



WHY IS  
**METRO RAIL PROJECT**  
DEVELOPMENT THE BEST OPTION  
FOR **SUSTAINABLE**  
**TRANSPORTATION**  
IN LARGE  
**LATIN AMERICAN CITIES**



Latin American Association of  
Metros and Subways





# EXECUTIVE SUMMARY

## OBJECTIVES:

To state, as Asociación Latinoamericana de Metros y Subterráneos (ALAMYS) [Latin American Metro & Subway Association], the technical, economic, political, social and environmental benefits, as essential elements to consider by the Latin American decision makers (national and local), of implementing or extending metro rail systems as protagonists of mass public transportation in the cities of the region.

## FINDINGS:

- a) Metro rail systems are more reliable, safer and faster than all other existing means of urban public transportation.
- b) They revalue cities and increase the added value in their vicinities.
- c) They are synonymous with high efficiency in the use of urban space and the emissions impacting the environment.
- d) They have lower economic costs when all its externalities are considered.

## KEYWORDS:

metro rail systems - mass public transportation - social inclusion - urban development - environmental quality - efficiency - integration



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1

WHY SHOULD LATIN AMERICA  
URGENTLY  
RETHINK THE  
PLANNING OF ITS PUBLIC  
TRANSPORTATION  
SYSTEM?

*“There is a clear, global trend towards an increase in an urban population, who chooses to live in the cities rather than in a rural environment”*



Since last century, there is a clear global trend towards an increase in urban population, people who choose to live in the cities rather than in a rural environment. The benefits of living in urban areas is undeniable: access to all sorts of products and services that are relatively close compared to rural areas – e.g. health, education, employment, utilities, and leisure activities, among others – making rural-urban migration a significant trend in all regions.

Latin America is no exception to this rule: the projected population growth for 2015 – 2020 is 1% in urban areas, and -0.3% in the rural areas of the region (CEPALSTAT, 2017). This is in addition to the statistics of the Economic Commission for Latin America and the Caribbean (CEPAL) on the number of inhabitants in Latin America, which is 647 million for 2017, and in a short period of time 90% of

that population is expected to be located in the urban hinterland.

Within the cities, there is a constant pressure from the population to meet the urban mobility requirements as a way of ensuring the democratic, equitable and efficient access to the different goods and services offered by the cities in order to reach the levels of social inclusion that bridge the gap for the high rates of inequality that exist in Latin America.

Unlike other private means of transport –e.g. cars–, public transportation is an excellent tool that can greatly help to ensure those social access rights if it is considered as part of the urban transport systems, given its high prevalence in the daily lives of people, since it brings closer business and commercial centers, industrial neighborhoods, health centers, educational institutions, historic

centers, residential and recreational areas (parks, stadiums, town squares, open spaces for sport activities, etc.) and all sorts of places concentrating crowds, all those who live or concentrate their lives far from these areas of interest.

In spite of the relevant role played by public transportation in the development of our cities, unfortunately, we see an aggravation of a concerning phenomenon in Latin America: some of the cities of the region are characterized by an alarming lack of political will (and a consequent lack of resources) to promote projects for an efficient urban planning, leading our cities to a rather monocentric topology: one single area combining most of the public institutions and private corporations, jobs and services of all kinds, in contrast to the great surrounding periphery, where most of the low-income population has been relegated

*“Metro networks should be the protagonists of integrated systems along with other efficient modes of transportation”*



to and who consequently are condemned to travel long distances with difficulty to perform their daily activities in areas where it is hard for them to get there.

Thus, public transportation should not be seen as a means in itself, but as one of the most relevant elements for the development and progress of cities, a fundamental right for people that substantially improves their quality of life.

With this assumption, and when talking of choosing an optimal means of transportation, the different states of the region should direct their efforts to meet the transportation needs of the population through the provision of efficient, reliable, clean, safe, modern and sustainable systems, especially for people who also increasingly demand caring for the

environment and be assured of being transported comfortably and in a dignified manner –characteristics which are almost absent within the various public transportation system in Latin American cities.

Nonetheless, the states should always view public transportation as user-oriented systems. There are no two ways of reading this: it is the states who have to plan these systems, integrated from a centralized metropolitan authority and with a sense of public service within a regulated framework and institutional structure, beyond the property of the infrastructure or the operational management of the different system components.

