

# The Rail Decentralization and Modernization Program in Brazil: Lessons Learned

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**ABSTRACT:** In 1991, the Republic of Brazil asked the World Bank's assistance in the decentralization program of its urban rail systems run by the Companhia Brasileira de Trens Urbanos (Brazilian Urban Trains Company-CBTU). The systems were to be transferred (decentralized) from the Federal Government to the local (State and Municipal) authorities. The local authorities agreed to receive the systems as long as they were rehabilitated and modernized but also requested that the Bank acted as "honest broker" between the parties and financed the program. The Bank agreed to embark in this program because it saw an opportunity to revitalize very important trunk corridors of the metropolitan regions which, if properly integrated with the existing bus systems and land use could greatly enhance mobility in the region, particularly for the main users who are low-income. From 1992-2002, the Bank lent more than US\$1 billion for the decentralization program and follow ups in the States where decentralization was completed. This paper examines the main issues involved in a program of this nature, the institutional obstacles faced and the lessons learned.

**RÉSUMÉ :** En 1991, la République du Brésil a demandé l'aide de la Banque Mondiale dans le programme de décentralisation de ses systèmes ferroviaires urbains dirigés par la Companhia Brasileira de Trens Urbanos (la CBTU, Société Brésilienne de Trains Urbains). Les systèmes devaient être transférés (décentralisés) du gouvernement fédéral aux collectivités locales (nationales et municipales). Les collectivités locales ont consenti à recevoir les systèmes dans la mesure où ils étaient réhabilités et modernisés, mais ont également demandé que la Banque agisse comme un "courtier honnête" entre les parties et finance le programme. La Banque a consenti à s'embarquer dans ce programme parce qu'elle a vu une occasion de revitaliser les grands couloirs très importants des régions métropolitaines qui, si correctement intégrés aux systèmes d'autobus existants et à l'utilisation des sols, pourraient augmenter de manière considérable la mobilité dans la région, en particulier pour les utilisateurs principaux qui ont de faibles revenus. De 1992 à 2002, la Banque a prêté plus d'un milliard de dollars (US\$) pour le programme de décentralisation et de suivi dans les États où la décentralisation a été achevée. La communication examine les questions principales impliquées dans un programme de cette nature, les obstacles institutionnels auxquels il a fallu faire face et les leçons apprises.

## 1 BACKGROUND

The Government of Brazil (GOB) created CBTU in 1984, by separating suburban rail passenger services from freight services which, at that time, were both being provided by the national railways (RRFSA) on existing rail lines (810 km), in 9 states. GOB's objective was to create an agency fully dedicated to suburban rail service which could offer a more cost efficient rail service to the Metropolitan Regions (MRs) than that provided by the Federal Railways (RRFSA), thereby relieving some of the MRs peak-

hour capacity problems. CBTU operated suburban rail services in Rio de Janeiro (380 km), São Paulo (192 km), Recife (52.5 km), Belo Horizonte (33.6 km), Salvador (13.5 km), Fortaleza (42 km), Maceió (33 km), João Pessoa (30 km), and Natal (56 km). The CBTU's nine subdivisions covered 44 municipalities with a total population of 38 million inhabitants, providing a daily transportation service to about 1.9 million passengers (mostly low-income), but in 1992 were carrying far less passengers than it was expected (less than half), offering a very poor level-of-service, requiring an average subsidy of

US\$800 million/year from the Federal Government and not reaching the modal share (15%), which it could easily achieve if it were operating properly, thereby falling short of the goals for which the agency was created. The head office of CBTU was and is still based in Rio de Janeiro and that distance from the operating subdivisions was often criticized by the local authorities who claimed that decision-makers are too far from the real operation and are not quickly responsive to the population needs.

Although CBTU carried less than 8% of all motorized trips, it served some of the poorest areas of the MRs, penetrated most city centers and had an estimated repressed demand (simply due to lack of capacity at the prevalent tariffs at that time), in both São Paulo and Rio of an estimated 1,000,000 pass/day each. This was the result of an inefficient operation due to frequent disruptions of the system caused by equipment shortages and failures, power supply and overhead catenary problems, lack of appropriate signaling to decrease headways and frequent accidents in the rail right-of-way. The weak financial situation of CBTU was a result of poor cost recovery mechanisms such as very low tariffs (normally 1/3 of the bus tariffs for equivalent trip lengths), fare evasion, a non-commercial oriented management, lack of appropriate cost accounting and financial management, very weak inventory management which affected spare part and rolling stock availability and inexistent staff and line rationalization strategies. In addition, the economic feasibility of some of CBTU's subdivisions (João Pessoa, Natal, Maceió) was being questioned given their potential ridership and their replacement by more cost-effective modes evaluated.

