Urban Transport Policy Proposal for Mozambique

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Executive Summary

Public transport services in Maputo are inefficient, inadequate, and unreliable, and give poor value for money. Most of the vehicles used are unsuitable for the purpose, in poor condition, and badly driven. The service has been described as “a poor service for poor people.” It is unsustainable in the sense that if drastic measures are not taken soon the capacity of the system will decrease, the quality of service will deteriorate, and the costs to the users will increase.

The private sector, which has by far the greatest market share of public transport services, is fragmented and disorganized and can function only by disregarding regulations. The services provided by the public sector bus operator are infrequent and unreliable and incur substantial losses that are made good by government.

The fares charged by private sector operators are higher than those charged by the public sector operator and are considered excessive by some users. A recently approved fare increase had to be rescinded, and operators are unable to earn sufficient revenue to meet costs. It was not possible to determine the true operating costs and revenues for the private sector, but at current levels of expenditure, revenue is clearly insufficient to maintain and replace the vehicles. Serious inefficiency in the operation inflates its cost, and if the system were to operate efficiently, it could deliver better service at fares similar to those currently charged, without the need for subsidy.

Government public transport policy is unclear and inconsistently applied, and regulations are poorly enforced. Transport policy must be clarified, its objectives—affordability, safety, coverage, reliability, convenience, comfort, environmental considerations, traffic congestion and sustainability—made more specific, and regulations amended to reflect this policy.

Several institutions are involved in service delivery, but responsibilities conflict and overlap, which creates confusion. Transport authorities should be established to take responsibility for all aspects of public transport provision and to provide integrated and coordinated public transport systems.

The fragmented nature of the private sector is a major cause of inefficiency, and small operators should be consolidated progressively. Eventually four to six large private sector bus operators should provide all bus services in Maputo.

As in other countries, public sector operation of transport services in Mozambique is unprofitable; this applies in all sectors, not only road transport. Public sector bus companies should therefore be privatized, either as going concerns or through disposal of their assets at market value.

The current form of competition in the market has undesirable consequences, but the benefits of competition can still be enjoyed through route concessions. This, in fact, is already government policy, although so far no concession has been awarded. This policy should be implemented in all urban areas, and it is recommended that the concept be tested and demonstrated as soon as possible through a pilot project. Before any concessions are awarded, however, it is important that all details are thoroughly considered.

The type of vehicle used for the majority of services is inefficient and unsuitable for the large volume of traffic they must carry in urban areas. Larger buses should be used, particularly on the main routes, and small vehicles phased out. This process has commenced but should be accelerated.

The bus route network has developed piecemeal over many years and must be reorganized to meet present-day requirements. The network should be reviewed as a matter of urgency before concessions are awarded. The network should be based largely on the trunk-and-feeder principle, with large buses on the trunk routes and smaller vehicles on the feeders.

Transport infrastructure—the road system, bus terminals, bus stops, workshops, and garages—is inadequate and in poor condition. Terminals are being constructed in Maputo, but these must be appropriately located, of suitable layout, and with sufficient capacity. Traffic management and parking control are poor, and although traffic congestion is not a serious problem in Maputo at present, measures must be taken now to prevent it from becoming serious.

The vision for public transport in all cities in Mozambique should be of a well-planned route network with service levels adequate to meet demand, appropriate vehicles on all routes, one operator per route, and a well-organized and efficient operation that is profitable at affordable fares. This vision can be realized, but only if the public and private sectors have the will and determination to make it work: the task will not be easy.

1. Introduction

OBJECTIVE

On behalf of FEMATRO, the consultants carried out a study to

- Examine issues related to transportation policy, with emphasis on the requirements of Greater Maputo;
- Identify policy options for the provision of the best and lowest-cost urban passenger transport service;
- Assist in the development of a transport policy proposal that provides short-, medium-, and long-term recommendations for public transport in Maputo; and
- Determine whether the policy options applicable in Maputo would also be applicable in other large cities in Mozambique, such as Beira and Nampula.

The study team met with representatives of the central government; municipal governments; public and private sector transport operators, including rail, air, and maritime operators, as well as bus operators; and donor agencies and other stakeholders. We presented our initial findings and recommendations to a broad cross-section of stakeholders at a workshop in Maputo and obtained valuable feedback. This report presents our findings, suggests policy options, and describes the implications of those options for the users and providers of urban passenger transport services.

BACKGROUND

Public passenger transport services in the major cities of Mozambique are provided principally by small private sector operators using vehicles known as *chapas*, mostly 15-seat minibuses, and a smaller number of 25-seat vehicles. In Maputo and other large cities, these services are supplemented by publicly owned companies operating larger conventional buses, but the market share of these operators is small.