Public transportation should be a quality service for the population, and its first goal

is to facilitate urban mobility. Therefore, this responsibility should not be considered as a consumer good, but as a fundamental right that must be met to encourage the dignified mobility of our societies; leaving it to the market would imply meeting a function that, on the long run, will only bring inefficiencies and poor quality services, as different experiences have proven during the last century.

A mobility directed to the intensive use of efficient means of transportation in our cities may include various means, such as: a) public mass transportation that includes the use of metro, commuter trains, trams and other motorized feeding services; b) minor public transport through conventional uses and through Bus Rapid Transit (BRT); c) bicycle and walk.





However, the existence of multiple transport systems requires planning in order to achieve an efficient interaction and thus benefit from and exploit the qualities of each of them based on the density of demand. That is why at ALAMYS we believe that transportation systems should be designed bearing in mind an intermodality, but understanding that its protagonists should be efficient light-rail systems.

Once this is settled, the next step in order to greatly improve our mobility is to recognize that in Latin America there are many realities of demographic distributions very similar between their countries, so when designing an efficient public transportation, different estimated demand flows should be considered, since urban train systems can be adjusted.

At ALAMYS, we are convinced that Latin American cities meet the conditions for the development of metro rail project initiatives, whether through the construction of new metro networks or the expansion of the existing networks, since the need of mass public transportation in densely populated cities is evident, like in Latin American countries with a level of urbanization of 79% and with evident little or no capacity to extend road infrastructure to accommodate surface systems.

Metro networks should be the protagonists of integrated systems along with other efficient modes of transportation in high-density corridors in order to improve the quality of life of people, shorten distances, bring lives closer, and therefore contribute daily to the development of our cities in Latin America and their people.

Below you will find four important reasons which, as ALAMYS, we consider fundamental to explain the evident benefits from supporting metro rail projects for Latin American cities. These will not only result in a substantial improvement of the quality of life of its population, but also an improvement in the competitiveness of Latin American countries when their major cities have sustainable mobility, helping them to take a huge leap towards an equitable socio-economic progress that all governments –national or local– seek for their constituents.



2

FOUR REASONS FOR BUILDING  
**METRO RAIL PROJECTS**  
IN LATIN AMERICA



As mentioned above, one of the greatest issues faced by Latin American cities is the lack of urban planning. The development and growth of cities has mostly been handed over to the market, with rather weak regulations by the different states. These have mostly established the permitted and prohibited land uses, but they do not irrefutably set the way of such use in residential, industrial, amenities and service areas, and in the mobility infrastructure to cope with these growths.

Consequently, the topology of Latin American cities has become mostly monocentric, with only one zone concentrating services and employment opportunities, surrounded by several ring roads where residential areas are located. This has, in turn, created a flow pattern towards the city centers, whose transport corridors move a high demand of users, and whose environments are dense in terms of population.

To address this, investment decision-making for transportation infrastructure in the region has tended to be reactive to the urban development process instead of using these investment as future-oriented actions taking city growth into consideration in a planned and integrated manner, as they do in Europa and Asia.

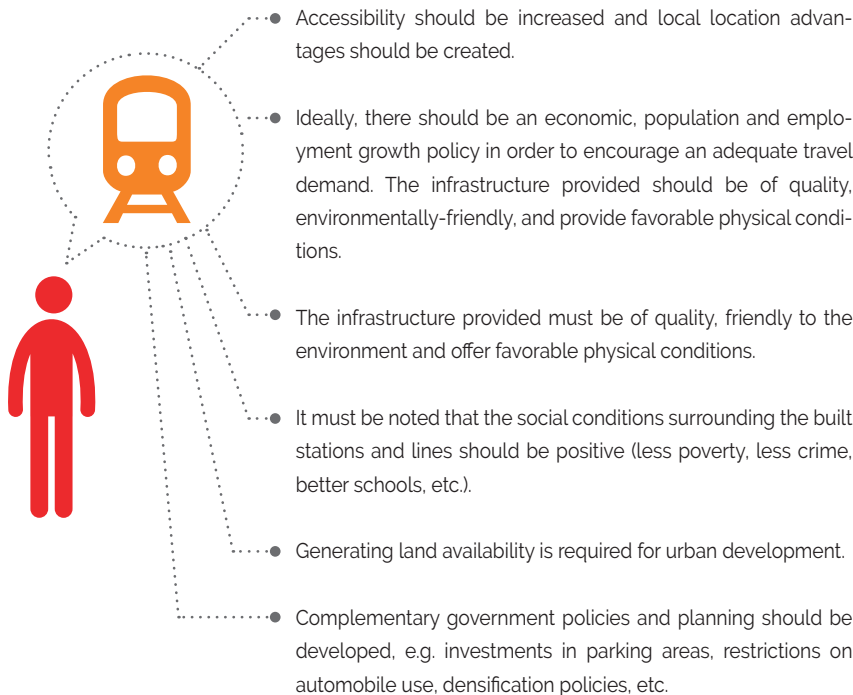
Consequently, investments in transportation infrastructure have become outdated in urban development, resulting in an increase in traffic in areas of new real estate developments, greatly increasing commuting time and air pollution. Hence, decisions must be made conversely to traditional ways: urban density must go hand in hand with the development of the metro rail system; that is, they must be jointly planned. Additionally, urban planners must take into consideration that a building takes approximately half the time it takes to build a subway.