In 1992, while the systems in Recife and Belo Horizonte were quite modern, the networks which were operated in São Paulo and Rio were old and in very poor condition, lacking adequate rolling stock and suffering from frequent operating disruptions. Ironically, these were the lines which carried more than 90% of the overall CBTU's daily ridership. In both megacities, CBTU's ridership consisted mainly of the lowest-income groups who live in the fringes of the MR (more than 87% of CBTU's Rio subdivision ridership earns less than 3 minimum salaries), which are served by these rail lines. Since 1984, the 1.2 million pass./day ridership in Rio de Janeiro has been decreasing mainly due to the lack of peak hour capacity and in 1991 was reduced to .71 million pass./day. In São Paulo, the ridership went up from .712 in 1984 to .966 million pass./day in 1991. In São Paulo the ridership was clearly repressed by the lack of train capacity. In Rio, the ridership increased every time a new train was introduced, suggesting that train capacity is a major ridership determinant.

CBTU subdivisions were not well integrated either physically or tariff wise with the other urban transport modes except in São Paulo where a major effort promoted by the Metro has resulted in good physical and tariff integration between the several modes. The construction of well located transfer terminals was the catalyst for such an efficient integration. In Rio, there is very little modal integration and this discourages the use of two or more complementary modes, increasing therefore the overall tariff for those users who are forced to use two modes to get to work. In Belo Horizonte (DEMETRO) and in Recife (METROREC), the problem was not the lack of reliability of the system. Instead, in these systems especially in Recife, it was the short length of the networks and the lack of modal integration which has affected considerably the ridership of the systems. The Porto Alegre's federally-owned and operated rail system (TRENURB) financed by the Bank's Second Urban Transport Project in 1980 also suffered from this lack of modal integration as a result of poor coordination between the different levels of government and of agencies involved in its planning, operations and its ridership was well below original forecasts contributing to growing financial deficits. Modal integration of the urban transport systems serving the MRs ought to be a top priority in the sector and the CBTU decentralization program included several measures to assure better integration of CBTU with the other modes.

CBTU's Financial Situation: Similar to almost all urban transport systems in the world, CBTU required massive subsidies. During the last three years before the start of the first decentralization loan to São Paulo (1988 to 1990), the federal government subsidized 100% of the capital improvements and debt service, and close to 80% of working costs (operating costs without depreciation and financial costs). CBTU's working costs were 9.2, 14.8 and 8.7 times farebox revenues for 1988, 1989 and 1990 respectively. In 1990, which was a typical year, farebox revenues accounted only for 8.3% of the operating costs (excluding depreciation and monetary corrections) due to very low fares and high evasion. In the last five years prior to the decentralization program, the lack of funds for rehabilitation, especially counterpart funds to match supplier credits, led to lower rolling stock availability rates, delays in improving the power supply and substation systems, deferral of track maintenance and other problems.

## 2 CBTU'S DECENTRALIZATION MANDATE

The institutional disruptions in the sector, which became even more apparent after the extinction of EBTU (Federal Urban Transport Agency) and the

constitutional changes of 1988, which shifted the burden of urban transport from the Federal Government to the municipalities and the states, were expected to have a substantial impact on the financing and provision of urban transport services. To be consistent with this constitutional mandate the Federal Government decided in 1991 to transfer CBTU to the States and set a deadline to accomplish such goal. The rationale for such strategy is that CBTU's transfer to the States would allow local Governments direct participation in their planning and operations, better monitoring and integration with other urban transport services under their jurisdiction in the MRs and, consequently, would lead to cost-efficiency gains which, when combined with policy and tariff reforms, would improve the level of service and produce a substantial reduction of government subsidies to rail transport. To facilitate the transfer to the states the Federal Government decided to embark on an urgent physical rehabilitation and financial restructuring program for the several subdivisions, through which it intended to improve its overall operational performance and reduce its operating expenses, and approached the World Bank for financial and technical support. This paper attempts to summarize the results of such program and draw some lessons for future similar projects.

