehabilitation, by improving air quality, by reducing emissions, by energy and water efficiency, by increasing comfort and leisure spaces;

**Mobility** through collective, shared, electric, autonomous and soft transport;

**Technology** through sensors, intelligent lighting, production and energy management, big data, artificial intelligence and communications;

**Education** for the promotion of digital and artistic skills, continuous learning, retraining of people and entrepreneurship;

**Culture** through creativity, collaboration, co-creation and volunteering.

## Our Experience

- > 24.000 Light points
- > 150 Gateway's
- > 800 Line Group
- 131 Users

## Some cities with Management Systems:

Águeda
Lourinhã
Porto
Pombal
Leiria
Alcobaça
Cascais
Sintra
Oeiras
Lisboa
Vila Franca de Xira
Porto de Mós

Mangualde
Setúbal - Monte Verde
Guarda
Açores - São Roque do Pico
Viseu
Avis
Portimão
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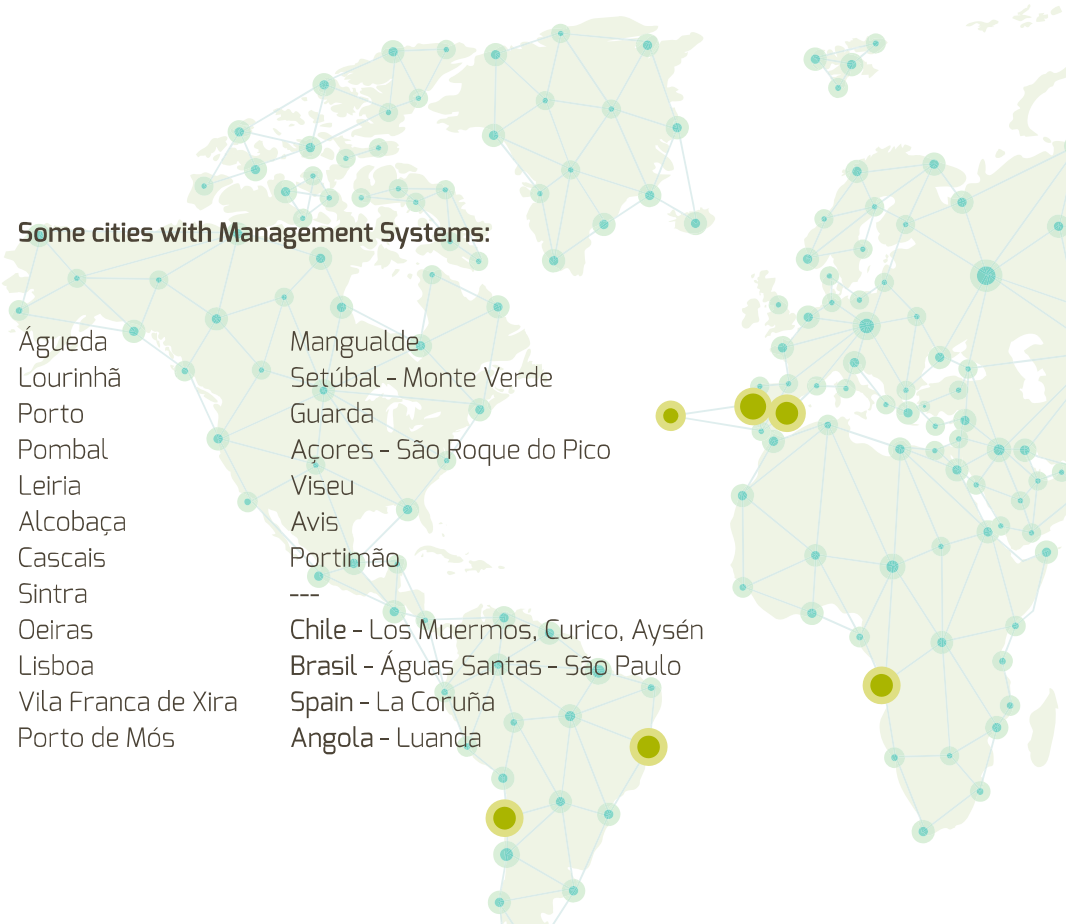
**Chile** - Los Muermos, Curico, Aysén
**Brasil** - Águas Santas - São Paulo
**Spain** - La Coruña
**Angola** - Luanda




**Wireless Platform for Smart Cities**

allows you to collect and analyze data as well as individually identify all points on the network and know their status.

## GESLUCE _ For Smart Cities

Remote Data Management System

In light of the complexity and resource management needs that cities are facing, together with their technological partners, Lightenjin has developed a management platform for cities of the future called **Gesluce**.

This platform allows in a simple way to manage equipment / services connected to the network, functioning in a bidirectional way. That is, it sends a set of actions / tasks to the equipment on the ground, allowing them to function autonomously, and receives reports and alerts from them that will be treated and presented to users so that they can take quick and effective actions / decisions.

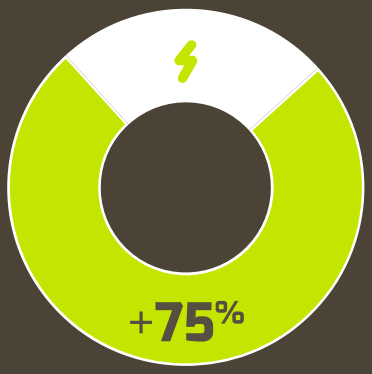
Gesluce has the ability to manage in real time and 24 hours a day the entire lighting infrastructure of a city, autonomous lighting systems, scenic / multimedia lighting systems, irrigation systems, information and/or advertising panels and traffic lights, loading of electric vehicles, sound systems, parking. In addition to real-time management, it is possible to collect and receive data such as energy consumption, number of people and / or vehicles, level of luminosity, movement / presence. This data can be converted into re-directionable alarms for platform managers or even for civil protection, police and firefighters.