Nonetheless, and particularly in regards to public transportation, the solutions provided for the population of the different cities in our region must necessarily match the demand. On this matter, metro or urban train projects are the most effective solution for the mobility needs in those corridors that already have a high demand and whose environments are relatively dense, thanks to the high capacity and frequency that can be provided with this type of technology.

While reducing the gap between urban and transport planning, it is relevant for this matter that the development of metro systems is done in a harmonious way in the urban space and following a comprehensive policy of mobility and land usage that works consistently and in addition to other modes in order to meet the needs of the population. In the literature there are some factors or conditions



that help and strengthen the impact that building a metro line may have in changing land use and urban development (Higgins et al., 2014):



Considering all these factors adequately, in reality we observe that the inclusion of mass public transportation services, such as metro, has significant impacts in the activity and mobility system. Therefore, this also suggest that such infrastructure, besides meeting the transportation needs historically overlooked in some cities, should also be considered by urban planners and by the authorities as a tool to guide the development and revalorization of various areas of the city, always generating integration with other means in order to attain an efficient public transport network.

We will review the four significant advantages of the design, implementation and expansion of the metro rail systems for Latin American cities already in progress through a technical, political and economic tour, showing their positive social impact in the population to be transported.

## 2.1

### METRO RAIL SYSTEMS ARE FASTER, MORE RELIABLE AND SAFER



In scientific literature there is evidence supporting the development of metro systems in order to meet a demand for mass transportation in an urban context. The main argument is that they are highly effective transporting great volumes of people, both for the capacity for which they were designed and their operation on rails fully dedicated to this mode.

However, there are other less tangible attributes that users value in a means of transport like metro. Generally, these series of factors are not considered in the models of user behaviors and estimate of the demand, nor in the methodologies for evaluating projects, due to their difficulty to be quantified (Ben-Akiva & Morikawa, 2002). The factors mentioned are, among others:

- a. **Reliability:** metros in general are more reliable, since they have little or no interference with other modes, which allows to maintain relatively regular travel and waiting times.
- b. **Information for users:** metros tend to have certain advantages when providing information to users regarding schedules, location of stations, and services in their surroundings, among others.
- c. **Comfort:** including availability of seats, quality of the trip, quality of the waiting time, and ventilation in the vehicle. Generally, metro trips are smoother and waiting conditions in the stations are better compared to other surface means of transport.
- d. **Safety against accidents:** since metros have a central, contained control system in railways, they have an advantage in terms of user's perception.
- e. **Safety against crime:** although other surface means may have an advantage in this context (due to the fact that they are required to have a driver on board), metros are perceived as safer because they transport more people and, in most cities, they have specialized security guards along with a Closed Circuit TV for this purpose.
- f. **Availability:** although surface modes tend to show a higher density of stops along urban stretches, metro systems provide a higher frequency, since they are concentrated in high-demand corridors.



All factors and attributes above mentioned have the common denominator of being hard to quantify, but extremely relevant for dignifying the mobility of people who use public transportation. This user perception towards less quantifiable attributes of the metro systems or similar technologies is known as "Psychological Rail Factor" or "Rail Factor" (Scherer & Dziekan, 2012).

