

Project:

Light pollution

Country: **Uruguay**

Participants: **Milagros Chiarino, Valentina Leguisamo and Guadalupe Marino.**

This work arises from wanting to participate in the call for projects worldwide production.

Those involved belong to the Group 4 th year 2 of the School and High School San Miguel in the city of Mercedes, Soriano, Uruguay.

From the hall of astronomy, it was decided to research on the subject: "Light pollution", to understand that it is an interesting and attractive theme still current and needed to summon and investigate.

It is also one of the themes of the programmatic content of the program of astronomy's 4th year in secondary education in Uruguay.

The project seeks to address the polluting effects of the misuse of light. While they have investigated work in this regard, he is that they are not so many and intends to contribute to the study.

Finally, we are happy to participate with others in instances of production of knowledge to be able.

Light pollution

Light pollution is the effect that produces the bad illumination of the night sky. This phenomenon happens every day in most of the cities since nobody cares about the topic and there is no knowledge of him. In general, is thought to be more lighting there is greater security and is not taken into account that this causes either, not knowing the consequences in the environment in which we live and the things that surround us. This is not only a problem that occurs in large cities but also happens in small towns and no one becomes aware of it.

This, we would have to remove our lighting, but quite the opposite, with a good location we will light just enough so innumerable benefits, and not bad spending power in heaven that should not be illuminated.

The effects produced by the improper installation of lighting are:

1) Glare:

Glare occurs when the light fixture or light bulb, light can be seen directly since humans adapt quickly to the surface or point of greater brightness than in your field of view (in addition to its slow adaptation of a very enlightened to another dark area). This phenomenon is due to the bad light installations that can harm to pedestrians, cyclists, and drivers (even boats and aircraft).

This is a phenomenon that instead of preventing traffic safety in general creates more risks.

2) Waste of energy:

As we have already mentioned the improper installation of artifacts and inefficiency in your design causes a large amount of energy losses and because of that it increases the high costs of maintenance. The great loss of energy causes an extra need in environmental pollution.

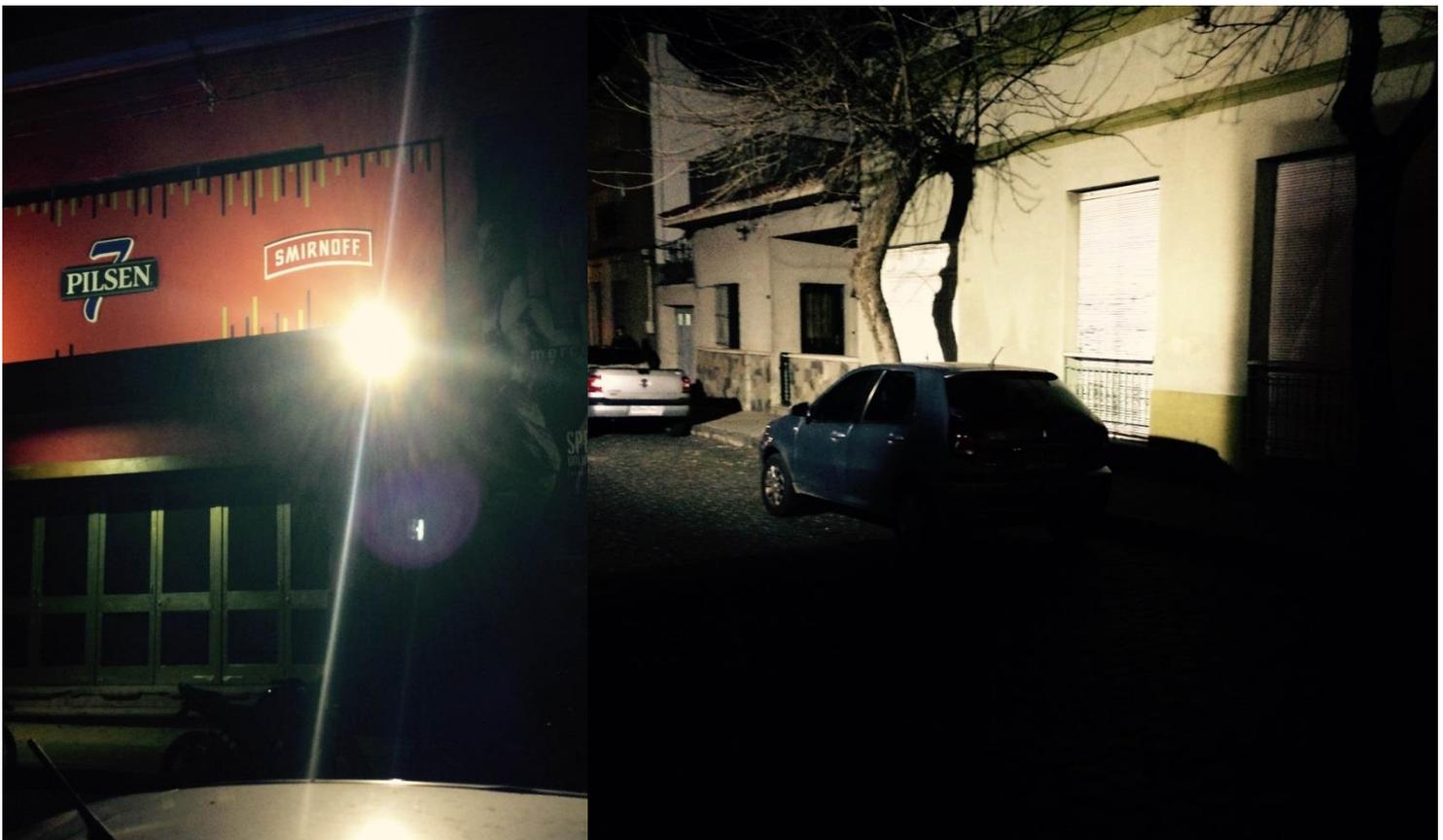
(3) Illumination of the sky:

A large part of the light that is scattered directly upward creates adverse illumination of the night sky over our cities hurting us on the observation of the stars. If we had in mind this bad lighting, in addition to saving costs, we would have a less bright sky by the diffuse light that we waste, and this will allow future generations to enjoy the beauty of the stars and the children can observe, learn and thus their studies could be aimed at different fields of science. The night sky is also a heritage and deserves to be preserved.

(4) invasion of light on private property:

poor lighting, e.g. in a neighborhood, inadequately lit the houses in the neighborhood, enters through sales of the bedrooms, bothers to sleep and create an unattractive view of the area. The exterior lighting of buildings and houses can disturb passers-by and other neighbors.

A clear example of this in our city:



5) Effects on plants and animals:

The night light alters the activity of various living things. In the case of insects, it is capable of producing an imbalance. Some birds may disappear; mammals, reptiles and amphibians are altered in their habits. The functions of plants, photosynthesis, and growth are altered by the night light causing premature aging of some species.

Negative effects on some crops have been documented as well as the alteration of the physiological and metabolic functions of livestock.

As we see, the light is something very important that we should not miss nor wasting, being even more this year. The international light year. This year it was created with the intentions of:

- Make known among the population the influence of light and its technologies on everyday life and how are necessary for development.
- Increase the dissemination of scientific culture among young people.
- Increase international cooperation.
- Disseminate the discoveries that have demonstrated the importance of light in science and scientific development during the last two centuries.
- To value and promote research in the field of light and related applications.

- Promote the importance of lighting technology in sustainable development and in the improvement of the quality of life in developing countries.
- To publicize the relationship between light, art and culture, as well as strengthening the role of the optical technologies in the preservation of cultural heritage.

Public lighting in Uruguay

This issue is discussed in two major areas:

- Light sources
- Reflectors and protective devices

You will also find other points to consider, but of lower incidence, such as neon or illuminated, public signage lighting of public and private buildings, monuments, etc.

Light sources

In Uruguay there are foci of public lighting have very different light sources, ranging from the incandescent electric light bulbs, which are found mainly in paragraphs neighborhoods; or also the pockets of gas of mercury that has been reproduced in recent times; or the pockets of gas of sodium, mainly concentrated in the large avenues and downtown areas.

Reflectors and protective devices

If we consider that the capital city of Uruguay, Montevideo monthly spends many millions of pesos by concept of consumption of public lighting, it is completely absurd for much of the light generated by the bulbs is emitted upwards or to the sides, rather than being directed toward the pavement that is ultimately the only thing you need to do the lighting. The illumination of buildings should not pay you to taxpayers, but their owners, if they wish to illuminate.

This reflection comes to consideration because the majority of lighting artifacts are so badly designed that instead of directing

light toward the floor, they wasted it by sending it in any other direction. But this does not happen only here, a report of the "International dark-sky association" estimates that two million dollars are wasted by lighting concept public night directed upwards or sideways, or not pavement, annually in the United States.

But not only from the economic point of view, the poorly designed lighting fixtures are harmful, but that in the avenues of fast vehicular circulation, artifacts that reveal the light bulbs from afar tend to fascinate to motorists, with the consequent loss of visibility and increased risks of accident. **What we need is not lighter, but better visibility** (Sky & Telescope, August 1996)

After studying the issue, we want to focus on what is our country and the type of illumination used.

