

URBAN MOBILITY  
OF RESIDENTS  
FROM SHANTY  
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INFORMAL  
SETTLEMENTS IN  
BELO HORIZONTE:  
WHAT HAS BEEN  
IMPROVED?

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## **Urban mobility of residents from shanty towns and informal settlements in Belo Horizonte: what has been improved?**

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### **Abstract**

Brazilian Law establishes the universal provision of public transportation as a guideline in planning and management of urban mobility systems. Following this guideline is essential to observe if the service offered has quality and equity in the villages and slums of Belo Horizonte, it is necessary to lead the formal service into the informal city too. This service allows for better internal coordination of villages and slums, making easy the integration with other service lines of urban public transport system and guarantee to the resident's access to urban facilities, such as schools, health centers, churches and trade.

**Keywords :** Towns and slums, poverty and mobility, sustainable urban transport, social exclusion.

### **1. Introduction**

People or social groups are always, in one way or another one, excluded from the environments, situations or instances. Exclusion is being out on the sidelines, without possibility of participation, in social life as a whole or in some of its aspects. The high social and economic inequalities in Brazil and especially in its metropolitan areas, needs treating on the extremely unequal relationship that exists, through public policies which aim the social inclusion.

This work focuses on one of these public policies seeking to enable the excluded ones the access to essential public services through improves mobility with the expansion of the network of public urban transportation. The possibility of access to this essential public service changes the reality of the population and opens new perspectives for the development of their capacities and to exercise their rights and seeking opportunities.

The service the transport needs within villages and slums presents physical and operational barriers that generally discourage the government and operating companies to find out solutions to the issue. The matter is aggravated by the growth of these areas on hillsides without at least road system, which condemns its entire population to walk long distances on a difficult topography to get their commuting.

As part of an administrative policy guided by the inversion of priorities and direction of investments to the poorest areas, the experience of Belo Horizonte begins in May 1996 with the establishment of a shuttle minibus collective operating in the region of Barreiro, in the extreme north of the city. The investments of the municipality in the urbanization of villages and slums, with construction of new roads and paving the existing ones allowed a gradual expansion project. The system currently has ten lines of buses which transported an average of 281,000 passengers/month in 2011. The service is operated by private concessionaires and is managed by Belo Horizonte Municipality through a public company of its indirect administration: BHTRANS.

The work covers five steps required for conceptualizing the theme and reviews the procedures. The first step deals with the socio-spatial segregation in a sociological perspective, the second section considers social exclusion and mobility, while the third describes the Specific Global Plan, the fourth step describes how the program to improve mobility in towns and slums is made and eventually the final considerations on the topic.

## **2. The socio-spatial segregation in a sociological perspective**

Discussing the concept of socio-spatial segregation in Brazil, especially its measurement and the consequences of its existence, it is important to seek work which took as its aim of study the two largest cities in Brazil: Rio de Janeiro and São Paulo.

A historical retrospective presented by Ribeiro (2003, p. 163) on the experiences of being examined social space points to the need to “find units of analysis for constructing a synthetic representation of their differences.” According to the author, everything goes back to London in the late nineteenth century, when Charles Booth led to the term “first experience of analyzing social space for public policy purposes” (RIBEIRO, 2002, p.159). This sort of study was also conducted in the United States, by members of the Chicago School, which “sought to develop techniques to apply of showing the influence of territory – understood as the social environment – the understanding of a vast range of social problems, such with juvenile mental illness, etc.” (RIBEIRO, 2003, p.161). In Brazil, according to this author, the first studies for the purpose of urban planning, social analysis of the territory, have been prepared by the Society of Graphical Analysis and Concepts Applied to Social “Mecanografica” (SAGMACS) on the cities of Rio de Janeiro, São Paulo and Belo Horizonte.

But conceptualize as “segregation” in order to then study it? Marques and Torres (2005, p.13) argue that residential segregation is “the degree of residential segregation or isolation between different social groups.” For Ribeiro (2003, p. 163), in turn, the term residential segregation denotes the idea of separation and exclusion of certain groups from the whole city situations where there is absence of relationships that bind these groups together with the social.”

Eduardo Marques (2005, p.31) argues that “socio-spatial segregation in terms involves at least three distinct processes.” The first method would be one that implied in total and isolation (as in the case of ghettos and citadels). The second process is related to unequal access. The third turn is related to the “separation or homogeneity internal and external heterogeneity in the distribution of the groups in space” (MARQUES, 2005, p. 34). The author explains that there is not a unified position on the issue in Brazilian production, “being the term used to designate both separation and inequality of access” and these positions are not mutually incompatible (MARQUES, 2005, p. 34).