According to research, these features even show that sometimes certain more quantifiable characteristics valued by experts and planners (e.g. cost of the fare or travelling time) have become in some cases less valued by the users, since they care more about the travelling experience that impacts the users' day-to-day experience; a comfortable and safe transport makes people feel more willing to face their routine and to rate the transport system and the government policies on this matter as "good" or even "excellent".



The same study attempts to explain the causes for "Rail Factor" through surveys, concluding that the qualities considered by passengers regarding the metro and urban trains are as follow:

**EMOTIONAL ATTRIBUTES:**

including convenience, appeal and nostalgia, among others.





#### **SPACE TO DO ACTIVITIES:**

this refers to the perception of more space inside the vehicle, the possibility to move during the trip, or to use the travelling time doing other type of activities work or leisure related: read a book, listen to music, etc.



#### **TRAVEL ATTRIBUTES:**

these include speed, punctuality and reliability, among others.

Ultimately, reliability and speed are key attributes when dealing with a public transportation system valued by the population. But additionally, considering the high transport capacity that urban train systems can provide, it is possible to attain an efficient, reliable mobility for high-demand volumes through the development of these systems with good quality standards.

At ALAMYS, we are convinced that if Latin American governments wish to successfully contribute with an efficient public transportation system, reducing the burden currently experienced by people due to an unreliable, unsafe, cumbersome and obsolete transport, they must pay attention to the attributes mentioned that the modern societies of the region demand today.

## 2.2

### METRO RAIL SYSTEMS REVALUE CITIES AND INCREASE THE ADDED VALUE IN THEIR VICINITIES



*“Capturing added value can be done using several tools, such as property taxes, contributions for improvements, levies or urban planning agreements – contributions in cash or kind in return for the right to develop- and the selling of building rights”*

Throughout the world you may find evidence that the development of metro systems helps to revalue the neighborhoods, revitalizes cities, and generates added value, impacting the activity systems.

A study for various cities in the USA (Cervero, 2004) shows that the increase in value of a property close to a metro station –between 400 to 800 meters- varies from 6.4% for the city of Philadelphia to 45% in the city of Santa Clara. Also, in another study conducted in Peking, China (Ma et al. (2013)), the increase in price of the properties located less than 1.5 kilometers from the metro stations in that city is estimated at 5%.

Generally, private owners of properties on these lots take advantage of this revaluation,

since the market value at which they acquire these goods raises just by the fact of increasing the levels of accessibility of public transportation through the development of this type of transport projects, or even because there is a certainty that in a near future these projects will go forward.

In contrast, in some cities that revaluation has been recaptured by the State or the competent authorities, allowing the funding of part of the infrastructure that involves the development of metro, or even financing new projects. An effective capitalization of this type of impacts allows the creation of other interesting financial strategies, such as the one successfully developed in Hong Kong called Rail + Property or R+P, which allowed the financing of metro infrastructure projects<sup>1</sup>.

(1) The corporation that owns and operates Metro service of Hong Kong (MTRC) does not receive subsidies in cash from the authorities for financing the building of infrastructure. Instead, it collects a kind of contribution as a land use permit granting the company the rights to develop the land surrounding the stations for the new initiatives, promoting the building of residential, commercial, and touristic projects and parking lots, among others, allowing the capitalization of the increase in value of the land.



At the Latin America level, revalorization of cities due to transportation projects and the subsequent capture by the State of the added value generated is not a ripe process yet or is still incipient.

Brazil and Colombia lead the way, with almost 30 years of evolution of the mechanisms of added value capture, while Argentina, Uruguay and Ecuador have started to develop innovative experiences in this area (BID, 2016).

Capturing added value can be done using several tools, such as property taxes, contributions for improvements, levies or urban planning agreements –contributions in cash or kind in return for the right to develop- and the selling of building rights. That is, there is not a single tool for capturing the added value

generated by metro projects, but instead some of the previously mentioned tools may be adjusted.

At ALAMYS we are certain that capturing the added value for investments in new infrastructure is a necessary innovative path to allow raising funds to finance projects.

Therefore, we call for the political decision makers to transform the legal, institutional and fiscal framework of their governments (local and/or national), so that value capture is possible and easy to implement.