### 3 THE CBTU DECENTRALIZATION AND MODERNIZATION PROGRAM

As mentioned above, *CBTU* is a federally-owned and operated urban/metropolitan rail commuter system established in 1988 to provide services in 9 metropolitan regions. Main systems were located in São Paulo, Rio de Janeiro, Belo Horizonte and Recife. Smaller systems in Salvador, Fortaleza, Natal, Macaé, J.Pessoa. The Central Administration was always in Rio. The objectives of the CBTU decentralization and modernization program were: a) Transfer urban rail transport responsibilities from Federal to *local* (state and municipal) governments, as determined by the 1988 Constitution; b) Improve level-of-service, integration with other modes and especially financial management; c) Improve access of the poor to employment, health and education facilities; and d) Eliminate or reduce substantially direct federal capital and operating subsidies to CBTU. But because decentralization meant that local authorities (State and Municipalities) had to receive the systems, the question is why would they want to do so. Could they afford them?

### 4 WHAT DID LOCAL GOVERNMENTS WANT?

States and Municipalities liked the idea of running their own rail systems but they wanted the *plant and equipment* rehabilitated, especially the train fleet. Or in cases where the existing system was too short to have an impact on total urban trips, they wanted an extension of the existing system (Belo Horizonte and Recife) or a new system (Salvador). They would accept the systems provided the Federal Government would finance the rehabilitation in full. But they also wanted the federal monies for the rehabilitation transferred to them and they wanted to manage the rehabilitation themselves. The Federal government refused to do so in the cases of São Paulo, Rio, Belo Horizonte and Recife and only agreed to do so much later, in the cases of Fortaleza and Salvador, but always retaining some control.

### 5 WORLD BANK VIEWS AND ROLE

Why would the World Bank accept financing these systems? The idea of decentralizing systems from federal to local governments was appealing because: 1) Owner /operator would be closer to the user. Urban Transport should be mainly a local or metropolitan responsibility; 2) Integration with State and Municipal run suburban rail, subway and buses would be easier and 3) States would have the right to concession out the systems to the private sector if they wanted to, thereby decreasing the burden on local government finances. The Federal government could not do that according to the 1988 Constitution. Therefore, decentralization was a prerequisite for "concession". There were several risks assessed by the Bank for this program: First, two- three actors would be involved in the project (Federal, State and major Municipality), with conflicting short-term views. The Federal wanted to decentralize but did not want to give locals the responsibility for the works and goods necessary for the rehabilitation. The decentralization would take place when the loan would be 60% disbursed to ensure that local authorities would comply with the obligation to assume the systems. However, that would add the number of actors involved in construction and operation. Federal laws did not allow management of Federal monies by State. So, after transfer, State would be operating the system and the Federal government would still be implementing the rehabilitation program. This was bound to cause disputes and accusations. Transfer was scheduled to take place in the middle of the rehabilitation project to ensure that the State would comply with its obligation of receiving the system. What if there were delays in physical implementation?

Why then loan the money? World Bank was seen by both parties as the “honest broker”. This was an unique opportunity to promote integrated urban transport, land use and air quality strategy. Besides the ridership was mainly “very poor to low-income population” and the project would increase their accessibility to jobs, education and health facilities. Further degradation and shutdown of system would mean more buses on the street already very congested. Finally, decentralization, that is transfer to local authorities was a “sine qua non” for future concession of the systems to private sector.

## 6 RESULTS:

By 1994, the São Paulo (1992) and Rio (1994) systems were decentralized and the Rio system was subsequently concessioned out to the private sector by the State. The Belo Horizonte and Recife system which are 85% completed and were scheduled to be transferred at the end of 2002, were not decentralized because the newly elected federal administration decided to change the decentralization model which is still being negotiated. Fortaleza was decentralized in 2002 as a condition of the rehabilitation and modernization loan they received because the Belo Horizonte and Recife experience of delaying the decentralization was indicative that decentralization should be done at the outset. The project had a profound impact in São Paulo’s rail transport and also in Rio. It is also expected to have a major impact on Belo Horizonte and Recife.