There are currently some 3569 luminaries in the city of Mercedes: 3287 sodium, mercury 192 and 117 other technologies such as LED, HPIT, halide metal, among others.

- Sodium luminaries we include:

 - r 2423 150W

 - r 279 250W

 - r 585 70W

- Within the mercury you will find:

 - r 60 125W

 - r 132 of 75W

In what refers to the type of lighting fixture, we have different brands and models. Among them:

- IBERIA
- STRAND
- LUMENAC
- PHILLIPS
 - STP186

All types of luminaires, use "CUT-OFF" that leaves the lamp inside not to see.

As we can see, in the past year Uruguay has tried to use mostly light soda, to find it as a metal better than mercury that pollutes less and pays even more (lumens). In addition sodium (yellow) lights, give an impression of more warmth than the white. Not to mention, it saves more economically due to this technology of sodium, are longer than the others.

Types of illumination:

IBERIA

Iberia LED is a decorative LED light. With outputs of up to 90W, available with a symmetric and asymmetric distribution. The flexibility of the different options that are available means that it is suitable for all applications in amenity, pedestrian lighting and seats.



STRAND

Created to suspend the streets downtown and highly recommended for narrow sidewalks or streets. They have an excellent light distribution of dissymmetrical type and good performance allowing to solve all the problems in such facilities.



LUMENAC

Cityse line features a rigorous design oriented to public lighting and road, by the use of materials optimum quality and durability and for its optical versatility.

Powers of 100 to 250W and adjustment device of the the position of the lamp. Installation in column position vertical or horizontal adjustable three-position tilt.

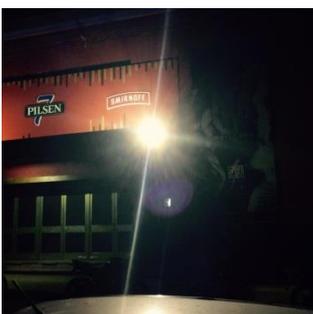
Optical Cut-off type. Agile maintenance system with top hinged with hook for access to lamp and control gear. Suitable for lighting of transit vehicle-lar, public spaces, parking lots, etc.

IP66



PHILLIP

This economic road fixture provides a new and modern light urban roads, residential areas and industrial streets while contributing significantly to an environment more secure and comfortable.