The chapas provide an essential service, but full-size buses probably would be more efficient and more suitable in the modern urban environment. Indeed, current government policy discourages the use of small public transport vehicles in city centers. In the context of this debate, the Confederation of Mozambican Business Associations (CTA) commissioned a study on urban transport policy in Greater Maputo to assess these issues in the light of international best practices. The study was carried out by Nathan Associates Inc. and funded by the United States Agency for International Development; its final report, “Urban Transport Policy for Greater Maputo,” was presented in December 2006.

That report concluded that the present system works, in that it provides transport for commuters at an affordable cost, with minimal government intervention and the only cost to government the subsidy paid to the publicly owned operator. The report, however, pointed out that small operators lack managerial skills and access to commercial credit and that many are consuming capital by deferring preventive and routine maintenance, making vehicles unsafe and unreliable.

The report's principal recommendations were that the system should remain as it is in the short term (to 2010), but with improved enforcement of regulations and improved infrastructure such as bus terminals and bus stops; later, bus priority lanes should be introduced. In the longer term, the report recommended, small vehicles should be replaced by larger vehicles on primary trunk roads, with smaller vehicles on collector and local roads feeding into the trunk routes in an integrated system. Small private sector operators should be consolidated into operators' cooperatives or formal companies to facilitate control, and training should be provided to the private sector owners in basic management and maintenance skills.

Since that report was written, there have been further developments. The cost of fuel has continued to increase substantially, and in February 2008 the government approved increases in the fares charged by chapas. Public protests broke out, and the proposed increases were not implemented. After these protests, the government and FEMATRO have been looking at strategies for reducing the cost of public transport. The present study is intended to assist FEMATRO in the dialogue with government to develop short-, medium-, and long-term recommendations to transport policy issues.

In accordance with the terms of reference, this study focuses on the road transport sector only. Both rail and water transport, however, could play greater roles in public transport in the future, and we recommend that a master transport plan for greater Maputo embracing all public transport modes be undertaken in the near future.

Some of what is recommended in this report is already being done, or is being considered. Moreover, several stakeholders in the public and private sectors have carried out studies and initiated projects related to public transport in Maputo, and all of this activity should be coordinated.

2. Urban Transport Problems in Maputo

Maputo is has a population of more than one million people, most of whom have low incomes. The public transport system, which covers approximately 80 routes in Maputo and neighboring Matola, is dominated by private sector operators, most with just one or two chapas. A publicly owned bus operator runs approximately 40 larger buses on 24 routes. The system is similar to systems in many other African cities. An ailing publicly owned company provides very limited service, while small vehicles operated on a largely informal basis provide all other service. The system works in that almost everybody has access to public transport, but in many ways the service is unsatisfactory, and has been aptly described as “a poor service for poor people.” The main problems of the present system include high fares, poor services, poorly maintained and operated vehicles, inadequate operator incomes, and traffic congestion.

EXCESSIVE FARES

Operating costs have been rising steadily in recent years while operators’ net incomes have been declining. Fares have been raised periodically, but not enough to fully compensate for the cost increases. Transport operators consider the fares to be low, while some users feel that they are excessive.

In February 2008, protests broke out when a proposal was made to substantially increase the fares charged for chapa services. A contributory factor to the public unrest may have been the size of the proposed increase: fares had been held at same level since 2005, while operating costs had risen steadily. As a result, when a fare increase became unavoidable, the extent of the increase (up to 50 percent) came as a shock to people whose incomes are very low. If fares had been permitted to increase frequently in small increments, as is the case with the majority of other goods and services, the effect would have been much less extreme; in reality, the fares charged are not unreasonable, although it might be argued that the fares are excessive in view of the quality of the service provided.

Nevertheless, the present system is financially inefficient in a number of respects, and the cost of this inefficiency is reflected in the fares charged. The operating costs of the public bus company are excessive (as discussed below) and could be reduced; the use of small vehicles on routes with high traffic volume is not cost-effective; and the use of resources, principally vehicles and labor, is inefficient. The use of vehicles appropriate to each route offers potential for savings. In fact, fares that fully cover the cost of providing the service are probably acceptable, although at present

service standards are poor and efficiency is low: an efficiently run service probably would be able to cover its cost with economic fares and without needing government subsidy.

From the user's point of view, bus service now offers poor value for money. Although the fares charged are clearly affordable by the majority of travelers, since the services are well patronized, the quality is poor. If operations were more efficient, the same, poor quality of service could be provided at lower fares, or much better, safer service could be provided at the same fares.