## 7 SÃO PAULO AND RIO DE JANEIRO:

São Paulo was decentralized in 1992 and subsequently merged with State-owned FEPASA system. and integrated with buses and the subway. The loan assisted in the preparation of an integrated urban transport, land use and air quality strategy and a concession study of the system so that decision-makers could evaluate several options for public-private partnership. The project improved considerably the level-of-service offered. Improved substantially the working ratio but did not eliminate operating subsidies particularly due to the number of free trips imposed by legislation which are not compensated. It had 50 trains rehabilitated with Federal money and other 50 with State money in parallel program.,17 Stations rehabilitated, 25 kms of track rehabilitated and 42000 sleepers replaced, 6.8 Kms of right-of-way walls built, signaling and telecom significantly improved. There was a dramatic reduction in fatal accidents. Ridership reached 1.2 million passengers/day and will tend to increase if more roll-

ing stock is added. Tariff evasion has been reduced but should be reduced further with installation of smart card. The concession of one of the lines of the system is being planned for 2004. The level of safety and personal security increased greatly in the system. The State recognizes that the decentralization program saved the suburban rail system, gave it an institutional framework leading to the establishment of a Secretary for Metropolitan Transport and established CPTM. The next step is make CPTM a real surface metro-type operation linking it to the existing but small state-owned and operated metro. All this was done with a flat tariff which was never higher than the São Paulo municipal bus tariff.

Rio de Janeiro System was decentralized in 1994 and a state company called Flumitrens assumed the system. The first 3 years of Flumitrens were plagued by the State’s budget constraints and the delays in the train rehabilitation project. This led to lower train availability which in turn had a devastating effect on demand which continued to shift to buses despite the fact that their fares were higher. In 1994, the State decided to get out of operation of urban transport systems and, in a comprehensive and pioneer privatization program, it concessioned out Flumitrens as well as the state-owned Rio Metro ferry boats and bus company to the private sector. At the time of concessioning, Flumitrens had only 125,000 paying passengers per day although it was probably carrying 30% more passengers which evaded fares. The private company which took over, SuperVia is now transporting about 380,000 passengers per day without any operating subsidies . SuperVia has not been able to transport more passengers because the State has not complied with the bus integration clauses and the bus lobby is very strong . The level-of-service offered by SuperVia is good, air conditioning trains are being introduced, there are no State operating subsidies and the tariff is still lower than the municipal bus flat tariff. There is a good integration with the also privately-operated Metro (Opportrans). 50 trains were rehabilitated with the Bank loan and other 30 with Federal money in parallel program. 20 Stations were rehabilitated and are quickly becoming hubs for their communities. 150kms of track were rehabilitated and 70 Kms of right of way walls built to protect the right-of-way. Signalling and telecom were improved. Personal safety increased dramatically so did security. The number of injuries and fatal accidents was also reduced. An informal regional transport coordination commission was created (AMTU-RJ) and an integrated land use, urban transport and air quality strategy is under preparation. The challenge now is to force bus-rail integration and that depends on the State willingness to deal with the bus and van lobbies.

## 8 BELO HORIZONTE AND RECIFE

In these two cases their rehabilitation and modernization loans were approved in 1995. In the case of Belo Horizonte, the project consisted essentially in extending the line by 6.5 kms and make the existing and new stations more accessible to bus and other modes, equipping them with escalators and elevators and bay areas for buses. In the case of Recife, there was a 4.5km extension and an electrification, broad gauging and modernization of the South Line (13.5kms) which was previously operated with diesel trains in very bad condition. Both projects advanced well but are not yet decentralized to the local authorities. Once finished they are expected to meet the targets set for them because in Recife there is already bus integration and in Belo Horizonte the municipal buses are integrating and the intermunicipal will soon be doing so. Both Recife and Belo Horizonte authorities were reluctant to accept the systems due to delays of the Federal Government in disbursing and completing the projects. They would accept the transfer as long as the Federal government would pay the salaries of the systems until 6 months after conclusion of the works. The new federal administration would accept to do that and pay an operating subsidy but wants to attach to this a performance contract with indicators. The new model was being discussed by the parties involved. Unions are also opposing the decentralization because they don't want to be State employees and they fear that the States next step will be the concession of the systems to the private sector.

