

# The River as an Energy Source: Supplying the Electrical Network in the Urquiza Park Area

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**Summary** – This work addresses the problem of the illumination in the Urquiza Park, in Paraná, which affects residents and tourists. This document sets out a need to implement improvements in electrical infrastructure due to lack of planning in its original design, lack of investment in maintenance and obsolescence of electrical infrastructure. As a solution, this work proposes the implementation of Smart Monofloat turbines. These turbines take advantage of the kinetic energy of the water to generate sustainable electricity. This proposal aims to improve the lightning of the Urquiza Park in an ecological and efficient way, which may benefit the local community and tourists, while maintaining environmental protection.

**Keywords:** insufficient lightning – electrical infrastructure – Smart Monofloat turbines

**Resumen**— Este trabajo aborda la problemática de la iluminación en el Parque Urquiza que afecta a residentes y turistas. Este documento planteaba la necesidad de mejoras en la infraestructura eléctrica debido a la falta de planificación en su diseño original, falta de inversión en mantenimiento y obsolescencia de la infraestructura eléctrica. Como solución se propone la implementación de turbinas Smart Monofloat, estas aprovechan la energía cinética del agua para generar electricidad sustentable. Esta propuesta busca mejorar la iluminación del Parque Urquiza de manera ecológica y eficiente, beneficiando a la comunidad local y a los turistas, manteniendo la protección del medio ambiente.

**Palabras clave:** iluminación insuficiente - infraestructura eléctrica - turbinas Smart Monofloat

## I. INTRODUCTION

In Paraná, the Urquiza Park is a cultural recreation area where people do different activities, for example, physical activities, social meetings, among others. However, some areas are poorly lit, so people do not circulate there. On the other hand, in some other areas, where events are held and there is usually a great number of people, there is an excessive demand for electrical energy.

The purpose of this work is to analyze solutions to improve the lighting in the poorly lit areas of Park Urquiza and efficiently manage the electrical energy consumption in high-demand areas. The objective is to provide safety, facilitate people's circulation and reduce the environmental impact.

In order to achieve this purpose, this paper is organized into three sections. Section 2 is going to address the lack of electrical infrastructure and inadequate

lightning in the Urquiza Park in Paraná. Moreover, it is going to identify and analyze the causes and consequences of this problem. Section 3 is going to propose and develop a possible solution by means of Smart Monofloat turbines and it is going to analyze the advantages and disadvantages. Section 4 is going to present a conclusion.

## II. PROBLEM DEFINITION AND ANALYSIS

### A. Description of the Context

The Urquiza Park is situated in Paraná. This city is the capital of the province of Entre Ríos, in Argentina. The city has approximately 300,000 inhabitants, making it one of the most populated cities in the region. Fig. 1 shows a map of Paraná.



Fig. 1. Geographic location of Paraná [1]

The Paraná River is one of the main attractions of the city. Along its coast there are beautiful parks and green areas, which are ideal for enjoying the nature and relaxing.

The Urquiza Park is located in the north of Paraná city, as Fig. 2 shows. Due to its landscape, people generally go to this park to do recreational activities.

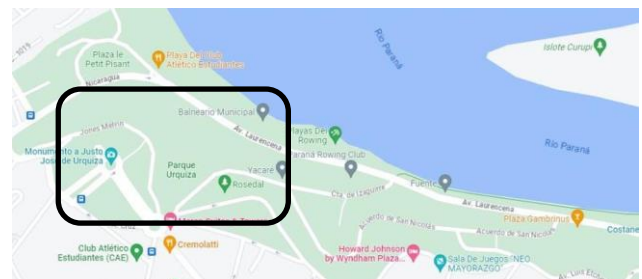


Fig. 2. Geographic location of Urquiza Park [2]

Fig. 3 shows that the Urquiza Park has big trees, paths and green areas. It is an ideal place for relaxing walks, exercising, or simply enjoying a peaceful day in nature.



Fig. 3 Urquiza Park [3]

The Urquiza Park also has recreational areas. There are playgrounds for children and special spaces for picnics. Fig. 4 shows the children playground area located within the Urquiza Park, where people take their children for recreational activities, and they gather to spend family time.



Fig. 4 Recreational areas in the Urquiza Park [4]

The Urquiza Park is a busy area, usually visited by the locals and tourists. However, there are necessary improvements to make in its electrical infrastructure, as it is presented in the following section.

### B. Problem Statement

In the Urquiza Park, there are many areas where illumination is insufficient. This situation creates dark and poorly lit zones. Additionally, there is inefficiency in the energy consumption of the park lights.

### C. Description of Scenes that Help Picture the Problematic Situation

The Urquiza Park has a lot of green space. Many people enjoy sporting and social events but, in many cases, they are limited by the light sun.

Fig. 5 shows an area of the Urquiza Park called *Rosedal*. This area is very well lit because the streets are usually circulated by cars, buses, and cyclists. For that reason, people feel safe when using these areas for their recreational activities.