This system is versatile and flexible and can be adapted in terms of communication protocols and applications according to the specificity and the IoT equipment existing in the cities, in order to guarantee an appropriate and stable connection.


## Benefits:

+ **Reduced maintenance and operating costs:** High equipment lifespan reduces the need for maintenance and continuous monitoring allows for planned and accurate intervention. Intelligent management of lighting and irrigation systems enables consumption to be reduced;
+ **Reduction of $CO_2$ emissions:** The ability to manage equipment such as irrigation and lighting in a rational way can reduce CO2 emissions by reducing energy consumption. In addition, it is possible to integrate air quality monitoring systems and collect information to support decision making;
+ **Security:** The integration of services such as air quality monitoring, signals and sound systems increase proximity to citizens and security agents by promoting increased security for cities and people;
+ **Ease of installation:** The control and management system is simple to install and easy to configure thanks to the compatibility with various communication protocols (1-10, DALI, SR, PWM) and the high intelligence of the intermediate devices that reduce the need for configuration on the ground, by simply installing the control devices in the luminaires and the gateways on the ground;
+ **Light comfort:** The use of state-of-the-art electrical and electronic components allows the adaptation of lighting levels to the needs of spaces and users in real time, in a dynamic and automatic way;
+ **Creating added value of city services:** The high capillarity of the network and public lighting allows the creation of a communications infrastructure capable of hosting and managing multiple services. This allows the economic, social and environmental value of those same services, guaranteeing even greater connectivity and communication between citizens and decision makers;

# The **Challenge** for the **Cities of the Future**




Cities consume more
of 75% of world energy

According to the United Nations, the population living in cities is expected to exceed 60% of the total population by 2030. This puts great pressure on cities and on how they are planned and managed.

In Mobility, there is a growing emphasis on collective transport, on-demand transport, electric vehicles, autonomous vehicles, on soft and shared mobility. These trends, coupled with the increasing importance of work distance, reduce the number of own vehicles in cities and increase the space available to citizens.

Energy Efficiency, which has a direct impact on $CO_2$ emissions and the energy bill, promotes the emergence of new energy production solutions based on renewable sources. Its storage and management will generate new business models, such as power network qualification or the dynamic purchase and sale of energy through electric vehicles and micro-generation.

Awareness of ever reducing resources leads to the need to manage and value resources such as water, waste, air and energy. The management of these resources has a direct impact on safety and the environment through the control of pollution, sonorous and luminous comfort.

In addition to this, exponential Technological Development puts increased pressure on infrastructures in terms of interoperability, security, obsolescence, dimensioning, retro-compatibility and upgradeability. Examples are: 5G, WiFi, vehicular (vehicle-vehicle, vehicle-infrastructure) and Internet of Things (IoT).

The new paradigms of Governance call for greater information and participation of citizens, real-time and connected sensors, and the collection and analysis of information through Artificial Intelligence and Big Data mechanisms in order to inform and support decision making and to understand unfolding consequences.

In terms of infrastructures, there has been a growing consensus for the integration of communications, energy, safety, sound, information and even decision making, using the Public Lighting Network as an anchor for the new urban services.

# Case Study

Câmara Municipal da Lourinhã _ Portugal

The municipality of Lourinhã had 162 units that used an inefficient technology (high pressure sodium vapor lamps and ferromagnetic ballasts) that were updated / replaced by LED technology equipped units that allowed a significant reduction in consumption and real-time management of the equipment without compromising light levels.

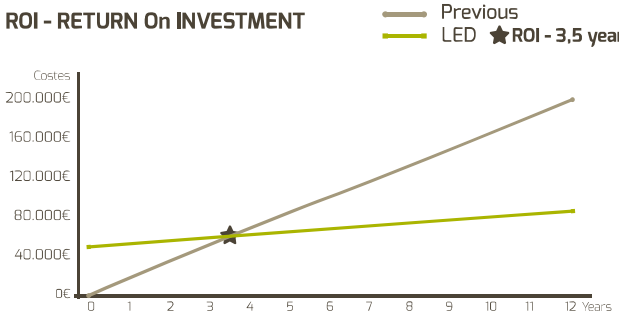
This project resulted in a reduction of 70,724 kWh / year, at a saving of 13.129€ per year and at a reduction of 23,8 tons $CO_2$ emitted, allowing a payback of 3.5 years.

| Return on Investment | Energy savings | Ton $CO_2$ Emission Reductions |
|---|---|---|
| **3,5** anos | **77** % | **61** % |

| | PREVIOUS INSTALLATION | CURRENT SOLUTION LED |
|---|---|---|
| Light Fixtures | Sodium Vapor | Oppidum, Primavir, Cithara |
| Number of Light Fixtures | 162 | 162 |
| Average Power | 138 W | 44 W |
| Average System Efficacy | 30 lm/W | 112 lm/W |
| Day-time Running Hours | 11 h | ECO + Astronomical Clock |
| Useful life span * | 2 Years | 12 Years |
| Yearly Power Consumption | 89.735 kWh/Year | 19.011 kWh/Year |
| Yearly savings of 162 Light Fixtures | | **70.724 kWh Year** |
| Yearly Savings | | **77% \| 13.129 €** |

* considering 50,000 hours minimum usage ( it might be more)

| | Sodium Vapor | | LED | |
|---|---|---|---|---|
| Type | Power (W) \| (Lm) | Efficacy (Lm/W) | Power (W) \| (Lm) | Efficacy (Lm/W) |
| Rural | 117 \| 3.360 | 29 | 36 \| 3.850 | 107 |
| Road | 167 \| 5.100 | 31 | 46 \| 5.809 | 126 |
| Park | 167 \| 5.100 | 31 | 46 \| 5.809 | 126 |
| Projector | 417 \| 16.200 | 39 | 202 \| 26.777 | 133 |



# The right **lighting** for **every scenario**

The generic name of public lighting covers a diversity of application sites ranging from city centers to peripheral and rural areas, from motorways to secondary roads, to large squares to gardens. Different applications require different material requirements and device conception, as well as different lighting techniques.