## 9 WHAT WENT WRONG?

Delays in the rehabilitation program, mainly train rehabilitation and modernization but also in civil works chiefly because the Federal Government did not make the loan funds and counterpart funds available as scheduled. The main reasons for that were initially the lack of counterpart funds due to budget constraints. That was mitigated by using mainly loan funds and financing temporarily a bigger portion of each loan category. But after the agreements with the IMF, the problem was fiscal space in the budgets and the priority of the Government was to meet the agreed surplus targets. Because of that, there was less and less money for the projects in the budgets and the implementation delays increased significantly. For example, at time of transfer of São Paulo and Rio less than 30% of physical implementation was completed. Furthermore, the Federal Government was supposed to maintain an adequate train and infrastructure maintenance budget for the fleet which was not being rehabilitated by the loan while the project was being implemented. This did not

happen and overall train availability was much lower than targeted at appraisal of the loan despite the trains rehabilitated and modernized by the project. At some point in São Paulo and Rio, train availability was as low as 50% and that had a further negative impact on the ridership which shifted to buses. Political bargaining at time of transfer created uncertainty. Initially, the financial situation of the country and the States worsened after the decentralization of the São Paulo and Rio systems and that, in turn, affected maintenance budgets. The maintenance budget for the systems they received was insufficient to ensure sustainability and that took some time to correct.

## 10 WHAT WENT RIGHT?

Once transfer took place, some State and municipal governments and operators started promoting modal integration. They started thinking about concession to private sector. They had to become more accountable and responsive to public protests about the poor service provided. They started to exploit the importance of rail as "Trunk Corridors" in their metropolitan regions. They also started to exploit options for non-operating revenues such as advertising, rights-of-way for cableways, developments around the stations.

## 11 LESSONS LEARNED

The lessons learned with this program so far are described below under two main categories: Institutional and Technological. The institutional have to do with institutional and policy changes sought by the program. The technological refer to the main technical components which had impacts on the outcome of the projects and on the bidding processes. The institutional lessons are divided into the following categories: a) The four pillars; b) Government; c) Regulatory Agency; d) Operator; e) Lobbies; f) Users; and g) Modal Integration and Tariff Policy. The technological lessons are divided into the following categories: a) Rehabilitation of Rolling Stock vs new trains; b) Civil Works; c) Turnkeys vs Unit cost and quantities and d) Type of bidding for concessions. Next we examine each of them

## 12 THE FOUR PILLARS

Before agreeing to the loan to each MR, it was required that they would commit to introduce the four following structural pillars:

a) Establishment of a Regional Transport Coordination Commission (RTCC): This commission would be formed by representatives of 3 levels of government, operators and users and would be responsible for transport coordination, prioritization of projects from the MR's standpoint using economic evaluation and establishing uniform tariff and subsidy policy; promote modal and fare integration; update on a regular basis the Integrated Urban Transport, Land Use and Air Quality Strategy and promote user participation in decision-making

b) An Integrated Urban Transport, Land Use and Air Quality Strategy: Each Mr would have to prepare an integrated strategy linking urban transport, air quality and land use with several components which could encompass: 1) Strengthening bus transport, through route restructuring and route re-bidding; 2) Beef up mass transit solutions including busways, commuter rail and metro and concession them out to private sector; 3) Traffic engineering; 4) Road building including ring roads and paving in poor areas; 5) Land use planning and zoning; 6) Transport demand management; 7) Technical Measures involving vehicles and fuels; 8) Monitoring and Evaluation; 9) A combination of some of the above

c) Financing Mechanisms to Ensure Long-Term Financial Sustainability including among others: 1) Urban Transport Funds; 2) "Versement Transport" or similar measures; 3) Sale of Additional Floor Space (Solo Criado) created by changing zoning regulations; 4) Advertising; 5) Real estate development in the areas surrounding the system.

d) Progressive Private Sector Participation: This could be done in: 1) Operations and management through long-term concessions where operators assume all commercial risks at preset subsidies or even paying a royalty and 2) In Investment and Rehabilitation through Build-Operate-Transfer or Rehabilitate-Operate-Transfer schemes.

The lessons learned in the four pillars were that all of the MRs created some sort of informal RTCC which helped at least the discussion of the main issues involved by technical staff. But that informal RTCC failed when major decisions involving tariff and subsidy policy and modal integration were at stake because the Governors and Mayors did not listen to their technical staff and treated those important issues as party politics frequently without caring much about the user and favoring a strong bus lobby. The lesson learned here is that one should strive for formal coordination entities empowered by the levels of government involved, with their own budget and authority. Insofar as the Integrated Strategy is concerned, all the MRs involved somehow

prepared a strategy but the land use portion was often weak because the Municipalities which are the main government in charge of land use did not participate in force in the exercise. This stresses even more the need for the formal RTCC. Insofar as the financing mechanisms are concerned earmarking is unconstitutional in Brazil. But other mechanisms such advertising in trains and stations, additional floor space through urban operations, use of rights-of-way for fiber optics cableway, etc were used both in São Paulo, Rio, Belo Horizonte and Recife. SuperVia the private sector outfit is the leader in using these mechanisms. Insofar as private sector participation in rail, Rio de Janeiro with its full concessioning of the sub-sector was the leader while São Paulo concessioned out one busway. Salvador and Fortaleza have also indicated their willingness to concession out the operation of their systems.