IRREGULAR, INADEQUATE, AND UNRELIABLE SERVICES

Chapas do not run according to a schedule, but leave the terminals when they are full or if the driver expects to have a full load soon after leaving the terminal. The frequency of departure therefore depends on demand, with lower frequency at less-busy times. In theory, this is appropriate, but it means that a passenger wishing to board at points other than the terminal may find that every chapa is full, and cannot find a place unless a passenger leaves the vehicle at that point. Otherwise, the passenger may be forced to squeeze onto a vehicle that is already full. Waiting times are long, and standards of comfort are low, with passengers crowding onto vehicles that are unsuitable for the services for which they are used.

The buses operated by the public sector company, TPM, do operate on schedule, but on most routes, an infrequent, hourly schedule. Therefore, although bus fares are lower than chapa fares, passengers who prefer the lower-cost service have very infrequent service.

An additional inconvenience to passengers is a result of the fare structure and measures taken unofficially by crews to increase their income. Routes are often split into two, so that passengers must pay two fares for their journey instead of one; passengers are often additionally inconvenienced by having to disembark from one chapa and to board another.

The effective capacity of the system is also inadequate. This is particularly apparent at evening peak periods, when large queues of passengers can be seen at the main city center boarding points. Additional capacity is provided by illegal operators, usually with vehicles unsuitable for the purpose. Roughly 1,000 full-sized buses are required to serve a population of one million people; the 35 buses operated daily by TPM plus the approximately 3,700 chapas serving Maputo and Matola offer the equivalent of approximately 700 full-sized buses (or a total seating capacity of approximately 63,000). Considering that a significant number of chapas do not operate every day, the combined fleet is clearly inadequate.

In the time available for the study it was not possible to examine the route network to establish the extent to which the cities of Maputo and Matola are covered. A number of routes in the Matola municipality, however, are planned but not served. The route system has evolved piecemeal over many years and probably does not meet present travel needs in the most efficient manner.

As well as the irregularity of the service, caused by the lack of schedules, the reliability of the service is affected by mechanical failure. The frequency with which chapas break down is not documented, but breakdowns are probably very frequent in light of the obviously poor standard

of maintenance. TPM did provide breakdown statistics: of the 35 buses operating on a typical day, seven to eight break down. Since each bus runs approximately 350 kilometers per day his represents approximately 1,600 kilometers per breakdown: this means that a passenger traveling 10 kilometers each way between home and work on TPM buses could expect to experience four bus breakdowns each year. An acceptable figure for this type of operation with a well maintained fleet would be nearer to 10,000 kilometers per breakdown.

POORLY MAINTAINED VEHICLES

The overall fleet condition is poor, largely because of poor maintenance standards. Chapas drivers, who are contractually responsible for routine maintenance and repairs, tend to minimize expenditure by performing only enough maintenance to keep vehicles operational. As a result, many chapas exhaust excessive amounts of black smoke and have worn tires, defective lights, cracked windscreens, broken windows, damaged or missing rear-view mirrors, and other defects. It is likely that other safety-related items, such as brakes and steering, are also poorly maintained. Ineffective safety inspection compounds the problem.

The public sector buses are also poorly maintained. The main reason for this is claimed to be a shortage of spare parts, but the lack of an effective preventive maintenance system is probably as large a factor, although buying buses for which spare parts are not available locally does contribute to the problem. The shortage of spares is attributed partly to the fact that insufficient spares are provided when buses are purchased, and that for some vehicles, such as the Chinese Yutong buses delivered two years ago, the companies have insufficient operational experience to know which parts should be held in stock. As a result, a large proportion of buses is out of service for long periods awaiting the delivery of spares, while some buses are cannibalized to provide parts for others: in practice, buses that are cannibalized rarely return to service.

BADLY DRIVEN VEHICLES

Many chapas are driven dangerously. Although accident statistics were not available, simple observation of the manner in which chapas are driven and the condition of the vehicles, many of which show signs of accident damage, make the case. Because drivers must maximize the number of trips they can make in a day to maximize revenue, they have an incentive to drive too fast and are inclined to race other chapas to bus stops to pick up passengers, sometimes obstructing other chapas to prevent them from picking up passengers. This practice also affects other traffic.

Chapa owners take no responsibility for driver behavior: their only concern is that the driver makes the daily payments for the use of the vehicle. Enforcement of driving standards is largely ineffective: although police levy fines for traffic offenses, the fines are regarded as an operating cost and do not deter drivers from driving aggressively.

