



Cuenca (Ecuador)

Implementation of the primary public transport network for the city of Cuenca – the tramway “*Tranvia de los Cuatro Rios*”

Background

The historic center of Cuenca-Ecuador currently concentrates activities of different branches such as commerce, finance and services, where the reasons for travel, work, shopping and personal management are numerous. In this dazzling place, the Cañari, Inca and Hispanic past and the influences of the Republican era, testify to an architectural, cultural and natural richness.

However, the loss of public space has become an issue that cannot be ignored, necessitating the implementation of projects that reclaim and improve spaces for pedestrians, as well as the conditions of comfort, safety and connectivity.

Although the Decentralized Autonomous Government of Cuenca has been carrying out works to improve mobility and accessibility in the city for several years, the City Center continues to suffer from vehicle congestion. Therefore, alternative solutions are imperative depending on the needs of the area, and the construction of a mobility system must be in line with the objectives of the Special Plan of the Historic Center project.

In this context, this plan's mobility and accessibility policies aim to improve the quality of the historical center in the protected area and in the rest of the city to reduce travel times by optimizing urban mobility in direct relation with the improvement of public space. One of the components of the mobility system proposed by the Special Plan project of the Historical Center of Cuenca is a Public Transport System based on the implementation of the Integrated Transport System and complemented by a Mass Transport System.

As an articulation of the project to SDG 11 of the 2030 Agenda for Sustainable Development, the tramway allows the protection of the environment by reducing carbon emissions by not consuming fossil fuels and, therefore, promotes the conservation of the historic center of Cuenca while offering complete and sustainable mobility. Integrated into the Central Government Plan for the development of strategic axes of productivity and infrastructure, this competitive mobility system linked to the reorganization and modernization of the public transport system allows savings in costs, travel times, greater traffic safety, and improved environmental conditions.

In the energy sector, transport contributes 45.16% of greenhouse gases. In this sense, the Cuenca tramway contributes to reducing GHG pollution because the efficiency of public transport is estimated at 27 GgCO₂-ecu / year, which corresponds to carbon equivalent units. Thus, the implementation of an electric mobility system such as the tram has 0 emissions.



Problem

Urban transport in the city of Cuenca has shown unsustainability in environmental, social and economic criteria. The environmental problem generated by the high levels of air pollution and the noise they produce is an aspect that affects the inhabitants of Cuenca and contributes to high levels of stress and aggressiveness.

The poor distribution of bus routes has generated social problems and delays in daily journeys, further adding to the deficient and dangerous transport model that has caused distress in the population.

Economically, the transport system has generated significant losses due to congestion, accidents, declining productivity, and insecurity. Another problem that is also generated by public transport is the lack of control and repetitive routes. Bus lines enter the historic center, run on heavily trafficked roads causing traffic jams and causing chaos and unrest among the population.

Since it is not multimodal transport, the public transport system involves a higher cost for the population due to the need to change bus to reach the destination. Besides, the city's vehicle fleet has grown considerably in recent years, leading to increased automobile traffic and pollution, especially in dense places where it is evacuated less quickly, such as the historic center.

The location of major urban amenities in the historic center has increased traffic congestion, resulting in the need for more parking areas on the roads, which alone do not meet demand. This exaggerated influx forces vehicles to circulate in search of central parking lots, whether public or private. Therefore, there is increased congestion of cars and an increase in private parking spaces, which alters the function of houses with uses that are incompatible and harmful to the built heritage.

The current configuration of the public space of the historic center was not designed so that the different modes of transport are accessible and can reach any point of the urban fabric. This situation creates problems of accessibility, integration, and equal opportunities for people with and without disabilities to access any space, whether public or private.

Objectives

- Restructure and improve the urban public transport service to improve the population's quality of life, including the networks and infrastructures that cross the historic center.
- Reduce environmental pollution thanks to a sustainable and ecological mobility system.
- Generate pedestrian corridors associated with shops and residential areas (quiet areas) to enhance neighborhood life in the city and, in particular, in its historic center.
- Discourage the use of private transport and promote the tram and other alternative and ecological means of mobility, as a means of mass and sustainable transport for the city.