## 2.3

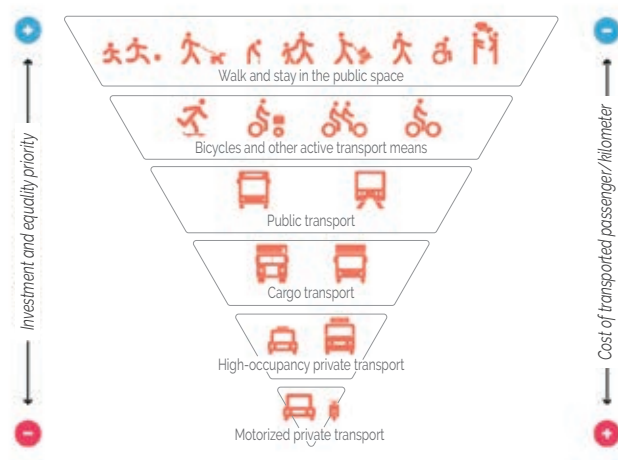
### METRO RAIL SYSTEMS ARE SYNONYMOUS WITH HIGH EFFICIENCY IN THE USE OF URBAN SPACE AND THE EMISSIONS INTO THE ENVIRONMENT

Urban space is a limited but highly important public good, since its use has decisive impacts on the quality of life of city dwellers. Roadways, such as streets and highways, green areas, spaces for cultural urban expression, sidewalks for pedestrians, bike lanes, among other elements, must live together harmoniously in the urban space, which comprises the citizen's meeting place, and for this same reason, it is highly necessary to define some type of prioritization on the possible uses.

Considering that the mobility infrastructure in most cases is developed on urban space, and that it concentrates different uses of mobility, the present trend in the world of transport is moving towards the efficient use of that space, understanding that the mobility of persons should be planned and cause the least urban impact possible.

Faced with this, one of the paradigms being adopted by various transport authorities and government institutions as a public policy is the "Urban Mobility Pyramid" (see figure 1),

FIGURE 1: URBAN MOBILITY PYRAMID



which indicates one of the ways of prioritizing the allocation of the limited urban space for the transport of people, based on the efficiency that can be achieved with each mode.

First, it should be noted that pedestrians and cyclists use a reduced space individually, but that together they represent a great deal of the travel within the modal share of the cities. Then, the pyramid assigns priority to the public transport, where vehicles like trams or metro use a reduced urban space to move larger amounts of people.

Only the penultimate place of the pyramid includes private vehicles like cars, given their inefficient use of space, especially considering that in the vast majority of cities these reach occupancy rates significantly below the total capacity of the vehicles.

It is then when metro, one of the public transport modes, appears as an efficient solution for the use of urban space when it comes to moving a large volume of passengers. Furthermore, generally the metro can use underground or elevated space for its layouts, freeing important surface space.

*“The present trend in the world of transport is moving towards the efficient use of that space, understanding that the mobility of persons should be planned and cause the least urban impact possible”*

## METRO AND EMISSIONS

With the vision mentioned above, our cities could stop the increasing ownership and indiscriminate use of cars and the traffic congestion caused by other public means of transportation that use fuels harmful to public health, and all the negative externalities in terms of congestion and emissions attached to this mode of transport, and at the same time maintain or even increase the use of public transport, creating friendlier and more inclusive cities for Latin America.

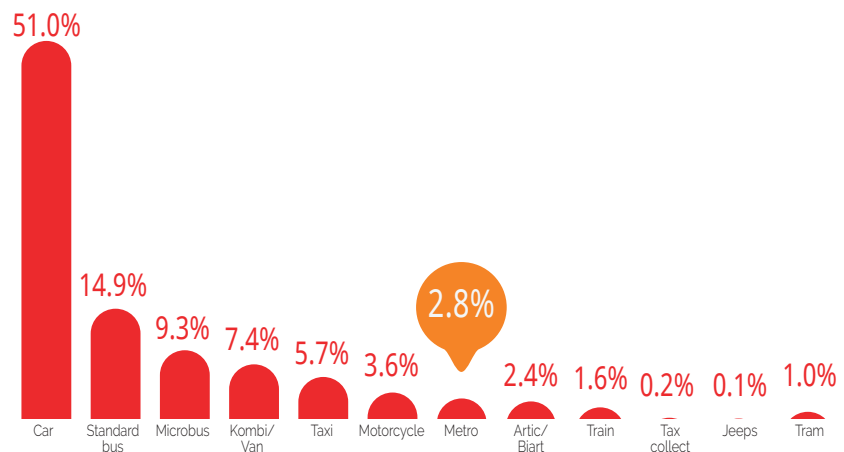
On the other hand, the relevance for environmental sustainability has currently become extremely high in political, social and economic terms, in a context where during 2015 a world-wide, transversal consensus was achieved at the United Nations Conference on Climate Change (COP21) in Paris. In that gathering, countries associated to the United Nations signed a commitment to reduce the risks and effects of climate change. Quantitatively, this led to continue the efforts to prevent the rise of the global average temperature above 2°C by 2050.