INADEQUATE OPERATOR INCOME

As discussed elsewhere, chapa owners and drivers are unwilling to provide accurate data on costs and revenues for several reasons: Owners are not fully aware of the true figures and drivers have an incentive not to disclose them. It was therefore not possible to make a comparison of actual

costs and revenues. However, at present levels, net income is clearly inadequate to maintain and replace vehicles.

Inefficient operating practices adversely affect the figures. Inefficient use of vehicles reduces revenue, while lack of preventive maintenance results in excessive maintenance and operating costs in the long term. Using small vehicles on routes with high traffic volumes is inefficient and renders services unviable. Viability requires maximizing vehicle time in revenue-earning service and minimizing time in idle waiting at terminals and bus stops. Chapas, however, spend significant time waiting at terminals. This indicates a substantial surplus of capacity on these routes, which reduces revenue and increases costs. Some urban routes probably have overcapacity, and a survey should be carried out to establish the extent of overcapacity.

TRAFFIC CONGESTION

Some claim that chapas cause traffic congestion in city centers. This is true in certain parts of Maputo at busy times but is less of a problem than in many African cities. Outside Maputo the problem does not appear to be severe. But as Maputo grows, and the number of private cars and other vehicles increases, congestion will become a serious problem, one made worse if small vehicles continue to be used on bus routes serving city centers. Still, the main contributor to congestion will be private cars, not public transport vehicles, small or large. The government's transport policy, therefore, should stipulate the extent to which private transport will be permitted.

Small buses are less efficient in their use of road space than larger buses. One large bus takes up about as much road space as two chapas but can carry five times as many passengers. The present mix of vehicle sizes is inappropriate for the services provided, and irresponsible driving compounds the problem. The most efficient way to transport large volumes of passengers is by means of the largest vehicles permitted by law or that can be operated safely on the roads in question. For most trunk routes in Maputo and Matola, the most suitable vehicles are large buses carrying up to 100 passengers. On some routes even larger vehicles, such as articulated buses carrying 150 or more, would be the most efficient. Smaller vehicles, such as the 15-seat or 25-seat chapas, are efficient only on routes with low demand or where road conditions make larger vehicles unsafe or impractical.

SUSTAINABILITY

The existing system is unsustainable. That is not to say that it will eventually cease to function altogether, but it will continue to deteriorate in terms of capacity, safety, and quality, while costs will rise steadily in real terms. At current levels, income from the chapa services is inadequate to maintain and replace the vehicle fleet or to expand the capacity that will be needed as demand increases. Over time, fares that cover costs will be unaffordable to more and more users. Adequate subsidies are not available for the private sector at present, and this is unlikely to change. TPM is inefficient also; in particular, its overhead is much too high for the present operation and it can continue to function only with government subsidy.

The present chapa system can survive only by operating illegally. If all regulations were enforced, operators would not be able to stay in business. They are forced to break the law to cover costs; otherwise there would be no service.

WHAT CAN BE DONE?

The service provided in Maputo is inefficient, inadequate, unreliable, unsafe, inconvenient, and uncomfortable and offers poor value for money. Unfortunately, the present system is the only workable system under the current circumstances. A possible course of action is therefore to leave the system as it is. As the city grows and the demand for transport increases, however, the problems outlined will be exacerbated. Increasing private car ownership as well as increased demand for public transport will result in chronic traffic congestion; the inefficiency inherent in the present system will become more pronounced, and the quality of the system will deteriorate substantially, while costs to users will continue to rise in real terms. This is not a realistic option.

Making the enforcement of regulations more effective would be difficult but is essential if any improvement is to be achieved, and tackling this must therefore be a top priority. Effective enforcement would result in improved driving standards, safer vehicles, and more reliable services; passengers would not be overcharged, as they are on some routes at present. This measure alone, however, would actually worsen some problems. The system functions at present only because drivers and operators are able to break many of the rules. Effective enforcement of vehicle safety regulations would ensure that all vehicles operate in a safe and roadworthy condition, but many are in such poor condition that it would be uneconomical to refurbish them to an acceptable standard. The number of vehicles operating would consequently be reduced, while expenditure on the vehicles that are refurbished would result in increased costs to users.

Prohibition of overloading would further reduce the capacity of the system. In addition, if operators were forced to charge the approved fares, their revenue would decrease, unless a substantial fare increase was approved. The increased costs, reduced revenue, and reduced capacity would have disastrous results.

The fundamental causes of many of the problems are a lack of clarity in transport policy, nonadherence to some aspects of policy, inappropriate regulations, and poor enforcement of regulations generally. The basic requirements to improve urban bus service in Mozambique are therefore

- To develop a policy that is clear, consistent, and appropriate to the requirements of Maputo and other cities
- To amend regulations to conform with this policy when necessary
- Most important (and most difficult), to ensure that regulations are effectively enforced.