In all cases, **Lightenjin** offers low energy solutions with LED light of high reliability and resilience (L90B10) and with the possibility of integration of control systems.

## Urban Centers

These are "passing-by" locations, but also meeting and leisure points. Functionality is also the main focus on back streets, where it is important to guide people to their destination with maximum safety and visual comfort.

## Infrastructure Transportation

Underground stations or surface interfaces need specific light requirements. In spaces with great public affluence and low natural light, the creation of pleasant, harmonious and safe environments is fundamental.

## Parks and Gardens

The use of these spaces in sundown hours depends on the sense of security that lighting provides. Pedestrian paths with path lighting ensure a well-lit route without tree-top interference. 360° lighting is important in clearing areas.

## Tunnels

The atmosphere in the tunnels is a very hostile environment, meaning that the design and construction of the luminaires has to contemplate materials that withstand adverse conditions, with high IP, low maintenance and adequate luminance in the various zones.

## Roads and side-roads

In these locations it is important to maximize illumination and minimize wasted energy. The clear visibility of vehicles, pedestrians, signs and road markings is fundamental for accident prevention.

## Rural areas

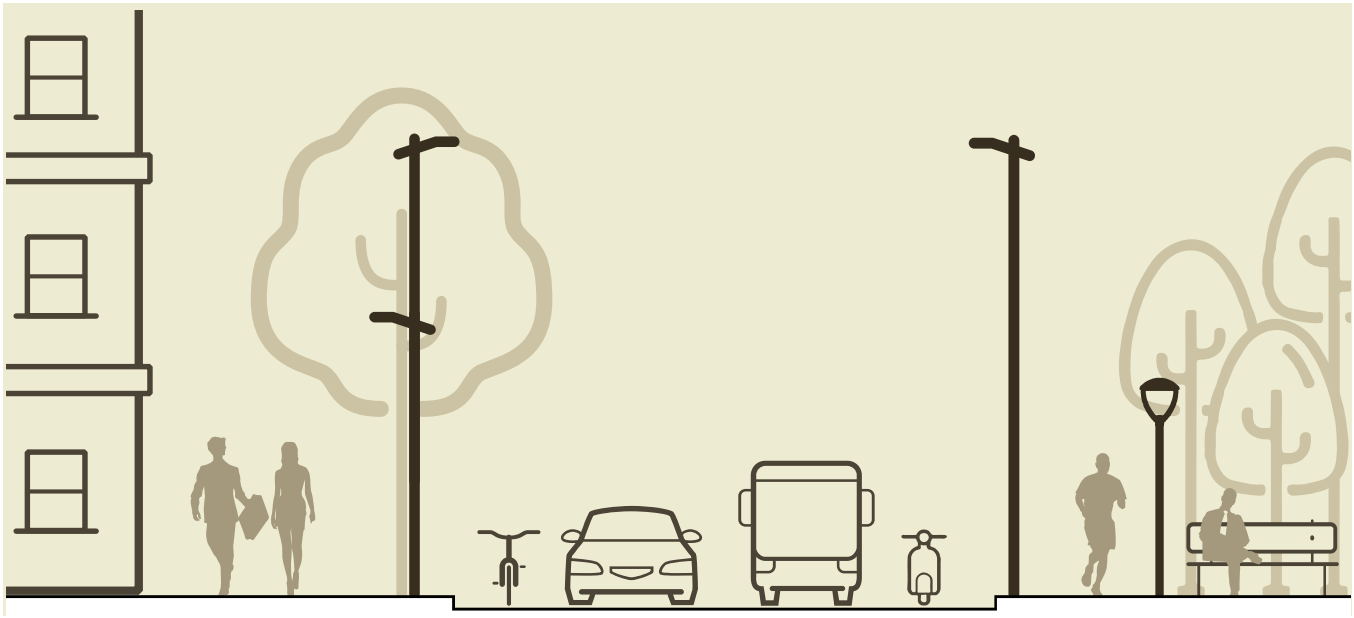
Energy efficiency can be greatly enhanced by using the Gesluce management platform to adjust lighting levels in order to obtain safety levels when there are no vehicles or pedestrians.

# **URBAN and RURAL** Lighting

Since our early days, lighting has been used for protection, locomotion and task execution. It is however, in the industrial revolution, that the amount of illumination increases considerably. This increase is justified by the increased need to perform tasks during night time, and as such, the need to promote safety and well-being. With the increase in lighting levels, less positive aspects also emerge, namely: light pollution, which, in addition to affecting the circadian rhythm of people, animals and plants, has a significant environmental / economic impact. It is therefore essential to ensure adequate lighting levels at different locations without compromising crucial aspects of health, environment and economy.

Lightenjin acts in this scope, we use bespoke software, which allows us to check with certainty the amount of lighting appropriate to the surrounding space, according to lighting standards. We use state-of-the-art LED with proprietary technology in our luminaires, which allows us to reduce the costs and levels of light pollution (ULOR <1%) in addition to high efficiency.

Thus, depending on the area of the city, different types of lighting should be considered:
**i)** Lighting in Pedestrian Areas, **ii)** Functional Public Lighting and **iii)** Lighting in Squares and Gardens.