Transport industry has a great impact on the environment, since it is estimated that, as of today, it is responsible for 23% of the total greenhouse gas emissions, and this figure could double by 2050.

However, not all transport means use the same amount of energy within this 23% of responsibility for greenhouse gas emissions. Graph 1 shows that cars, standard buses (so popular in Latin America), taxis, minibuses and passenger vans account for 94.6% of energy consumption, versus 5.4% for rail modes (metro, train and tram).

Therefore, we at ALAMYS call for Latin American countries to focus their political efforts on promoting a more efficient use of public transportation modes in terms of emissions and per user transported: metro, commuter trains and trams, since they generate considerably less emissions harmful for the environment, in a critical historical moment for caring about the planet.

TABLE 1: % ENERGY USE PER TRANSPORT MODE



Source: Mobility Observatory, CAF - Development Bank of Latin America

## 2.4

### METRO RAIL SYSTEMS HAVE LOWER ECONOMIC COSTS FOR SOCIETY WHEN ALL ITS EXTERNALITIES ARE CONSIDERED

During the last years, especially in Latin America, an intense debate has taken place regarding which technology to prioritize to meet the needs of mass public transportation in large cities.

In this context, comparisons are usually made between the following technologies: metro, light rail train (LRT) or tram and Bus Rapid Transit (BRT). The analysis tended to focus on the comparison of capital costs, dimension in which evidently BRT technologies and trams have lower values than commuter trains in general, and metro in particular. However, focusing primarily on capital costs has four important limitations:



The service life and renovation costs of infrastructure equipment and systems are disregarded. In the case of metro, the useful life of its components many times exceeds the horizons of economic evaluation of the projects, and are an investment forever. The return of investment should not be measured in years, but in generations.



The operational cost is not considered as a relevant element, and in many cases it turns out to be significantly lower for metro than for other modes.



The analysis omits the urban impact that metro and train projects might generate regarding positive externalities of this mode of transportation, such as the recovery of public spaces and the urban development. Incidentally, the metro mode strongly contributes to a lower accident rate in surface areas and to positive externalities.



The maximum amount of passengers that can be transported per hour in the sense of maximum load is clearly higher for metros than BRTs. Generally, it may be said that metros can transport up to 65,000 passengers/hour, while 2-lane BRTs can transport up to 18,000 passengers/hour, and 4-lane BRTs can transport up to 36,000 passengers/hour. Also, those BRTs with larger capacity create an important urban barrier, disconnecting the areas on both sides of the layout. This results in a significant traffic congestion in the vicinity of the BRT layout and also limits the crossing pedestrian traffic. This larger congestion ends up causing more pollution, an increase in accidents, and greater CO<sub>2</sub> emissions.

Indeed, the investment or capital cost required for developing metro projects is high, since comparatively, the civil works and expropriations required are generally larger than those for developing other modes.

However, for the reasons mentioned above, when discussing which technology is preferable to meet the mass transport needs, it is key to include the scale of the operational cost and urban impacts and be based on empirical evidence that may

be very useful when drawing conclusions in that regard.

For the different cities and/or countries, there is generally a point in terms of flow or demand from which the development of metro is more convenient than a system based in buses. This point varies among the different cities, since the costs for each of the necessary components for the development of the mobility technology vary according to the country, and also according to the corridors, even within the same city.

Regarding the operational costs, there is ample evidence in the public transportation systems throughout the world that the cost per transported passenger, or for passenger/kilometer may be significantly lower for metro compared to other surface mass transport modes. The disadvantage of commuter trains is associated in political circles and the public opinion to higher capital costs, which is an irrefutable fact, as explained previously with more detail.

We at ALAMYS firmly believe that at the time of choosing the technology for a mass transport project, the competent authority must carry out a full analysis including both the investment costs as well as medium and long term operational costs, and also the positive externalities that these projects involve. We are sure that, according to the arguments previously mentioned, this will result in the clear decision in favor of more metro systems in our cities.