3. Public Transport Policy and Regulatory Framework

POLICY

Mozambique's national transport policy, which is set out in Law 5/96 of 1996, is based largely on free-market principles and supersedes the policy of the socialist regime. In this chapter we review six aspects of that policy: regulation and planning, roles of the public and private sectors, funding, competition, employment, and roles of the central and local government.

Regulation and Planning

Under current policy, the government is responsible for enacting legislation on public transport services, for enforcing laws and regulations, and for planning services. The policy gives government a degree of control over the types of vehicles that may be operated, favoring big buses on urban and intercity services.

Roles of Public and Private Sectors

Under the previous policy, government was the main transport provider. The current policy states that the private sector should be responsible for provision of services. Any public sector involvement in service provision should be in partnership with the private sector, or as an operator operating commercially, on an equal footing with the private sector. In big cities, big public companies are preferred, in partnership with the private sector. The definition of "partnership" is not clear, although the term is generally used to describe a situation in which services are operated by the private sector under some form of contract or concession awarded by local government authorities. On intercity services, private companies are preferred, without public sector involvement.

Funding

Officially, the policy states that public transport services should be operated commercially, without subsidy. The general understanding, however, is that it is necessary to provide services at "social" fares, and fare levels are controlled by government. This may create problems if fares are controlled at levels that are insufficient to cover the cost of service provision. For publicly owned operators such as TPM the resulting losses are made good by the government (in contravention of policy), while private sector operators that are not adequately subsidized cannot cover their costs at the approved fares and must resort to undesirable practices to survive. Since February 2008,

urban chapa operators have been offered a partial rebate on fuel duty to help them with the high cost of fuel.

Competition

Policy states nothing about competition explicitly. The licensing system, under which operators are not free to operate wherever they wish and must charge the fares specified by government, however, implies that the policy calls for the level of competition to be controlled by government.

Employment

Current policy refers to employment by acknowledging that transport is a big employer, but makes no specific statement on whether transport industry objectives should include the creation of employment, or whether minimizing costs by maximizing efficiency should be emphasized, even if the number of people employed in the industry would have to be reduced.

Roles of Central and Local Government

The central government is responsible for national legislation and for regulating interprovincial transport services. The role of municipalities with regard to the provision of public transport is not clear. In practice, local authorities appear to exploit public transport for taxation income, but their responsibilities for planning, regulation, and enforcement are not clearly specified.

REGULATORY FRAMEWORK

Public transport in Mozambique is regulated by central and local governments. Government is required to approve routes and timetables and is therefore implicitly responsible for planning transport services, including the routes to be operated and the level of service to be provided. They also legislate the types of vehicles to be operated and the fares charged.

In practice, the operators, or the operators' associations, make most of these decisions, with the government merely giving its approval, although the government does decide the fares to be charged. Although this practice has resulted in a transport service that meets most requirements, there are deficiencies in the system, and the roles and responsibilities of the operators and authorities should be more clearly defined, and the parties should discharge their responsibilities more effectively.

Planning and Licensing of Services

Routes are not formally planned. Instead, a few chapa operators experiment with a new route or an extension of a route, and if the experiment is successful, FEMATRO proposes a formal change and licenses are amended accordingly. Sometimes the municipality identifies a route or local communities approach the municipality to request a route. Matola municipality's current five-year plan includes the extension of public transport services to cover the entire municipality, which involves the planning of additional routes. However, some of these routes are not popular with operators (mainly because of poor road conditions) so that some are served by only a few vehicles, while others are not served at all. Under existing regulations, it is not possible to force

an operator to run on a particular route. In effect, therefore, the operators decide on the routes to be provided.

Regulations empower government to award concessions for operating specific routes. To qualify for a concession, an operator must have at least two vehicles and a timetable and must specify stopping places. The concession is valid for 20 years, but proposals have been made to reduce this term to ten or five years. Concessions supposedly give an operator exclusivity on a route, but the term "route" is not defined: for example, several routes may converge on a common corridor and it is not clear whether this should be regarded as a single route with several variations or several separate routes. If the concession holder performs badly, another operator may be given a concession to operate alongside the incumbent or may be appointed to replace the incumbent. In addition, the government must approve timetable changes. The requirement for an operator to specify a timetable is dubious: a timetable is not used to coordinate services or ensure that too many departures do not leave from a terminal at the same time.

So far, no concessions have been granted, so it is still possible to rectify potential deficiencies in the system by developing more precise regulations.