Fig. 5. Walking areas in the Urquiza Park [5]

However, in other areas of the park, the lighting is not very good. Fig. 6 shows an area where there are many trees, paths and green spaces that are designed for recreational activities. However, this area lacks lighting poles, so its use is limited by the sunlight.

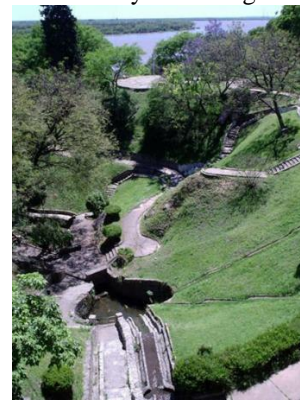


Fig. 6. Green space without lighting in the Urquiza Park. [6]

Fig. 7 shows another area of the Urquiza Park. In this place, there is a lot of green area where people can do different activities and also enjoy the beautiful landscape. However, this place also lacks lighting poles.



Fig. 7. Green space without lighting in the Urquiza Park. [7]

These images clearly show the problem of insufficient and inefficient lightning in the Urquiza Park. It is now necessary to analyze the causes and consequences of this issue.

### D. Identification and analysis of causes or factors that give rise to the problem:

There are many factors that give rise to the problem of insufficient and inefficient lighting in the Urquiza Park. One reason for this situation is the lack of urban planning in the original design of the Urquiza Park. It was planned only as a green space which the people used for different sports

and not as a meeting point for different social activities during the day.

The second cause of this negative situation is the insufficient maintenance of the park lighting. There is no investment in materials and qualified labor for the correct maintenance.

A third reason is the fact that there is an obsolescence in the electrical infrastructure of Urquiza Park. This is because there has not been investment in the supply of electricity network for a long time. In other words, there is a lack of planning, maintenance, and investment for a potential expansion of this infrastructure to create new recreational areas.

### E. Identification and Description of the Consequences

There are many consequences of the problem of insufficient and inefficient lighting in the Urquiza park. As a result of lack of urban planning, the people meet in the river coast because the environment is pleasant due to the good illumination of the coast and the whole park is not used due to the inefficiency in the distribution of the lighting posts.

There is a lack of maintenance in these areas which has caused the lighting to stop working overtime. In turn, this generates insecurity, and it can enable some criminal acts.

The obsolete electrical infrastructure prevents events or nighttime activities easily. To plan a night event in this area, generators are frequently used to help meet the demand of electrical energy.

## III. THE WAY FORWARD

### A. Problem approach

We propose as a solution the application implementation of Smart Monofloat turbines [8]. These hydraulic turbines use the kinetic energy from the water to generate electrical energy.

This turbine is designed for rivers and canals with a depth and width of two meters. It has three blades each with a diameter of one meter and it is connected to an electric generator.



Fig. 9. Smart Monofloat turbines [9]

One turbine can generate 8500 kWh per year. That can cover the needs of electrical energy of thirty houses. However, the energy production changes according to the depth of the river and the velocity of the water flow.

This device does not require the installation of big infrastructures such as a dam. It only needs to be anchored to the riverbed or to a mooring block on the shore. Moreover, the system offers an excellent protection against possible float rests that can block up the device.

### B. Strengths and Weaknesses of the Proposal

The main advantage that can be attributed to these turbines is the capacity of generating renewable and sustainable energy without generating carbon dioxide (CO<sub>2</sub>) that contaminates the environment. These turbines have a low cost of infrastructure, require a minimum space, and have an easy installation method.

However, there is a possibility of causing damage to the marine ecosystem. This situation can produce a negative environmental impact putting at risk the life of some native fish. For this reason, further research should be carried out before planning the implementation of Smart Monofloat turbines.

## IV. CONCLUSION

In conclusion, the Urquiza Park has a problem of insufficient and inefficient lightning. This bad experience affects local visitors and tourists. This problem originates from the lack of planning in the original design in the park, the negligence in the maintenance of the lights and the obsolescence in the electrical infrastructure.

Our proposal to implement Smart Monofloat turbines as a solution to the problematic situation of the Urquiza Park is a promising alternative. These turbines generate renewable and sustainable electricity, without harmful carbon emissions to the environment. However, the impact on the marine ecosystem must be carefully considered. In general, this proposal offers an innovation and ecological solution to improve lighting in the Urquiza Park.

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The present project is a skills integration activity in Inglés I at Universidad Tecnológica Nacional, Facultad Regional Paraná, carried out by EFL engineering students. The yearlong project requires students to delve into a problem in the city where they live and to address it by means of a simple project in English. Should the reader have any questions regarding this work, please contact Graciela Yugdar Tófaló, Senior Lecturer, at [gyugdar@frp.utn.edu.ar](mailto:gyugdar@frp.utn.edu.ar).