## Lighting for Urban and Rural Areas

In order to promote safety and harmony with the surrounding spaces, the application of luminaires in urban areas should be done at a relatively low height (8 to 10 meters), while in rural areas this should decrease (5 to 8 meters).

It is important to consider in the pedestrian zones, bicycle paths and gardens, three distinct zones of lighting levels:

**Zone P1** (zones of intense nocturnal use and zones of insecurity high) that requires average levels of illumination of 15 lux,
**Zone P2** (zones of moderate night use) requiring 10 lux of illumination and
**Zone P3** (zones of low night use) that can have average illumination levels of 7.5 lux.

In addition to the levels of lighting differentiated to the needs of the area to be considered, parameters such as color temperature and color rendering index (CRI) should have a differentiating and specific approach to the environment in question.

It is recommended that in domestic areas and pedestrian areas, color temperatures of 3000K ± 300K and CRI> 70, CRI> 80 can be used in more complex situations, such as intersections, cyclists and pedestrians.

In rural areas there are other factors that justify lower lighting levels. Artificial lighting is associated with changes in the natural behavioral pattern of plants, animals, insects and aquatic life.

It's key the preservation of the "Dark Sky". This term designates areas classified as free of artificial light pollution. The objective is the preservation of clear night skies, indispensable to astrophysical science, education, culture, technological development, nature conservation and tourism.

Unlike urban areas where lighting levels are a determining factor for tourism, in rural areas a clear and starry sky without light contamination is expected.

## Main Avenues

### PRIMAVIR EVO

Injected aluminum luminaire, with organic design with robustness against impact (**IK09**) and against entry of water and dust (**IP66**). Luminaire accommodates transparent tempered diffuser glass, available for flux **(2137-14794) lm** and maximum efficiency of **137 lm/W**.

## Zebra Crossings

### LUCERNA

Lamp consists of luminaire with body in meatl sheet galvanized anti-corrosive surface treatment anti-corrosive by hot immersion. Impact resistant (**IK09**) and dust and water entry (**IP66**). With a flux range of **(1716-9209) lm** and energy efficiency of **135 lm/W**.

# Junctions, Intersections and Roundabouts

## NOXIS S

Luminaire for areas with a demanding environment. Made of injected aluminum with high robustness against impact (**IK09**) and against water ingress and dust (**IP66**). Accommodates transparent tempered diffuser glass, available for outputs of **[6938-17281] lm** and efficiency of **140 lm/W.** Can be used up to 8 meters high.

# Residential Areas
## High Density

### NOXIS M

Luminaire suitable for car traffic routes, which can be installed on poles up to 14 meters high. Sturdy luminaire with impact resistance (**IK09**) and dust and water inlet (**IP67**). With luminous flux range of **[17281-22191] lm** and energy efficiency of **140 lm/W**.

# Urban Center

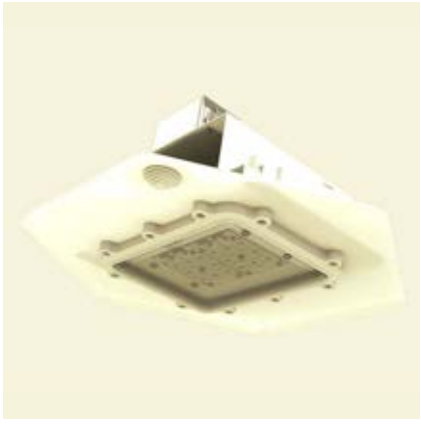
### CRATUS M

Luminaire with robust design (**IP65** and **IK09**) and clean lines. Construction in hot galvanized steel sheet. The luminous flux range is **[1716-9209] lm** and luminous efficacy of **135lm/W**.
Luminaire suitable for parking areas.

© Câmara de Águeda _ Portugal

Lourinhã _ Portugal

# Historic Center



## LIGHT ENGINE

Suitable solution for replacement of the light engine that was previously based on conventional technology to LED technology. It foresees the incorporation of circular or rectangular heatsink, depending on existing product. Available for overhead or underground networks and may incorporate a control system. A bespoke solution tailored for the clients needs.

## OPPIDUM

Lamp suitable for historical, residential and urban areas and public squares. Can be incorporated into posts up to 6 meters high. With impact resistance (**IK10**) and resistance to dust and water (**IP65**). Luminous flux between [**2472-9421**] lm.

Lourinhã _ Portugal

# Squares and Gardens

## PRIMAVIR LYRA

Injected aluminum luminaire with organic design with robustness against impact (**IK09**) and against water ingress and dust (**IP66**). This luminaire has transparent tempered diffuser glass, available in outputs from (**2282-15625**) lm.

## LLAMP

LLAMP is the ideal light spot for anyone looking for an autonomous and efficient lighting solution. The luminaire pole is equipped with **12 solar panels** and 2 batteries for an expected duration of 3 days, without having to be connected to the mains. The luminous range is **(1716-9209) lm** and energy efficiency up to **135 lm/ W.**

## LUCERNA

Lamp consists of luminaire with body in meatl sheet galvanized anti-corrosive surface treatment anti-corrosive by hot immersion. Impact resistant (**IK09**) and dust and water entry (**IP66**). With a flux range of **(1716-9209) lm** and energy efficiency of **135 lm/W**.

Águeda _ Portugal

## PALUS

Equipment available in two sizes, which was designed for the purpose of exterior illumination, such as sidewalks and parks. Its design, which projects light closer to the ground, allows for good lighting at a low cost together with a flux interval of **(427-726) lm**.

## PHARUS

Lighting fixtures with a 360º amplitude light and high visual comfort due to the incorporation of an anti-glare gutter, which directs the light emitted to the ground. This product has a wood lacquered aluminium stem, contributing for better suitability in the space where it is incorporated.