## OPERATIONAL SUBSIDIES FOR PUBLIC TRANSPORT

In the same area, generally public transport systems in developed countries generally have some type of operational subsidy. For example, in Oceania, North America and Europe, public transport systems have significant levels of operational subsidies, averaging value close to 50% or even more. The systems for Asian cities are located at the other end, covering great part of the operational cost with non-fare revenues generated thanks to a legal framework that facilitates business ventures for operators.

Latin America is in an intermediate situation in the case of cities that have metro systems, although most of the public transport services of this region, based mostly on buses, are self-financed systems provided by private companies that cover their operational costs with the fare value and provide –in most cases– a low quality service. Investment in metro infrastructure, however, as in most of the world, is provided by the State, under different financing schemes: direct, or through public-private participation.

Another component directly associated with the subsidies provided by the State is related to the fare schemes adopted and the fares

for the public set in the systems. In general, the lack of urban planning in Latin America and the liberalization in the use of the land has made lower income residents in the cities to settle in the peripheries, far from the production centers.

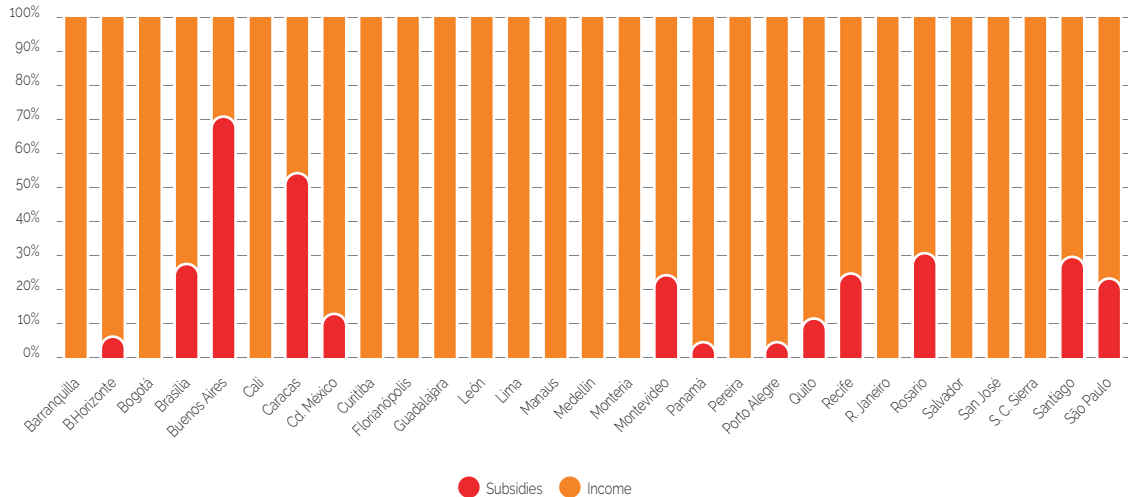
In view of this, one redistribution policy from the public transport is the implementation of integrated ticketing or a flat fare between the different modes that comprise the system –that is, the connections are not charged, or a very low differential is charged– which generates crossed subsidies from the residents who travel short distances (and who probably have higher purchasing power) to the residents who travel long distances from the periphery. This, along with a policy seeking to make fares affordable for the public in order to encourage the use of public transport. The operational subsidy levels tend to be quite high. On the other hand, when the value of the fare in urban areas correlates to the distance traveled, the subsidy levels tend to be significantly lower. But, given the rather segregated distribution of the residents in Latin American cities in economic terms, this fare scheme would have a lower redistributive degree than the one previously mentioned.

Finally, it is relevant to mention that in Latin American countries with metro systems, resources for operational subsidies on the one hand, and for investment in metro infrastructure and development, and investment in replacement for obsolescence or for technological advance, tend to be considered by public opinion as a single large disbursement by the States and intended for public transport.

Since operational subsidies –which generate social benefits but are inherently a fungible expense for the State– are the ones that ultimately maintain affordable fares for the public and have short-term results, large investments for metro development (which are an asset for the State) tend to be deferred in time, since their yields show in the long run and many time are not aligned with the political cycles of each country.

At ALAMYS we are convinced that the distinction between state resources for operational subsidies and investment in metro infrastructure and development is key within the political discussion when attempting to balance both components.