Torres (2004, p.81) states that part of the problem encountered in studies on the subject is not able to reach “a consensus about an adequate concept of segregation”, and that “the only kind of understood as the degree of segregation residential separation between different social groups have been effectively measured in other countries.” The author estimates that by studying residential segregation in Latin America “this concept has often been used loosely, as if the segregation was merely a reflection of the differences between social groups” (p.82). The term was being used inappropriately

as a synonym for “inequality”, “exclusion” and even of “poverty.” For him, in their analysis, “segregation can be understood as the degree of clustering of certain social/ethnic group in a given area” (TORRES, 2005, P.82).

Peter Marcuse (quoted by Torres, 2005, p.83) considers the phenomenon more closely: “Segregation is the process by which the population is forced, therefore unintentionally, to cluster in a particular area, in a ghetto. The process of formation and maintenance of the ghetto. “In examining this definition, highlights Torres (2005, p.83) points out that “an aspect often overlooked: the segregation should be understood mainly as a relational phenomenon, i.e., there is only segregation of a group when another group secretes or is secreted. “In a study in which certain areas of the city named as “fortified enclaves”, Teresa Caldeira (2000, p. 212) states that “the rules that organize urban space are basically patterns of social differentiation and separation. And more: “These rules vary culturally and historically, reveal the principles that shape public life and indicate how social groups interrelate within the city.” (BOILER, 2000, p. 212).

Some established concepts, it can be sought to answer where segregation was happening. In this regard, Ribeiro (2003, p. 163) argues emphatically that “all cities exhibit clear signs of social division on its territory” which leads to believe in the need to study it and measure it for, then measure its impact. After all, the author highlights the fact that there is a social division does not necessarily imply that there is a situation of segregation. It should highlight a relevant assessment of Torres (2005, p.81): “Paradoxically, few times the residential segregation of our cities was measured in empirical terms, despite a long tradition of international measure the phenomenon, particularly in the United States.

Before proceeding, it is worth highlighting Ribeiro’s alert (2003, p. 163) that “use of the term segregation as a concept depends on the theoretical view that is adopted to explain social relations and understanding of the distinction between differentiation, segmentation and segregation”. Regardless of view adopted, it seems important to discuss the concept of segregation along with the concepts of inequality and poverty.

As for poverty, it can be said that his analysis is not a simple task, it is important to point out that “most sociological studies of poverty is essayistic form, making it difficult to compare between different realities, regions in space and moments in time” (MARQUES, 2005, p. 40). After all, “the concept of poverty can only be understood as a social construction, since the companies were awarded collectively the set of goods and services to which all citizens should have access” (MARQUES, 2005, p.40). This is complex issue “since associates access to goods, services and opportunities differently to various social groups defined on the basis of their characteristics” (MARQUES, 2005, p.40).

As social inequality means that is, generally, “the existence of different social characteristics between social groups established from some cleavage continuous or dichotomous/categorical” (MARQUES, 2005, P. 41).

In terms of concepts, it can be said that inequalities in access have gained special relevance. These, from Kaztman (quoted by Ribeiro, 2003, p. 42), are the difficulties in accessing the labor market and the difficulty of access to public policies.

Asked the conceptualizations, it is important to advance the understanding of the measurement of segregation. From studies conducted in São Paulo, one arrives at a “very detailed description of the spatial distribution of social groups, showing the existence of various types of poverty” (MARQUES, 2005, P.59). From the intersection of the variables income and education, for example, concluded that, in São Paulo, “income tends to be more spatially and socially distributed than schooling” (MARQUES, 2005, p. 62). The studies brought to term in the metropolitan region of São Paulo indicate that the territory is occupied “by various social groups very different from each other,” worth it both for the rich and for the poor and the middle class (MARQUES, 2005, p.68). These results confirm the belief in “the existence of various forms of poverty”, which shows a complexity that “tends to grow further,

becoming very complex overlap between the effect of heterogeneity and cumulative” (MARQUES, 2005, p. 68).