Results

In the urban-architectural sphere, the project aimed at an integral intervention on the roads and spaces of the historic center that are part of the primary network of public transport, particularly sidewalks, roads, street furniture, signage, lighting, stations, etc. The project also aimed to ensure that its implementation



integrates most suitably with the characteristics of the urban heritage landscape without affecting the mobility of pedestrians or accessibility to buildings.

The tram project is a mobility alternative for the city that reduces the access of private vehicles to the historic center, complementing itself with border parking systems that absorb these needs. There are also proposals and public and private initiatives such as Super Manzanas, Parking Day, Bici Cuenca, among others that tend to reclaim public space for pedestrians.

As mentioned above, the intervention gives priority to pedestrians because they are a fundamental part of the interactions that take place in the public space. For this reason, the infrastructure facilitates the different movements, activities and dynamics that every citizen needs, with comfort and safety, integrating at the same time the various means of transport that circulate there.

Sidewalks and tram level crossings are well visible and marked. They are safe and inclusive spaces that encourage people to travel and experience them. The tram axis reinforces the existing pedestrian infrastructure and develops design strategies that have benefited users in areas requiring specific intervention.

To create a public space of continuous circulation and adapted to pedestrians with the interaction of different types of mobility, solutions have been brought to ensure the continuity of pedestrian mobility, such as eliminating architectural barriers and providing vertical and horizontal signage. Measures have been taken to appease traffic in conflicting intersections, while the materials used guarantee quality, durability and safety and maintain consistency with the built context.

“Quiet zones” have also been implemented, where the flow and speed of motor vehicles have been reduced. Spaces have been created for the development of passive activities, and vegetation and furniture were added. By increasing the level of comfort and improving the image of the sector, neighborhood life has been prioritized, improving the neighborhood environment and safety conditions, both for pedestrians and vehicle drivers.

The roadway has been reduced in turns and other strategic points, constantly modifying the trajectory of vehicles so that they are more alert and move more carefully, using the following strategies:

1. Extension of the sidewalk to the street: the use of flower pots, the extension of shops or activities allowing the appropriation of the street by pedestrians is encouraged. These are areas that can be improvised - through tactical urbanism interventions - or they can be planned and incorporate more elements such as: pedestrian lighting, vegetation and stationary furniture.
2. Use of vegetation as part of the urban image: Use of creative examples such as flower pots, umbrellas and furniture, to provide protection and define space for human activities. This is used in living spaces and in restaurants that have their tables on the sidewalk.

For all the above, the Tramway Project respects the criteria and conditions of authenticity and integrity for which the Historic Center of the city was inscribed on the World Heritage List. It was conceived as a living process of urban development. The project does not imply any change or alteration of the material and immaterial elements defining its image, such as the urban form (layout), the context, the buildings,



and the current functions. It is developed within the proposed policies of the special plan of the historic center of Cuenca.

The project enabled the use of cutting-edge technology that connects it to the city's current traffic light and traffic control system, which, together with the special signaling systems of the tram, guarantees the safety and mobility of pedestrians and vehicles in the protected area.

Among the advantages of this new means of transport, the following stand out: speed and punctuality, because it has an exclusive route and traffic priority. It is a safe way for users, as it has a CCTV system inside all units, stations and along the routes. In addition, the units are air-conditioned. As a result, the system is accessible, inclusive and comfortable, and people can enter with wheelchairs. Besides, the ticket machines at the stations have a braille and hearing system for use by people with visual impairments.

We worked on direct *educommunication*, with tours to deliver information, lectures were given, and leisure activities were carried out in educational centers. A process of public relations with the media, within the framework of a communicative policy of appropriation of the system, aimed to consolidate its social acceptance and develop a policy at the user's service.

Being the first modern tram in Ecuador, it received positive testimonials from locals and foreigners, was the subject of scheduled visits by universities and was recognized as an innovative project in the implementation of systems construction and technology.

Courtesy translation