## REDUCTA 30

REDUCTA 30 with **IP67** and **IK10** is a versatile point of light, which may be incorporated in a recessed manner into pavements, ceilings, and walls either inside or outside.
This product is ideal for small beams of light, signs, and sweeping walls.

Elevador Águeda _ Portugal

Elevador Águeda _ Portugal

# Other Infrastructures

## REDUCTA 175

REDUCTA 175 with **IP67 and IK10** is an equipment designed for exterior lighting with recessed mounting on the floor and suited for driving areas. Its high lighting power of **(1839-3211) lm** ensures that objects are illuminated and walls are swept at low operational costs, hence rendering this product very competitive.

## TULED 50

Watertight light fixtures intended for a very humid environment (**IP67 and IK09**). A versatile lighting solution in terms of variety of colour temperatures (**3000-5000 K**) and a high colour rendering index (>80). With a wide range of fluxes **(1830-8344) lm** associated with a maximum high efficiency of **121 lm/W**.

## TULED 20

A minimalist family of products. Developed for highly symbolic and architectural spaces with luminous flux of **(1299-5213) lm** allowing for different ranges in terms of façade. Its exterior mounting is ensured through the construction and use of materials conferring **IP68 and IK09**.

# Outdoor Parking

## CITHARA EVO

Luminaire for outdoor lighting of great heights with pole, column or wall application. The **IP66, IK08** and the **(10298 -36837) lm** range allow you to handle heavy outdoor work safely at night. Energy efficiency up to **140 lm/W** makes performance cost-competitive.

## TUNLUCE

Functional and efficient luminaire, suitable for application in tunnels with IP65 and IK09. Luminous flux of (8857-43892) lm and efficiency up to 142 lm/W. Can be applied to ceilings and walls. It enables the integration of a wide range of optical groups and control system.


Águeda _ Portugal

# Residential Areas
## Medium Density

### VIA

Luminaire suitable for functional areas, where there is a lower aesthetic requirement. Optional pole or arm attachment, with mechanical resistance (**IK08**) and resistance to dust and water **IP67**. Outputs between **(1679-15998) lm** associated with an efficiency up to **137 lm/W**.

# Residential Areas
## Low Density

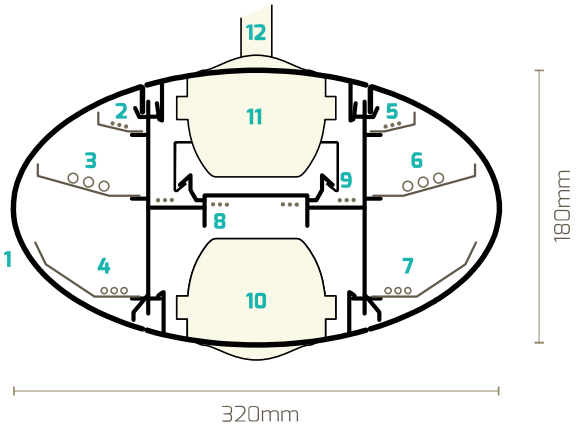
### CITYLUCE

Economical and efficient luminaire suitable for residential areas and public lighting. Assembled with LEDs with high energy efficiency. The injected aluminum body allows a more efficient dissipation which increases the lifetime of the luminaire components. The minimalist design enables easy use in any setting.

# **TRANSPORT** lighting solutions

The absence of or decrease in natural light in underground and / or surface stations means there is a need for lighting solutions to be installed in these environments. Thus, in order to ensure the visibility, comfort and safety of the people that use these environments, it is essential that we use efficient and functional lighting.

Within these environments, there are a number of areas that need to be illuminated, in particular: entrances, corridors, stairs, waiting areas, pedestrian tunnels, offices, bathrooms and finally, the most complex of all, platform areas. SUB multifunctional structure makes spaces with large crowds more pleasant, harmonious and safer.