The current procedure is for a bus or chapa owner to apply to the relevant authority for a license to operate a vehicle; the authority issues a license that specifies the route on which the vehicle must be operated. In practice, the owner requests the route for which the license is to be issued. The authority does not take into account the number of buses already licensed for the route when it issues additional licenses, so some routes have excess capacity and others not enough. In addition, illegal operators operate without licenses on routes of their own choosing and make a mockery of the system.

Chapas do not operate on any schedule. Drivers and conductors decide when to leave terminals; they may wait for a full load, or if they think they will pick up passengers early along the route, they may leave with less than full a load and will do whatever they think will bring in the most income or minimize their costs. TPM buses operate on schedules but because of the shortage of buses, service is infrequent.

The central government administers licenses for interprovincial services, provincial governments administer licenses for intraprovincial service, and municipal governments administer urban public transport services. This division of responsibility can create problems: for example, it is not possible to coordinate an interprovincial service with an intraprovincial service because the timetables are lodged with different authorities. Similarly, several routes between Maputo and Matola are licensed by one authority or the other, depending on where the operator is based. There is good cooperation between the two municipalities in planning routes, and meetings are held frequently between the two, but neither has full control of the services operating within its boundaries, and there is no authority with responsibility for ensuring that the urban area as a whole has a suitably coordinated network of routes. To overcome this, Maputo and Matola municipalities are considering forming a joint committee of municipalities including others such as Maracuane.

Vehicle Types

The government also has a role in determining the types of buses operated, although no specific provision is made for this in legislation. To some extent, local regulations imposed by the municipalities determine the size of buses that may be operated on certain types of service. A recent law (for Maputo and Matola only) specifically prohibits buses with fewer than 25 seats from being operated in city centers, but allows their operation in outlying areas or where road conditions dictate. Vehicles already licensed will continue to be licensed, provided that they are roadworthy; perversely, this provides an incentive to keep vehicles running beyond their economic lives.

Although larger vehicles would be more appropriate for many services, small vehicles are more widely used because they are much easier to purchase: it is possible to buy 10 secondhand minibuses for the price of one new large bus. Maintenance of small vehicles is easier for a small operator: many of the parts are common to those of cars or light trucks and are therefore readily available, and maintenance skills for small vehicles are more widespread as well. If more big buses were in use, maintenance facilities and spares back-up would improve, if there were not too many different makes and models.

Buses used by the public sector operators are purchased by government; purchasing decisions are made by planners at the Ministry of Transport and the operators have little input to the choice of vehicles.

Fares

Fares charged for public transport services must be approved by Government. The municipalities are nominally responsible for regulating fares, although in 2008 the Ministry of Transport decided the proposed fares for Maputo and Matola so that fares would be consistent between the two cities. In future the proposed committee representing both municipalities will decide on fares.

Enforcement

Responsibility for controlling chapa operations is shared between central government police, municipal police, and FEMATRO controllers. There is little coordination between the three and some duplication of responsibility. Buses may be stopped frequently for inspection by the different authorities. Corruption is a problem, and regulations are not effectively enforced. Maputo Municipality is considering proposing enforcement by a Transport Committee rather than the traffic police or municipal police.

FEMATRO officers have the task of ensuring that operators comply with their license conditions but the lack of adequate terminal facilities makes this difficult. Crews are able to charge fares other than those approved and operate short trips instead of the full route because there are no effective controls.

Illegal operators (operating without licenses) account for a large share of the market. Most run short journeys on busy routes using unsafe vehicles, including open pickup trucks that carry too many passengers in very dangerous conditions. Some licensed chapas also operate on routes other than those for which they are licensed—usually on routes that are more attractive than those for

which their vehicles are licensed. Many routes are therefore served by fewer vehicles than are licensed for those routes while popular routes often have more vehicles than are licensed or are necessary. Many legal operators have been forced to become illegal because they cannot afford to pay taxes and license fees.

There is no effective means of preventing illegal operation. It is estimated that between 15 percent and 30 percent of vehicles operating in Maputo are illegal. Of the 200 chapas operating long-distance routes out of Nampula, only 70 are said to be legal. One route in Maputo is reported to be operated entirely by 30 or 40 illegal vehicles (although the operators on this route pay daily fees to FEMATRO. The police will not allow any other operator on this route.

An enforcement-related problem is security. The Nampula operators' association said that most of the formal operators in Nampula stop before 6 p.m. or 7 p.m. because of security problems, including hijacking of chapas. Lack of street lighting on some roads and inadequate police presence are the main reasons.

4. Public Transport Industry Structure

PUBLIC SECTOR OPERATIONS

Several publicly owned transport companies provide urban passenger transport services in Mozambique. These include TPM in Maputo (the largest), TPN in Nampula, and TPB in Beira.