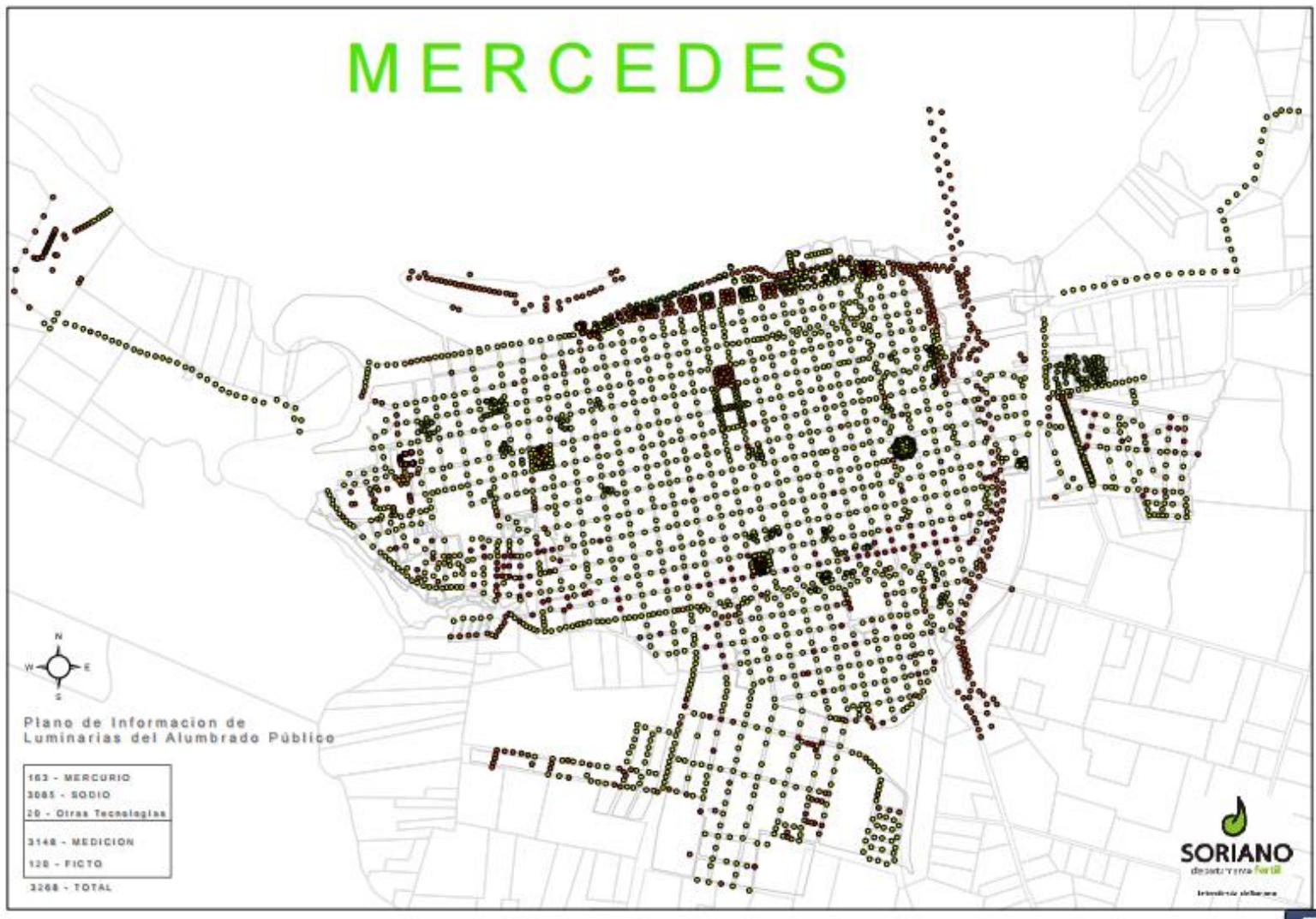


Finally, map of the city of Mercedes, Soriano, Uruguay. Where will you find designated the illumination that we possess.

Map 1: City of Mercedes; indicated with **Yellow** the type of sodium iluminario.

Designated with **Red** iluminario mercury type.

Green said another type of technology



Map 2: find the kind of support.

With **Yellow** arms

With **Red** wires



Globe at Night

The Globe at Night program is an international citizen-science campaign to raise public awareness of the impact of light pollution by inviting citizen-scientists to measure their night sky brightness and [submit their observations](#) from a computer or smart phone. Light pollution threatens not only our "right to starlight", but can affect energy consumption, wildlife and health. More than 100,000 measurements have been contributed from people in 115 countries during the campaigns each winter/spring over the last 9 years, making Globe at Night the most successful light pollution awareness campaign to give you!

As part of the project and the research wanted to participate in this campaign, to also work with the big issue that we treat: light pollution.

Below you will see pictures taken from the tabs that we have sent to this campaign to participate from our location.

Globe at Night
View summary of data submitted from this machine

1 When did you make your observations?
Observation Date (yyyy/mm/dd) 2015/06/10
Observation Time (24 hour time) 1:00p
Switch to [lighttime version](#)

2 Where did you make your observations?
Mercedes Uruguay Map It!
Location correct. [Reset GPS](#)
Latitude: -33.24463559283714
Longitude: -58.022681209108445
Elevation: 17.98 meters
Country: Uruguay
Location comments: Mercedes, Soriano, Uruguay.

3 How dark was the sky that night?
Constellation: Scorpius
Mag 2
Clear 1/4 of the sky 1/2 of the sky More than 1/2 of the sky
Sky condition comments: Logramos encontrar la constelacion facilmente, aunque el cielo no estaba totalmente despejado

Globe at Night

View summary of data submitted from this machine

1 When did you make your observations?

Observation Date: 2015/06/12
Observation Time: 19:00:undefined

2 Where did you make your observations?

Mercedes Uruguay

Latitude: -33.24408942856618
Longitude: -58.02253248307373
Elevation: 11.99 meters
Country: Uruguay

3 How dark was the sky that night?

Constellation: Scorpius

4 What were sky conditions like that night?

Clear 1/4 of the sky 1/2 of the sky More than 1/2 of the sky

Sky condition comments: Totalmente despejado, pudimos tener una clara vision de la constelacion.

Globe at Night

View summary of data submitted from this machine

1 When did you make your observations?

Observation Date: 2015/06/16
Observation Time: 19:30

2 Where did you make your observations?

Mercedes Uruguay

Latitude: -33.2438561328653
Longitude: -58.02257537841797
Elevation: 11.27 meters
Country: Uruguay

3 How dark was the sky that night?

Constellation: Scorpius

4 What were sky conditions like that night?

Clear 1/4 of the sky 1/2 of the sky More than 1/2 of the sky

Sky condition comments: El cielo totalmente despejado, pudimos observar la constelacion.