### 13 GOVERNMENTS

Governments, central or local, do not receive high grades except for São Paulo, Bahia and Ceará States. The Federal Government in the last 6 years delayed the release of loan and counterpart funds causing important and very negative impacts on project implementation and ridership which kept shifting to other modes. It also insisted too long in not passing the management of the works to local governments which would be more interested in speeding up the process. The State governments except for São Paulo, Bahia and Ceará demonstrated little interest in the success of their projects and in accelerating the transfer. They seemed to fear the bus and informal transport (vans). They seemed unable to control the buses and force their integration with rail. They imposed a number of new free transport/discounts without compensation to the operator, further aggravating the financial situation of the systems. The State of Rio, however was the best in increasing private sector participation in its systems, by concessioning out both the suburban rail system which it had received from the Federal Government and the Rio subway which was State-owned and operated. Its challenge is to create an enabling environment for them to grow. Municipal governments, except for Salvador, Recife and Belo Horizonte instead of supporting the rail systems with physical and tariff integration, land expropriation, they appear to forget that the rail systems although under State jurisdiction are going to operate mostly in the Municipality territory. They also imposed flat bus tariffs for their territories making integrated tariffs very difficult to negotiate. The lessons learned in the category Government are: a) No more decentralization loans should be made only to the Federal Government. They must involve participation in the loan counter-

part funds of the local governments. Although the loans to SP, Rio, BH and RE involved the respective States, they had no participation in the counterpart funds. Future loans must have local commitment even if its just for counterpart funds of the 3 levels of government (Federal, State and Municipality). In the cases of Salvador and Fortaleza, the States have participation in the co-financing and that makes them more responsive; b) The civil works management must be delegated to the local authorities with supervision by the main borrower as it is being done in Salvador and Fortaleza. That forces the local authorities to be more interested in the project and to answer more promptly the public pressures.

#### 14 REGULATORY AGENCIES

They have been very inefficient and fragmented, without full independence from the administration and incapable to answer quickly the needs for modal integration. In most cases has no power over other modes (the buses are in general under another agency...). The lessons learned in the category Regulatory Agency are: a) Governments must give Regulatory agencies responsibility and authority and independence and include under their jurisdiction all competing modes involved. Governments should also accept decisions against themselves when so judged by the regulatory agency and b) Regulatory agencies must be asked to deliberate very fast on the issues for deliberation otherwise the delays may have negative impacts on the bottom line of private operators who will start distrusting the agencies..

#### 15 OPERATOR

The public sector (government) as operator as opposed to the private sector, is highly vulnerable to political pressures of all types particularly requests for employment from political sponsors, does not create incentives for the managers and the most dedicated and productive staff. Finally, it is not sensitive to the market. In addition, it is highly constrained by the national procurement laws which limit its agility as opposed to a private sector operator which does not have to follow them. In general, publicly run systems are not interested in other sources of funding because they must pass on any non-operating revenues to the central Treasury, as opposed to the private sector operator who can use them in the system. The lessons learned in the category Operators are: a) The systems operated by the private sector are more agile, create more incentives to staff and have political independence as long as the regulatory agency performs its role well and b)

The employees of a public operator when transferred to the privately operated system appear to have a much higher productivity (Flumitrens vs Supervia) because of the incentive system and quicker decision-making.

#### 16 LOBBIES

The bus-owners lobby and more recently the van owners lobby have strong political power and they disrupt the system with strikes and demonstrations when they don't get what they want. With 70-80% of the trips by bus or van these strikes create chaos. It is rare the government that has the courage and political will to stand up to those lobbies and force them to rationalize and integrate with other modes with tariffs which favor the users. The worst example of modal integration is the State of Rio. Buses continue to run parallel to the rail system. A good example of integration is the Belo Horizonte Municipality system where the mayor took courageous steps to re-route the bus system and curb the informal van transport. An excellent example of physical bus-rail integration is Recife but it is very weak from the tariff standpoint because the federal government is picking up the rail subsidy and the local authorities are not very interested. But when the system is transferred the situation will change. The Lessons learned with Lobbies are: a) Never underestimate the power of the bus and van syndicates and overestimate the courage and political will of governments to comply with the modal integration clauses of loan or concession agreements and b) Attempt always to estimate the feasibility of a system without integration. If it is not viable there should not be funding without an iron-clad contract that guarantees this integration or the possibility of the rail operator to operate feeder buses to his stations.