But what are the effects of residential segregation and segmentation in the process of reproduction of inequality and poverty? Ribeiro (2003, p. 155) presents “the virtues of social analysis of urban spaces as a tool able to identify the possible role” these effects. The author identifies three mechanisms that are currently identified as causes of increased residential segregation in cities: globalization, the growing perception of insecurity and decentralization (with transfer to the national level) function of investment in public services (equipment and provision services).

And what to do with the information and analysis obtained through research on segregation? You would say that “there are basically two types of government strategy to combat segregation and promoting fairness” (MARQUES, 2005 p.50).

The first strategy in pursuit of equity is the state promotion of social mix, creating mechanisms that force people from different incomes to live more closely. Important here is to highlight some statements that Bourdieu (2003, p. 165-166) recalls: “in fact, nothing is more intolerable than physical proximity (experienced as promiscuity) the socially distant”; “certain spaces, and particularly the more closed, more select, require not only economic capital and cultural capital, but also social capital “and” the meeting in the same place in a homogeneous population also has the effect of dispossession redouble dispossession, especially regarding culture and cultural practice.”

The second strategy described by Marques (2005, p. 50) is “to improve the conditions of urban areas inhabited by the poor, raising its status to a standard nearest experienced by groups with better social condition.” The author points out that both strategies “can lead to the production of a city more mixed and less unequal, although, the experiences from advanced countries do not always confirm this” (MARQUES, 2005, p.50). Here, once again, what seems to motivate the author in his conclusions is the focus on the complexity of the matter: “our analyses indicate that these situations are more complex than the literature suggests [...]. The central element is the combination between the complexity of the social structure, the heterogeneity of peripheral spaces and elements and processes of cumulative socially negative.” (MARQUES, 2005, p. 53)

One can therefore consider the segregation study as “an instrument capable of enunciating social problems” (RIBEIRO, 2003, p. 164). In the field of policy formulation, in turn, argues that, “especially in the case of urban policies, the space is considered one of the central dimensions in building these capabilities [technical and administrative], for potential use in building territorialized strategies of state action” (MARQUES; TORRES, 2005, p. 14). Putting in another way, the social analysis of urban space should be seen as a “tool able to identify the possible role of targeting and effects of residential segregation in the process of reproduction of inequality and poverty” (RIBEIRO, 2003, P.155).

### **3. Transportation and social exclusion**

The share of the population living in the city has its formal mobility with guaranteed quality, not only by the capacity of this type of funding, but also by the availability of adequate infrastructure to mobility with quality. The same cannot be perceived in the informal city, where mobility is reduced due to the absence of the conditions necessary to qualify the displacements Torquato (2004). Thus, the use of urban space and its benefits are unevenly distributed, exacerbating social inequality.

In designing the service of socially inclusive public transportation to the city should stick to the specificities of each region and territorial dynamics. The process of social and spatial segregation of the poorest, present in large Brazilian cities, has a result of the conditions limiting the mobility of this population group, often due to not being adequately met the needs of transport.

Gomide (2003) considers that the provision of a service of public transportation accessible, efficient

and quality, which ensures the accessibility of the population to the entire urban space, causes an increase in the quality of life of the poorest people, contributing to an increase in income, providing access to base social services and job opportunities. Thus, public transport is an important tool to avoid urban poverty and promoting social inclusion.

Some attributes appear to be crucial to understanding the ease of access to public transport service: the distance travelled on foot to enter the system, the availability of information about the service, the existence of adequate infrastructure to service the route of the line ( paved roads, lane width), quality of service and price.

#### **4. Specific global plan**

Improvements in villages and urban slums of Belo Horizonte were designed through a partnership between the Municipality and local communities. These experiments demonstrate that urban interventions in spontaneous settlements are much more successful and more durable as the beneficiary population participates. Thus, the government acts on a request from residents and explicitly in line with efforts by the communities themselves.

In participatory urban upgrading projects in villages and slums, analyses the dynamics of each village or slum on the organization of neighborhood associations, seeking to prioritize the works discussed and approved by the community. Projects must be appropriate to the type of soil, topography, vegetation, climate and other physical and geographical characteristics of each locality. Expropriation, removals are avoided so as not to destroy the existing neighborhood relations. The techniques and design standards used must be adapted to the context of the villages and slums, whereas interventions may not be definitive. It should employ economic solutions without sacrificing the quality of work.