TPM

TPM provides urban and suburban services in the Greater Maputo area and a runs small charter operation but does not provide long-distance service. Sixty-one routes comprise its urban network, though only 24 are run at present because of a bus shortage. The longest route is approximately 30 kilometers. The charter operation, which started in 2007, runs in Mozambique and goes to neighboring countries. Demand in this market is considered to be unsatisfied, and TPM claims that the service is profitable and contributes to the cost of running the urban services. It operates five coaches and has no plans for immediate expansion.

Excluding the charter buses, the operational fleet consists of 60 buses, of which approximately 35 to 40 are run every day, all day. Some buses are 12 years old; 35 are awaiting scrapping; and a substantial number of vehicles is out of service at any given time because of age and condition and delays in the acquisition of spare parts. The reason given for the lack of spare parts for the newer buses is that until operational experience has been gained it is difficult to know what parts to keep in stock. In fact, the main reason for the shortage of spares is likely a lack of funds. TPM is regularly short of cash to pay fuel and wage bills and lacks resources to invest in stock of essential parts. But failing to keep adequate stock when spares are not immediately available on the local market is shortsighted because the resulting unavailability of the vehicles further reduces the income stream.

In June or July 2008, TPM is expecting 100 new buses. TPM is not planning to use any of these to replace its oldest buses (although this would be advisable), but will use the worst of the old buses only at peak hours. The plan is to strengthen service on the 24 operating routes, then reintroduce other routes. A two-tier service, with basic vehicles at low fares and more comfortable vehicles at higher fares, is being considered.

Conductors collect fares and must pay in all revenue at the end of each shift. TPM crews are paid salaries in the conventional manner, unlike chapa crews. Revenue integrity is a problem; tickets are issued and inspectors make random checks. Some buses have electronic ticketing machines

and TPM plans to equip all buses with the machines. Doing so will not only make inspections easier but will also facilitate the introduction of a more complex graduated fare structure and eliminate the need for conductors, some of whom will be retrained as drivers.

TPM employs 490 staff, including 173 drivers. This equals approximately 12 employees per bus, while about five staff per bus would be appropriate. TPM's infrastructure (depot and offices) and organization are geared for a fleet of about 300 buses. The present level of operation cannot support this overhead. Total daily revenue is approximately Mtc 150,000—approximately 850 fare-paying passengers per bus per day, and about 1,000 total passengers including those entitled to free travel. This represents reasonably good loads, but with the current shortage of buses, a higher figure should be achievable.

TPN

TPN was formed in 2006 after a public company of the same name operated by Nampula Municipality went bankrupt and ceased to operate. TPN operates six routes, some wholly within Nampula and others to surrounding towns; the longest route is 80 kilometers. Additional routes will be operated when new buses are received. The company has six Chinese Yutong buses. One is out of service awaiting major repairs, and others require replacement parts but are still operable. At the time of our visit three buses were in the depot. Some spare parts are provided with the buses when they are delivered but these are insufficient. TPN is placing orders for fast-moving parts such as filters (nearly two years after commencing operation). Although TPM operates similar vehicles and put TPN in touch with an importer of Yutong parts, the two companies do not cooperate in purchasing spares. The Ministry of Transport has promised that 14 more buses will be supplied this year but has not provided details on make or type. TPN hopes to operate about 30 buses in future.

For routes in Nampula, TPN charges a flat fare of Mtc 5, the same fare charged by chapas; on longer routes it charges graduated fares. The city routes are said to be unprofitable because fares are too low, but the long routes make enough profit to cover losses on city services. TPN receives no subsidy from the government. Since it was formed it has achieved a small operating surplus each year, although this is decreasing as the buses age and maintenance costs rise. The surplus is insufficient to cover capital costs, and the company is spending money on rehabilitating its offices and parking yard. It also proposes installing a fueling facility. Available funds are insufficient to pay for yard surfacing or workshop construction, both of which are urgently needed.

TPN has 36 staff, of whom 14 are drivers and conductors. The 22 administrative and maintenance staff are excessive for an operation of this size and would be more appropriate for a fleet of about 50. The depot, if properly surfaced and equipped, could handle approximately 50 buses.

PRIVATE SECTOR OPERATIONS

About 1,000 private firms in Maputo and 600 in Matolo provide urban passenger transport services using about 2,500 and 1,200 vehicles, respectively. FEMATRO estimates that 60 percent of these vehicles are operational. The great majority of firms are small family-run enterprises.