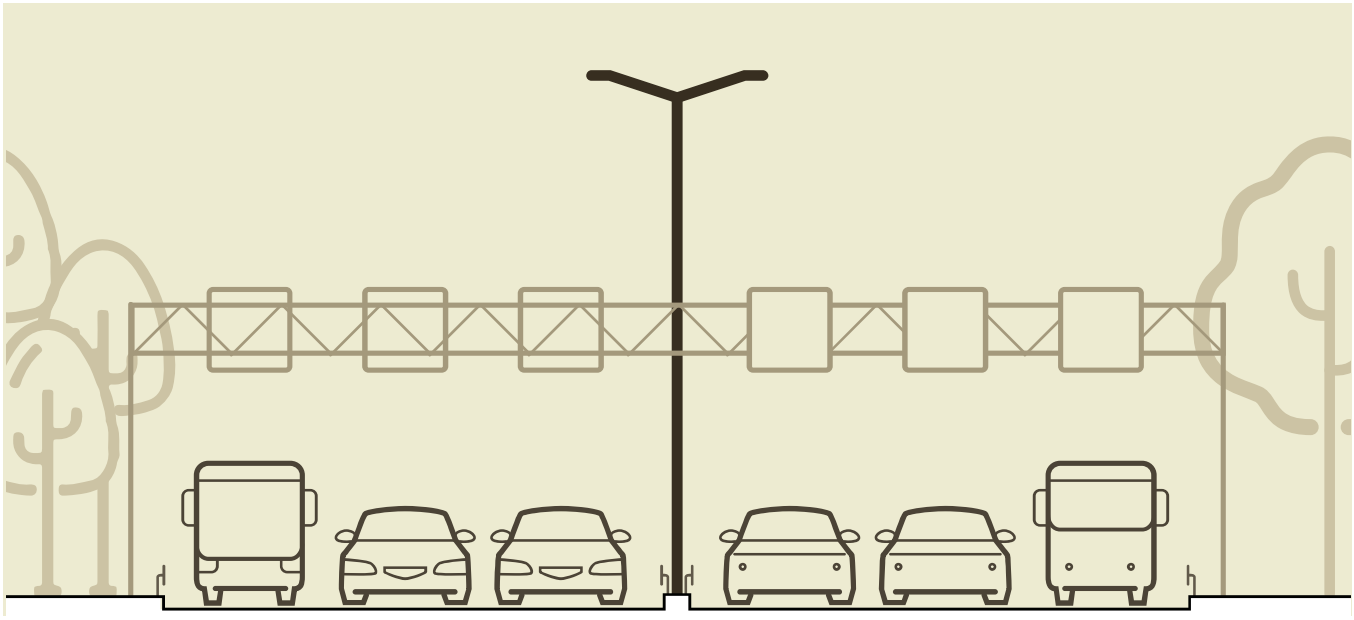



The SUB is a multifunctional structure that brings together the various types of technology necessary to ensure that spaces function correctly, by controlling the lighting, sound, video surveillance system, emergency lighting, search & rescue lighting and signage..., reaching various destinations without interruptions, changing directions on various levels.

**1 -** Removable outer covers;
**2 -** Sound cable trays; (13 $cm^2$)
**3 -** CCTV cable trays; (22 $cm^2$)
**4 -** Emergency cable trays; (31 $cm^2$)
**5 -** Signalling cable trays; (13 $cm^2$)
**6 -** Search & Rescue cable trays; (22 $cm^2$)
**7 -** Backup; (31 $m^2$)
**8 -** Cable trays - Direct lighting; (2x 3,2 $cm^2$)
**9 -** Cable trays - Indirect lighting; (2x 3,7 $cm^2$)
**10 -** Direct lighting;
**11 -** Indirect lighting;
**12 -** Rigid tube suspension

*note: the values in brackets refer to the area for each compartment*

# Lighting **MOTORWAYS** and intercity roads



## Lighting for Motorways and Intercity Roads

In functional public lighting, it is essential that there is a good quality of lighting design in order to allow users to distinguish obstacles and danger situations in their path.

As a general rule, luminaires for intercity and motorway routes are positioned between 10 and 14 meters. Classification is according to the ME standard, meaning that roads are subdivided in ME1 to ME3 for motorways and ME3 to ME6 for intermunicipal routes. The factors used for this ranking are the speed allowed by the road, traffic volume, diversity of vehicles authorized for traffic, separation of lanes, parking density, parked vehicles, ambient luminance and traffic control.

The difference of these typologies is a result of the average luminance and required uniformity meant for the site to be illuminated, which requires average luminance levels of 1.0 cd/m2 (ME3), 0.75 cd/m2 (ME4), 0.3 cd/m2 (ME6) and 0.5 cd/m2 (ME5).

It is recommended that in high traffic areas, for example, highways, motorways, lighting should comply with a color temperature of 4000K ± 300K and CRI> 70.

# Motorways

## NOXIS M

Luminaire suitable for car traffic routes, which can be installed on poles up to 14 meters high. Sturdy luminaire with impact resistance (**IK09**) and dust and water inlet (**IP67**). With luminous flux range of **[17281-22191] lm** and energy efficiency of **140 lm/W**.

# Intercity Roads

## NOXIS S

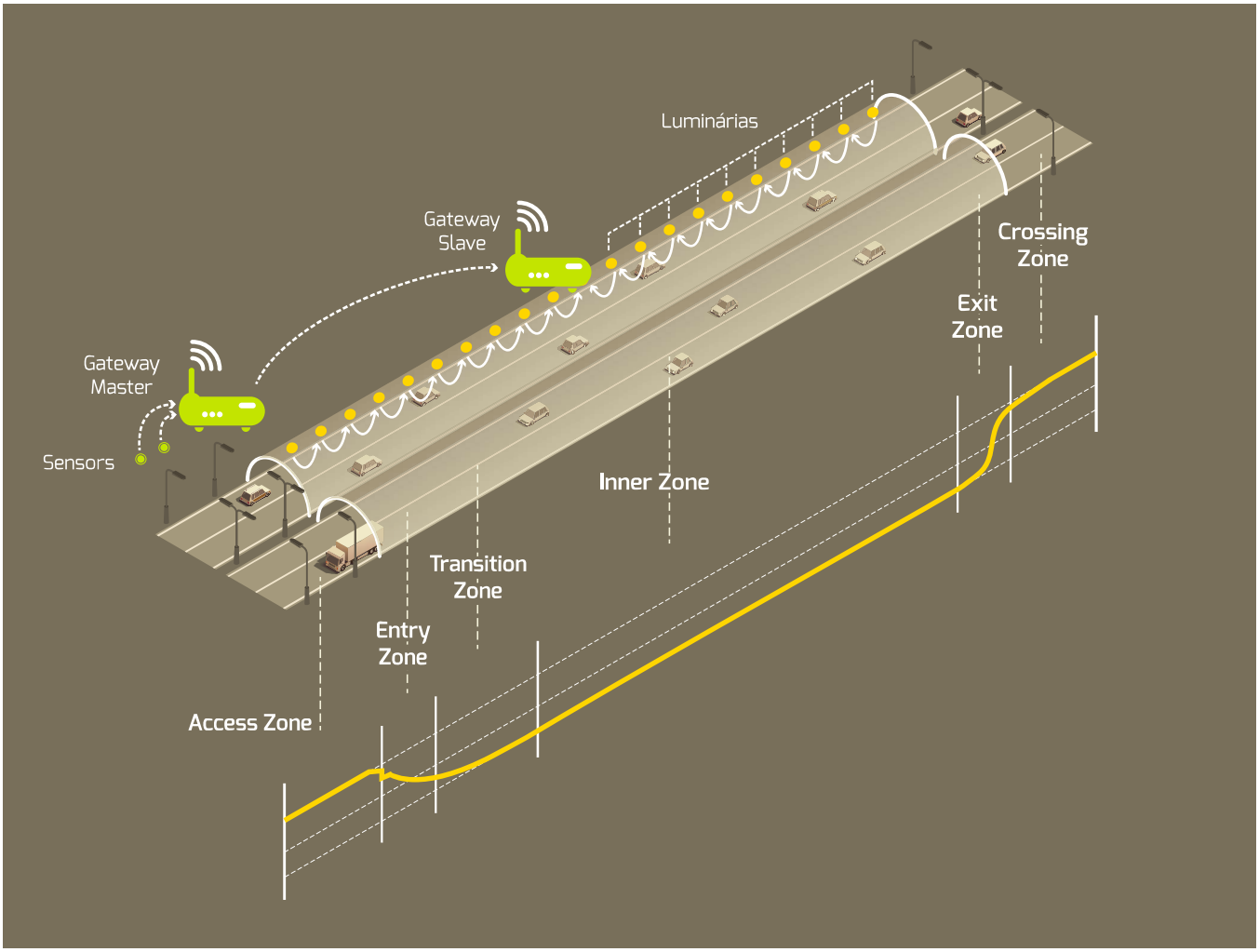
Luminaire for areas with a demanding environment. Made of injected aluminum with high robustness against impact (**IK09**) and against water ingress and dust (**IP66**). Accommodates transparent tempered diffuser glass, available for outputs of **(6938-17281) lm** and efficiency of **140 lm/W.** Can be used up to 8 meters high.