PUBLIC TRANSPORT FUNDING, LATIN AMERICA, 2014

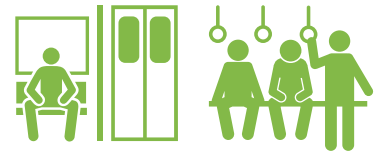


Source: Mobility Observatory, CAF - Development Bank of Latin America. Caracas, 2004.



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## CONCLUSIONS



Urban population continues to grow in cities throughout the world and Latin America is no exception: access to products and services, such as health, education and leisure activities is obtained relatively close to the large urban areas. However, the ongoing growth of cities imposes a tremendous challenge in terms of mobility of the residents, who demand a transport system to support the activity system of each city.

For the above reasons, public transport is a key element. The efficiency in the use of urban space in the mobility of users and the environmental sustainability it can reach makes it socially profitable to develop this type of metro rail systems, increasing the quality of life standards of the residents.

When designing metro and tram systems in the cities, it is possible to contemplate the intermodality as a policy that guides the design, considering exploiting the efficiency reached by each mode in different situa-

tions largely related with the demand that needs to be met. When it comes to large volumes of demand and usually on highly dense corridors, metro and commuter trains are a good mass public transport solution, addressing the speeds they can reach in fully dedicated railroads and the high capacity of this technology on the rails.

Integrating this type of means with other forms of minor public transport creates a harmonious public transport system for the users. One example is buses, which can provide a more dense coverage than metro networks using minor infrastructure like local railroads, and work as a feeder network or as a complement to the metro, creating greater integration and urban development. All this developed together with a comprehensive mobility and land use policy enhances the impact in terms of urban development in the vicinity of lines and stations, increasing the accessibility and improving the social conditions in the vicinities of lines and stations.

Nonetheless, there are clear and evident reasons to develop metro rail projects in Latin American cities as a mass public transport solution:



a) **GREATER SPEED, RELIABILITY AND SAFETY:**

these tangible and intangible attributes, highly valued by metro users, are normally not considered in the models for estimating the demand or in the assessment methods in our region, but they are present at the time of choosing the users' mode of transportation for the inherent features of commuter trains –little interference with other modes, capacity, information to users, comfort, safety, high-frequency availability, etc.





**b) REVALUATION OF CITIES AND INCREASE IN THE ADDED VALUE OF THE VICINITIES:**

metro projects, when proposed together with a comprehensive policy on mobility and land use, enhance the impact in terms of urban development in the vicinity of lines and stations. Evidence throughout the world indicates that properties close to metro stations increase their value due to the characteristics and attributes mentioned above. Furthermore, there are different schemes for capturing this added value by the State, resources that can be collected to do other urban projects.



**c) GREATER URBAN SPACE USE AND ENERGY EFFICIENCY:**

as a limited public good, the use of urban space should be prioritized. It combines different modes of transport and their associated infrastructure: green areas, spaces for cultural urban expression, among other elements. In terms of mobility, metro provides the possibility to transport large volumes of passengers using reduced urban spaces, or moreover, the metro solution can be designed underground in certain cases. On the other hand, metro efficiency in terms of polluting emissions is high; as per passenger/Km transported, metro is the public transportation mode with less CO<sub>2</sub> emissions into the atmosphere, component responsible for the global warming in our planet.



**d) LOWER ECONOMIC COSTS FOR SOCIETY WHEN ALL ITS EXTERNALITIES ARE CONSIDERED:**

Metro requires large sums of money in infrastructure, rolling stock and systems, which is a recurring criticism from the public towards this mode, and which works against the development of this type of technology. It is entirely true that state resource should be carefully invested, ensuring social returns that are equally beneficial for the city residents. For this reason, when considering all the components and externalities, inherent to metro development, such as operational costs, urban impacts, service life and renovation costs, light rail trains reveal lower economic costs for society than other modes, injecting competitiveness to countries, transforming their cities in cities with sustainable mobility, resulting in these projects becoming a financially efficient solution in social terms for massive demand volumes.

Latin American cities have become large and dense population centers. At ALAMYS we firmly believe that promoting more and better metro rail projects, for the four main reasons mentioned above, will bring more equality, integration and efficiency to our cities' mobility. Ultimately, we believe that metro projects trigger a priority that should be top in the region where we live: the improvement of the quality of life of all citizens thanks to the urgent prioritization of an efficient planning of public transportation in our cities.



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