The process of improvements in urban slums and villages conducted by Urbel, the public body responsible for the urbanization of villages and slums, in partnership with the local community encompasses many sequential steps and interrelated and culminate with the Global Urban Plan. According ARROWS-MG (1992) this is a tool that ensures the development and implementation of urban improvement projects consistently and according to proper conception of the physical and socioeconomic characteristics of the area, in addition to equipping the community in search of resources and support for fulfillment of their demands.

The definition of the road system is one of the primary steps in the development of the Global Urban Plan of villages and slums because this is the structuring element in the organization of urban space. In conventional classification, the streets and alleys of the slums and villages fall under the category of local roads and pedestrian routes, but you can divide the local roads into the Main Street and side streets, and for the transportation system interests through the main street type.

In the development of road projects in villages and slums the interrelationship between Urbel and BHTRANS, manager of urban public transportation system, enabled the works carried out in villages and slums ensured the possibility of movement of public transport on the streets of the leading brand. The road projects are simplified pattern adapted to local physical conditions and allow the design of public transport vehicles receivable and other essential public services , noting maximum gradient, track width, etc.

#### **5. Villages and slum program**

The Municipality of Belo Horizonte implemented since 1994 as a result of Specific Global Plans, works to improve the infrastructure of the villages and slums, many of them through the features of Participatory Budgeting. The deployment of these new roads, paving and widening of existing ones BHTRANS allowed to enable the implementation of the Project for Improvement of mobility for

residents of villages and slums of Belo Horizonte, an old demand of its residents.

This program of social inclusion and formalization of the informal city, which consists of the implementation of mass transit lines within those communities, reverses the perspective of traditional priority of public managers of the urban transportation: direct investments to areas of lower System passenger demands and less road infrastructure, public transport priority and security of users of the system; produce a transportation service with a focus on user needs; vehicles use low capacity in the system to perform regular service, usually taken as uneconomical; ensure the service by social viability, not economic, and designing the service in partnership with the effective participation of the community through meetings with CRTT'S – Commissions for Regional Transport and Transit.

Overcoming the obstacles to meeting the transportation needs in villages and slums could be overcome only with the integration of actions between government, community and business operators. The community is fully involved and in all phases of project development and implementation, through several meetings with representatives and community leaders, and members of the Community Associations.

Community leaders played an important role in approving the route of vehicles. According to the NTU (2004) the operation of the service can only be done safely if the consent of the informal leaders and community acceptance. Throughout the operation, the operators sought to maintain this partnership and community leaders, today, are driven not only for discussions on the operation and management of the lines. But also to reduce the conflicts between: the company, its officers employees and community.

The lines are designed to make the internal links and the surrounding villages and slums. It intends to enable the community to shift the main points of a desire to travel, in particular the urban facilities: health centers, schools, churches and local businesses. To allow coordination with the city, these lines integrate physically and tariffly the end of rows with other service features in the city.

In the implementation of this service, the operators sought and BHTRANS suit the limitations road, completing the vehicle technology by using a model adapted minibus for this sort of operation.

The vehicle defined for the service operation was a specially adapted minibus to travel on narrow and steep roads. Smaller than that found in the market, this vehicle carries 25 passengers seated and 15 standing. The Volkswagen microbus or 8.5 tons was adapted by the operator in conjunction with the manufacturer: It was shortened the wheelbase so it could work with up to 6 tons and so super-dimensioned brake systems and clutch components such plenty requested for service operation. The reasons are that these vehicles carry very low speeds, the path constraints, with a high number of deceleration and acceleration, and downhill, they have to walk very slowly, requiring an effort above normal for these components.

In 1993, with the start of line operation 7902S – Set Taquaril, the BHTRANS establishes a new public policy planning and management of urban public transport system and contributes decisively to improving the quality of life and social inclusion of its residents. That was the first line of transportation circulating in the city of Belo Horizonte in the informal city.

The line 7902S came through with zero tariffs, free carrying locals to the end point of an existing bus line (line 7902). The problems encountered with this free service were such that the actual community leaders requested that the charge was introduced, creating an integration tariff between the line 7902S and 7902 one.

Three years later, a program was developed and named as Program for Improvement Mobility Villages and Slums, with the guideline and principle inclusion. In this program, the first service was offered the line 319, in May 1996, to serve two communities: Town Cemig and Hope Set. The last two lines were

put into operation at 107 and 336, in 2007. There are in operation today, ten lines, as described in table 1, in different villages and city slums.