## VIA

Luminaire suitable for functional areas, where there is a lower aesthetic requirement. Optional pole or arm attachment, with mechanical resistance (**IK08**) and resistance to dust and water **IP67**. Outputs between **(1679-15998) lm** associated with an efficiency up to **137 lm/W**.

# **TUNNEL** Lighting

A road tunnel is an infrastructure that restricts natural lighting, producing shadows that limit the driver's ability to see objects or road obstructions. During the daytime the outdoor lighting is very high, which can lead to not being able to see inside the tunnel - black hole effect. On the other hand, the tunnels exit can cause dazzle. During the night the inverse effect may happen, the illumination inside the tunnel being greater than the exterior, leading to dazzle at the entrance and black hole effect at the exit. This said, adequate lighting is fundamental for the safety of those who circulate in it.




The incorporation of control systems in the lighting has several advantages because, in addition to promoting energy saving, associated to output control, it allows a customized result, like adjusting the levels and color of light against the variations derived from the seasonality and climatic changes along the year. In addition, with the variety of lenses available, we can ensure adequate dispersion of light in the various areas.

As important as ensuring the lighting specifications, it's also crucial to ensure the mechanical and electrical specifications of the luminaires. In mechanical terms, Lightenjin luminaires are developed with specific application requirements, ensuring robustness (IP≥66 and IK≥08), resistance to corrosive environments, vibration and temperature variations. We also guarantee an adequate maintenance factor, minimizing the failure rate and consequently, maintenance costs. From the electrical point of view, our luminaires are produced with state-of-the-art components of high quality which guarantees a high life time, high luminous efficiency, high luminous flux and low luminous depreciation.

At the lighting level, a road tunnel can be divided into 6 zones, detailed below and schematically represented in the image:

**1 - Access Zone**

a zone still located outside the tunnel and refers to the area in which the driver must be able to detect possible obstacles and enter the tunnel without abruptly reducing speed.

**2 - Entry Zone**

between the access to the tunnel and the transition zone. In the initial phase the illumination should remain constant with a level of illumination similar to the exterior and at a later stage the intensity is reduced up to 40% of the initial value. The distance from this zone is defined by the estimated speed of traffic.

**3 - Transition Zone**

the purpose of this zone is to move from a high level of illumination to a lower level so that the driver can gradually adapt the vision. The end of the transition zone is reached when the illumination is equal to 3 times the interior level

**4 - Inner Zone**

constant illumination zone where the driver is not subject to brightness fluctuations

**5 - Exit Zone**

the levels of illumination between the interior and exterior of the tunnel may have significant differences in illumination which requires visual adaptation from the driver.

**6 - Crossing Zone**

responsible for connecting the tunnel exit to a motorway. If this zone does not have any external lighting system, at night it can cause vision issues on drivers.

Túnel Raposeira/Ponta do Pargo _ Madeira, Portugal

# Escape

## STAGNUM Explosive Environments

The Stagnum ATEX luminaire is a weather-proof armor (**IP66, IK08**) suitable for environments with demanding or potentially explosive atmospheres (ATEX). It has high mechanical strength materials: compact fiberglass body, transparent polycarbonate diffuser and stainless-steel clips.

## NEPTUNO

Emergency luminaire suitable for corrosive environments.
Stainless steel body and polycarbonate or glass diffuser. With mechanical resistance (**IK07**) and dust and water (**IP67**).

# Central Track

## TUNLUCE

Functional and efficient luminaire, suitable for application in tunnels with IP65 and IK09. Luminous flux of [8857-43892] lm and efficiency up to 142 lm/W. Can be applied to ceilings and walls. It enables the integration of a wide range of optical groups and control system.

# Side Track

## ATEX

Light fixtures for illuminating explosion hazard areas (ATEX). The **IP66** ensures leak tightness and the protection of electrical components so that the electrical equipment does not ignite in an atmosphere surrounded by potentially explosive elements. The **IK07** renders it robust and a luminous flux of **(820-3610) lm** ensures good lighting.