#### 17 USERS

There are very few user associations capable of serving as monitors of the level-of-service offered by the system. They are not well informed of innovations and new services. The capacity to pay of a metrorail user in Brazil is low (although its willingness-to-pay is high) and the operator and government must take that into account and work out cross-subsidies if necessary. The lessons learned in this category are: a) Government must create incentives for the creation of user associations in order to have a constant feedback of the level of service quality; b) Customer service is essential to receive complaints, publicize new services as done by e.g., SuperVia and Opportrans (Rio Metro); and c) User participation in re-

gional transport coordination commissions is crucial and should be compulsory.

## 18 MODAL INTEGRATION AND TARIFF POLICY:

This is the Achilles heel of all the program because local governments do not reach an agreement and are incapable of imposing to all modes a physical and integration plan to which they had agreed to, before the loan was signed. The upshot is that the user must pay 2 or more tariffs and the number of buses and vans going downtown is huge with a very negative impact on congestion and travel time. The metrorail riderships are lower than estimated at appraisal because this main obligation is not complied by most governments. It is important to point out that there is also a wide belief that if only the bus and rail systems were efficient then passengers would automatically return to rail, and in addition, bus routes would be redirected to feed the trains. This is a gross simplification of reality because passengers create habits which are difficult to reverse if the advantages of one mode over another are not significant. Although these advantages are clear in the case of passengers living within walking distance from the stations, they are less clear in the case of riders who must take a bus to reach the station. Furthermore, bus owners will only re-route their services either if they are forced by some regulatory agency or if they see financial advantages in doing so. Therefore, while modal integration is desirable and recommended, it is not the panacea for increasing ridership unless the user sees considerable financial advantages in utilizing the combined transport option and the bus operators see financial advantages in serving the rail stations. The Lessons Learned on Modal Integration/Tariff Policy are: a) A solid agreement between the 3 levels of government must be signed before the works started with clear penalties for non compliance of that clause; b) Or the metrorail operators must have in their contracts the right to operate bus feeder services to their stations. For example, the Rio Municipality allowed MetrôRio to operate feeder buses to their stations and the State of Rio must do the same because it has tried all the negotiations with the bus owners to no avail. If it does not do that its rail investment will be underutilized.

## 19 REHABILITATION AND ROLLING VS NEW TRAINS

Train rehabilitation takes always much longer than expected and the delays in making the trains available have a devastating sometimes irreversible effect

on demand that shifts to other modes. This was an important determinant of the delays and loss of ridership in the São Paulo and Rio cases. Bidding for new trains is also lengthy because of petty legal fights between the very few world suppliers. Bid time is much higher than expected. The Lessons learned- on Rehabilitation of rolling stock vs new trains are: a) The government and operators must be realistic when they estimate the time for train rehabilitation and installation of air conditioning. The contracts must have clear clauses for compensation to the operator for late delivery and to the supplier for payment delays; and b) Supplier associations must alert their members to end their judicial litigation to bring down the competition. Delays are becoming so substantial due to this litigation that they might discourage Banks from financing new train-sets.

## 20 CIVIL WORKS

Sketchy basic engineering projects at appraisal lead in general to much higher costs which are found out when the detailed engineering is completed. On the other hand if one waits for the detailed engineering project, the political window to undertake the project may close and the project will have less appeal. One needs good advanced basic project with costs at plus or minus 15%. The low number of borings for soil samples is often responsible for surprises later on which may increase the costs. Underestimating population resettlement and expropriations is quite common and that also may drive project costs much higher. The civil works contractors lobby favors heavy construction particularly in stations, elevated structures and tunnels. Project designers fail often in important design aspects which end up driving costs higher and they never pay for them. Why not standardize stations as in the Madrid metro new extensions? Why not seek other economies of scale? The Lessons learned-on Civil Works are: a) The basic project must be quite advanced particularly insofar as the main structures are concerned. The number of borings must also be adequate to prevent surprises; b) The project designers must seek solutions which are simple and repetitive which decrease the cost of infrastructure because in the multilateral Banks the main criticism to metrorail projects is the very high infrastructure cost. So, bringing down infrastructure costs must be a priority; c) The detailed engineering project must be prepared by independent project designers and not by the contractor as it is often the case in Brazil and d) the introduction of value engineering is highly justified.