**Table 1**

<b>Lines in operation in the Villages and Slums Program</b>	
<b>Lines</b>	<b>Description</b>
101	Aglomerado Santa Lucia
102	Vila N Sra. De Fátima.
103	Cafezal
107	Vila Marçola / Rua do Ouro
201	Morro das Pedras
203	Morro das Pedras / Ventosa
204	Estação Vila Oeste / Nova Gameleira
319	Vila Cemig / Conjunto Esperança
321	Olhos d'água / Pilar
336	Hospital Eduardo de Menezes / Vila Bernadete

The lines that serve the villages and slums have a monthly cost of R \$ 222,838.80, while the monthly income is around R \$ 64,312.45 (base May/05). There is no external subsidies to public transport system of Belo Horizonte, and therefore used the system of cross-subsidization, where surplus lines transfer funds to deficit through the Clearing House Tariff - CCT. Despite this high deficit, proportionally the amount is relatively small compared to the total system cost.

The tariff lines reduced to slums and villages was implemented in December 2000 and had a major positive impact on the city. This tariff level, 27% of the cost of the fare dominant, was created with the goal of social inclusion of people to the transportation system, providing access to local services (schools, hundreds of health, commerce) and other lines in the system. This solution proved to be interesting benefit for local travel, macroaccessibility extend (integration with larger number of lines) and inhibit evasion. Initially the integration took place through paper tickets. From December 2004 promoted to full fare integration through smart card BHBUS, allowing residents of Villages and Slums only pay a fee to use the lines of Villages and Slums associated with regular lines.

According to Borges (2001) in Santa Lucia Particleboard before the implementation of the online population moved an average of 1.5 km on foot, by steep paths to reach the bus stop lines that are surrounding. The line deployed, with 7 km long, allows the internal links to promote access to internal and external equipment to integrate with the end point of the lines around. The situation in Sierra Particleboard was no different before the implementation of internal line. Large portion of its population walked for 2 km on steep paths to reach the bus stop. With the implementation of the lines 102 and 103, with 3.6 km and 4.8 km long respectively, it was possible to articulate the interior of the village and integrate with the rest of the transport service in the city. The reality on Particleboard Morro das Pedras, in Vila Cemig eyes and water is no different from these two noted above.

Traders estimate that this service despite deficit has to be provided as it ensures the universality and equity of care transport network throughout the city, besides contributing to the formation of a positive image of the operators. The community says that the service has contributed to improving their living conditions and has led to reducing violence by allowing an offset safer, but has not attended to the continued growth of demand (NTU, 2004).

In selecting drivers and collectors, there was a high rate of refusal because of the low level of security function. The solution was to hire employees from the community to also curb in part to revenue evasion. According to the testimony of local residents attended, this measure helped to reduce evasion and without it almost no one would pay passage (NTU, 2004).