## CITHARA EVO

Luminaire for outdoor lighting of great heights with pole, column or wall application. The **IP66, IK08** and the **(10298 -36837) lm** range allow you to handle heavy outdoor work safely at night. Energy efficiency up to **140 lm/W** makes performance cost-competitive.

## TUNLUCE

Functional and efficient luminaire, suitable for application in tunnels with IP65 and IK09. Luminous flux of (8857-43892) lm and efficiency up to 142 lm/W. Can be applied to ceilings and walls. It enables the integration of a wide range of optical groups and control system.

# **Products** Index

## 12 **Main Avenues** & **Zebra Crossings**

PRIMAVIR EVO

LUCERNA

## 13 **Junctions, Intersections and Roundabouts**

NOXIS S

## 14 **Residential Areas** High Density

NOXIS M

## 15 **Urban Center** & **Historic Center**

CRATUS M

LIGHT ENGINE

LIGHT ENGINE

OPPIDUM

## 16 Squares and Gardens


PRIMAVIR LYRA


LLAMP


LUCERNA


PALUS


PHARUS

## 18 Other Infrastructures


REDUCTA 175


TULED 50


TULED 20

## 19 Outdoor Parking


CITHARA EVO


TUNLUCE

## 20 **Residential Areas** Medium and Low Density


VIA


CITYLUCE

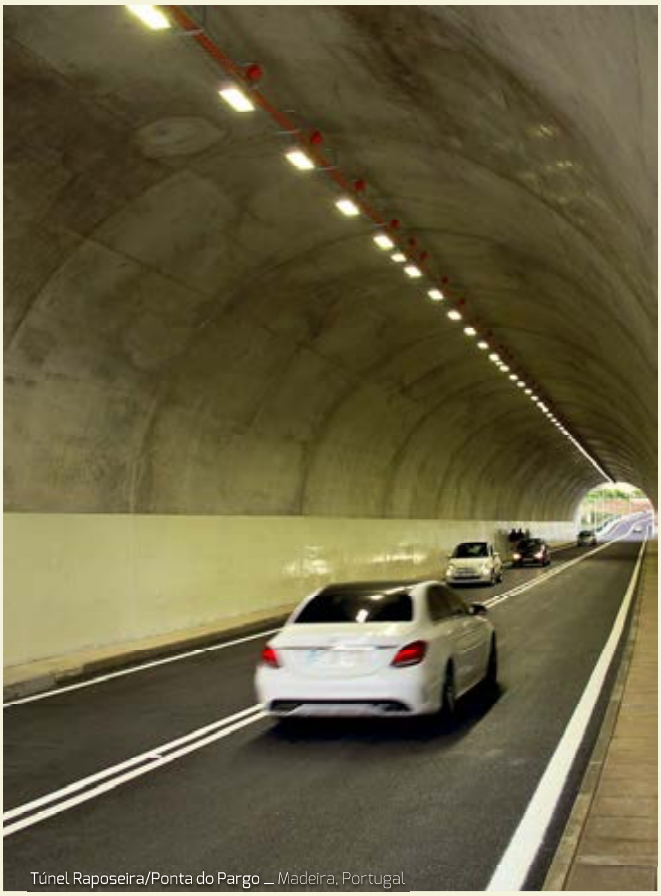
# **Products** Index

# **Lightenjin** Projects

Câmara Municipal de Águeda _ Portugal

Estação Metropolitano Parque _ Lisboa, Portugal

Parque Botânico Vale Domingos _ Águeda, Portugal



Túnel Raposeira/Ponta do Pargo _ Madeira, Portugal

Estação Metropolitano Avenida _ Lisboa, Portugal

# **Lightenjin** Projects

Câmara Municipal de Águeda _ Portugal

Parque Miragaia _ Aguada de Cima, Portugal

Madeira _ Portugal

Estaleiros Navais de Viana do Castelo _ Portugal

ALUFAP _ Águeda, Portugal

Câmara Municipal da Lourinhã _ Portugal

Elevador Águeda _ Portugal


Câmara Municipal da Lourinhã _ Portugal

# Special **Ephemeral** Projects

An urban space does not always have to be the same. It can be improved, lived, "played", even for a brief moment, for a few hours, for a few days ...

Lightenjin has always been receptive to creating partnerships and synergies with clients, offices and creative minds to realize unique creations and adapted to the spaces and the interactivity of the users.

KALEIDOTREE- ALUMIA by Openfield Creative Lab _ 2016. Porto, Portugal

METAMORFOSE by FAHR 021.3 _ 2015. Porto, Portugal

HOUSE OF CARDS _ 2015 Águeda, Portugal


STIMULUS - Super Bock Super Rock by FAHR 021.3 _ 2015, Lisboa, Portugal

# Lightenjin

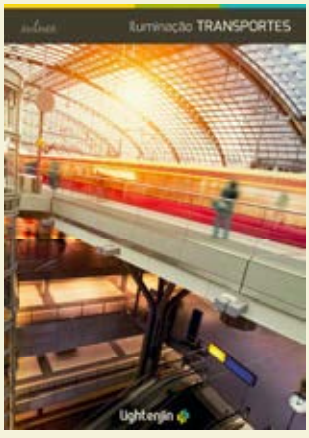
Lightenjin manufactures professional lighting solutions to be applied in interiors and exteriors.

Lightenjin products combine technology, ergonomic design, lighting control, and energy efficiency always keeping in mind user well-being as the main goal.

If you do not find the technical solution you are looking for, please do not hesitate to contact our engineering department.






We are constantly updating our documentation. Whatever your business field, please read the related brochure, where you will find more detailed and specific information.

Documentation available on **www.lightenjin.pt/en/downloads**

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www.lightenjin.pt

**Lightenjin II - Indústria de Iluminação, Lda.**

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