21 TURNKEYS VS UNIT COSTS AND QUANTITIES Turnkeys have been useful to reduce the bid-

ding costs. But the present Government practice of unreliability of payments and delays in freeing the money due to fiscal space reasons makes turnkeys very difficult to be accepted by the contractors. Unit costs and quantities always lead to much higher costs than initially planned. The Lesson learned on Turnkeys vs Unit costs and quantities are: a) The government must make an effort to comply with the agreed budget schedules in a very reliable way. Delays may lead to shutdown of the works and the costs required to restart the works also may lead to a built-in risk cost which makes works much more expensive; b) To return to unit costs/quantities is a setback which will only increase the civil works costs and will make future projects unfeasible

22 TYPE OF BIDS FOR "CONCESSIONS" The bids for "concessions" which require investments from the concessionaire have not been very successful in Brazil, mainly because the concessionaire quite often must invest heavily to repair what the government should have given him in good condition. There is a tendency for the concessionaires not to comply with the promised investments particularly if the demand expected does not materialize or the government fails to meet its contract obligations. Concessions without compulsory investment obligations for the concessionaire have been more successful. Negative concessions, that is, with an operating subsidy such as in Buenos Aires, attract more the investors because they feel protected. The duration of the concession and the mechanisms to update the tariffs are crucial elements to attract the investors. The obligation to include either a civil works contractor or a rolling stock manufacturer in the concession consortium tend to limit the number of bids. The Rio concessions both for Metrô (OPPORTRANS) and Flumitrens (SuperVia) were positive that is without operating subsidy. The lessons learned on type of bids for "concessions" are: a) In systems with less than 300,000 pass/day, at the tariffs prevalent in Brazil, a bid for a concession with investment obligation on the part of the concessionaire is not advisable. Above that, it depends on the country risks, its macroeconomic situation the risk of foreign exchange; b) Negative concessions in Brazil are only possible if the Concessions Law will be changed and they must require a payment guarantee to the concessionaire in case of financial crisis of the Government, as it happened in Buenos Aires. and; c) The composition of the operating concessionaire consortium should not require either a civil works contractor or a rolling stock manufacturer. It must require however a firm with solid finances and an experienced operator (based on a staff team with good operating experience).

## 23 CONCLUSIONS

The decentralization program has laid the foundations for the modernization of the Brazilian metrorail systems and is already showing good results in São Paulo, Rio, Recife and Belo Horizonte. The delays in completing the works and rehabilitating the rolling stock have affected ridership, but soon the systems will be completed, the train frequencies will increase and will attract more passengers. However, to make the decentralization process a success and to ensure the long-term sustainability of the state companies, the issue of appropriate tariffs, financing mechanisms and modal integration must be seriously and urgently addressed by the local authorities. Recife is now doing that. The resolution of those issues is crucial to the future success of the operation and the states and municipalities involved ought to agree on tariffs which are based on equity, road congestion alleviation, environmental impact and the ability of the user to pay. If subsidies are justified because of the low-income population, mechanisms must be introduced to assist those users. But it is important to ensure that the operator is adequately compensated to be able to properly maintain the equipment and plant to sustain an acceptable level-of-service. Otherwise, the vicious cycle of irreversible degradation of the system will not be broken. To increase the chances of long-term sustainability, it is advisable that a substantial private sector participation in the operation and even ownership of metrorail systems is sought. Tariff affordability is also an issue pervasive to all urban transport modes but particularly buses. The tariffs for home-to-work trips are becoming a heavy burden for the very low-income classes. To avoid social exclusion due to high fares, subsidies, particularly targeted subsidies, are warranted and mechanisms need to be worked out between the Federal and local authorities to provide these subsidies when the MR complies with all clauses related to regional transport coordination and modal integration. Finally, the experience with both concessions in Rio (SuperVia and Opportrans) has been so far very positive, but governments must ensure that there is an enabling environment for the private sector to continue to invest.

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