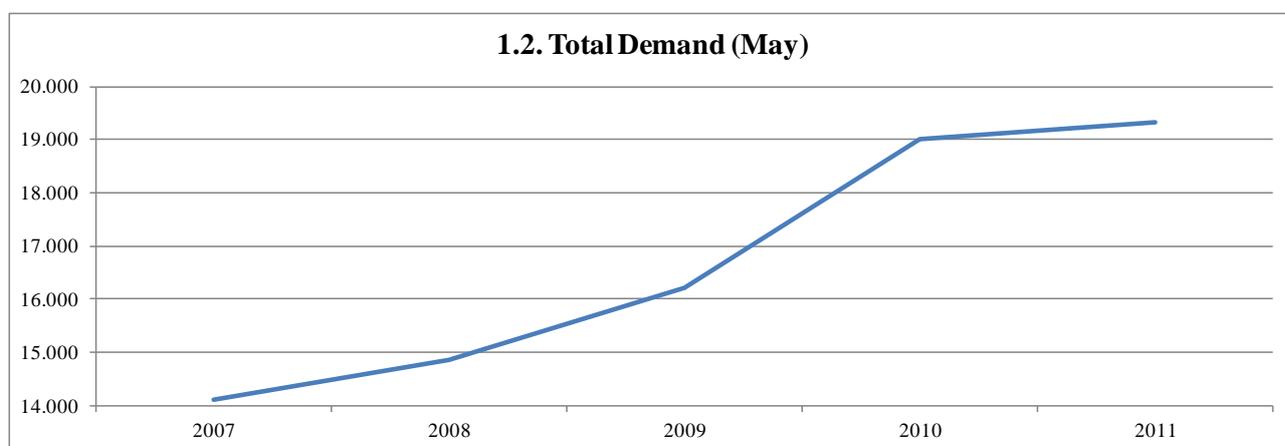
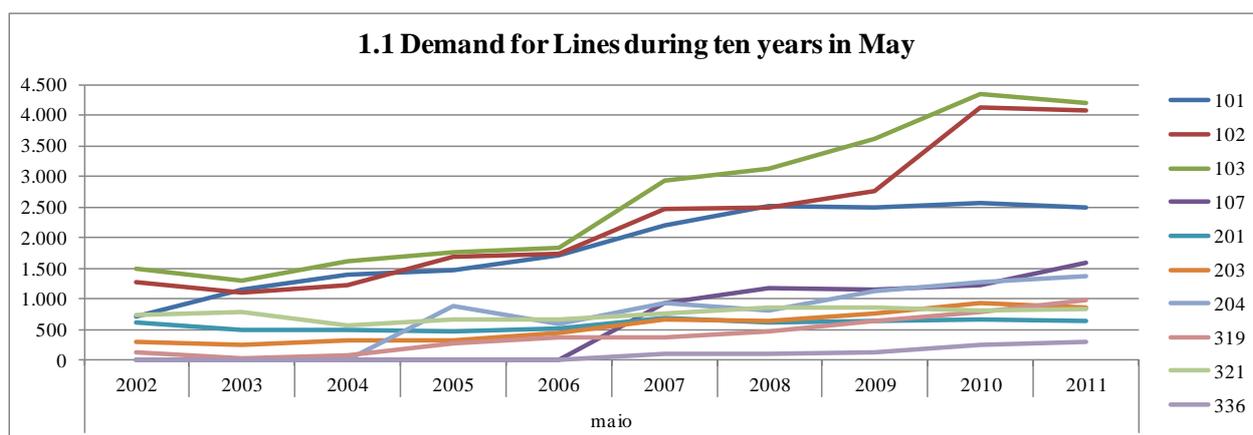
The five communities served by the lines are the larger towns and Slums of Belo Horizonte who did not have a mass transit system in its interior and its population is described in Table 2.

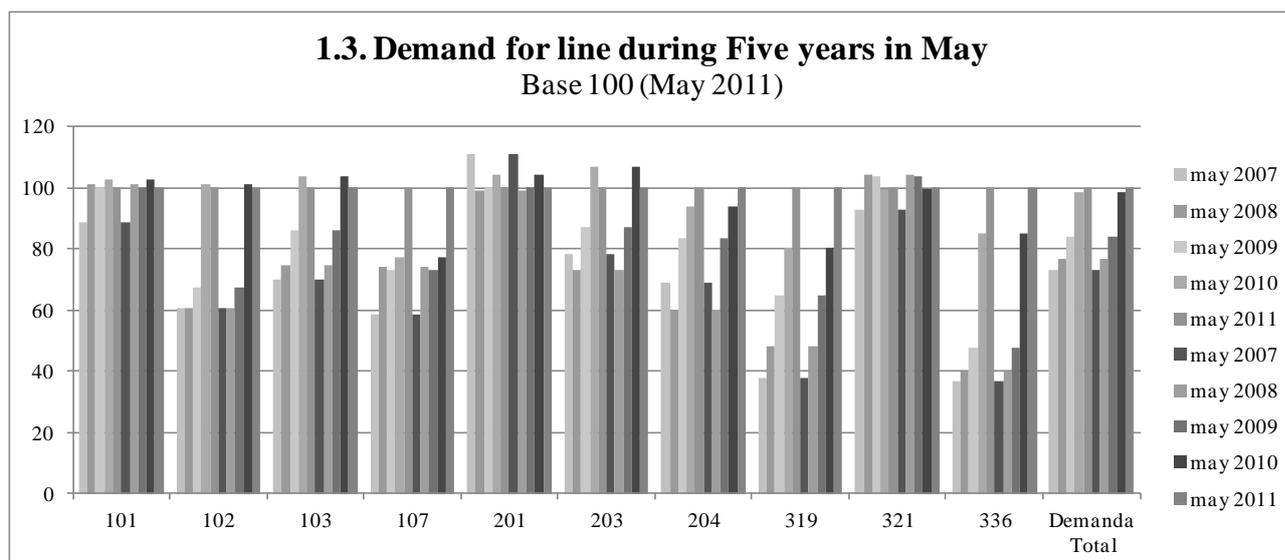
**Table 2**

<b>Served Population in the communities</b>	
<b>Villages and Slums</b>	<b>Population (2005)</b>
Aglomerado Santa Lúcia	16.914
Aglomerado da Serra	46.086
Aglomerado Morro das Pedras	14.363
Vila Cemig	4.352
Olhos d'Água	2.520

Moving average passenger refined lines of service to villages and slums in June 2005 was 6835 passengers per day. The following are Graphs 1 accompanying historical lines that show the evolution of passengers carried in the lines of villages and slums. Note that the lines show a steady growth in demand over the years, except the lines of Particleboard Saint Lucia (101), Morro das Pedras (201) Eyes and water / Pilar (321) do not show a significant increase in their demand, but stability in the volume of passengers carried. It should be noted that not observed in any of the lines there is no significant reduction in the volume of passengers over the years.

**Graphic 1**





## 6. Final considerations

Overcoming social exclusion involves the universalization of citizenship. A strategy to fight against the social exclusion, in this sense, is ensuring access to essential public services. One such service is public transportation. In this sense the Municipality of Belo Horizonte invested in the urbanization of villages and slums with the introduction of new routes and widening and paving of existing roads, which allowed these regions BHTRANS deploy a service of public transportation with good quality and affordable.

The use of minibuses for transportation services in areas with poor road system, integrated physics and tariff the other lines of the conventional system ensures deleted for a segment of the population, access to public transportation, in addition to contributing for the integration of slums and villages to the urban fabric. It constitutes one of the instruments of public policy that helps the excluded are able to recover their dignity and materializes the participation in collective action; improving access to employment, income, social services and education, as well as health and cultural programs.

The results of this program can be characterized by the following benefits transferred: ensuring the residents of these villages and slums service access to public transportation; reducing the time and distance of travel on foot, and improving accessibility and mobility of residents.

In aspects tariff highlight two points. At first it appears that the application of differentiated tariffs and the insufficiency to cover operating costs of the lines indicates an initial perception of inefficiency, but this deficit is compensated by attracting new demand for the system. The second is that a program of social inclusion in public transport services cannot be limited to the tariff subsidy for a group or for all users. But, they should also stick to the expansion of network services and the regularity and reliability of services.

However, some questions still remain unanswered and need to be answered, especially those that deal with the comparison of transport in the city offered as formal and informal in the city. Were the residents of the entire city on foot over distances of the same order of magnitude to reach their destinations? What about manning the lines? What about the age of vehicles? And the ranges of travel? What about the stability of demand in some of the front lines to the steady growth in other lines?

Data relating to the research of origin/destination held in 2001/2002 indicate that citizens from Belo Horizonte make 1.66 trips/day. However, when evaluating this mobility index by income that is observed is the inhabitants of the lowest income bracket (less than 0.5 times the minimum wage per

capita) are only 1.13 trips/day. Taking only the collective modes, the inhabitant from Belo Horizonte makes 0.44 trips/day while those with lower incomes are only 0.34 trips/day. In non-motorized modes, in turn, what you see is the reverse situation: the city average is 0.29 trips/day and in the range of lower income is the average of 0.61 trips/day.

The data presented in this article were obtained directly in BHTRANS, but not all data required for a more thorough analysis of service are available, especially those relating to daily demand of each line over time, since the creation of each one. The moment that Brazil is under the aegis of two new regulatory frameworks, it can be said that this difficulty need to be overcome. These milestones are: a) Federal Law 12.587, enacted in January/2012 establishing the guidelines of National Policy on Urban Mobility in coordination with those provided in the Federal Constitution of 1988 and the Statute of the City, 2001; b) Federal Law 12.527, enacted in November/2011 and entry into force in March/2012, which provides for the procedures to be observed by the Federal Government, States, Federal District and municipalities to ensure access to information provided in the Constitution of 1988.

To comply with legislation that is being called “law on access to information,” the BHTRANS should provide data and indicators to society well acquainted with the services managed by it, including the public transport service in villages and slums in Belo Horizonte. To comply with the law that has been called the “National Policy for Urban Mobility”, in turn, society should participate in the development of diagnostics, indicators and targets stipulated for achieving universal service transportation. After all, do not just take the service to the geographically segregated communities: it is necessary this service is offered with quality similar to that offered in the rest of the city and that such offer is able to intervene positively in the segregation of its residents.

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