According to the 2006 report, 70 percent of Maputo's licensed private and public buses are 15-seaters, 10 percent are 26-seaters, and 16 percent are 29-seaters; the remaining 3 percent are full-sized buses operated by TPM. There are approximately 80 routes in Maputo and Matola, most of which are between 9 and 30 kilometers long.

In Nampula (population 500,000) there are approximately 100 owners, with fleets ranging from one to 10 vehicles, nearly all 15-seaters. About 250 chapas operate on 17 routes in the city, and about 200 (mostly illegal) outside. The operators' association considers this number to be adequate. Long-distance services are provided by 25- and 30-seaters and some full-sized buses, as well as trucks fitted with benches, which carry passengers and freight in very unsafe conditions. Nampula's one large operator—Mikula—has about 20 buses providing long-distance service. Most of its buses are in poor condition and are about 10 years old.

The majority of chapa owners are members of operators' associations, which, in turn, are members of FEMATRO. The main function of the 23 associations in Maputo is to control routes by ensuring that vehicles are properly licensed and drivers comply with regulations. Each route is controlled by one association.

Exhibit 4-1
Rise of Private Participation in Transport in Mozambique

Ownership and responsibility for transport operations are being transferred gradually to the private sector. For example, private Mozambican and Portuguese investors now own 80 percent of the Maritime Company, and employees will probably purchase the government's remaining share at some point. The government is not involved in the company's day-to-day operations.

The government owns 100 percent of CFM, the railway and ports company. CFM has three divisions, South, Central, and North. In the northern and central divisions, the government owns the infrastructure and rail rolling stock but consortia manage operations. These consortia are structured so that CFM retains majority control. In the northern division, for example, 49 percent of the SDCN consortium is owned by CFM and 51 percent by private interests, including various Mozambican interests and two U.S.-based rail companies. SDCN itself owns 51 percent of another consortium, CDN, while CFM holds the remaining 49 percent. Thus CFM's direct and indirect interests in CDN amount to approximately 74 percent. The arrangement is similar in the central division, with the major consortium including two Indian rail companies. In the southern division, CFM still manages rail services while contractors manage some port terminals. For strategic reasons, some operations, such as oil terminals, remain under full government control.

The government owns 89 percent of LAM, the national airline, and employees own the rest, but LAM is run as a private company with minimal government involvement. The board has only one government appointee (in a nonexecutive capacity). LAM is required to operate commercially and cover its costs. Domestic air transport was liberalized five years ago: new entrants to the market did not last long, and LAM is the only operator.

None of these three organizations is profitable. CFM breaks even. LAM's losses are not made good by government and it has accumulated three years of losses. Its operating surplus cannot fully cover financial costs. LAM plans to renew its fleet with more fuel-efficient aircraft and increase its network of domestic and regional routes, and it is hoped that this will make the company profitable.

INFRASTRUCTURE

Transport infrastructure includes the road system, terminals, depots, workshops, and pedestrian facilities that complement public transport. Maputo's poor road conditions are being improved under the Pro-Maputo program. Some main roads are wide, straight, well surfaced, and suitable for maximum-sized buses. Sidewalks, which affect pedestrians and their access to buses, are in urgent need of rehabilitation, and the lack of street lighting in some areas contributes to security problems. Maputo Municipality has plans to widen roads in the city and may one day provide for exclusive busways. The generally poor traffic management and parking control now tolerable with light traffic volume will become very serious problems if not improved before traffic volume increases.

Terminal facilities are poor. All terminals are on-street stands or off-street plots with minimal facilities. The Maputo Municipality has plans to construct eight urban terminals, three in the city center and five on the outskirts, with some due for completion in 2008. The terminals will belong to the municipality but be managed by the private sector under concessions. They will not be used for long-term parking, servicing and cleaning, and the municipality would like the private sector to provide workshops and depots. TPM's large depot in Maputo can house a few hundred buses. Bus shelters are being built at roadside stopping points but chapas continue to stop anywhere to load and unload passengers, regardless of safety or traffic conditions.

5. Costs and Revenues

Chapa owners rent their vehicles to drivers for a daily fee. Until 2007 the fees were Mtc 1,500 for a 15-seater and Mtc 1,800 for a 25-seater, but they have since been reduced to Mtc 800 and Mtc 1,200 as drivers could no longer afford the higher fees after paying higher fuel prices. Fees are standard for all routes regardless of variations in profitability.

Drivers retain all fare revenue to pay the daily rent and cover operating costs (i.e., fuel and lubricants, tires, routine servicing and maintenance, fees charged by FEMATRO, road tolls, conductor's wage). The balance is the driver's income. The chapa owner covers the costs of the vehicle license, taxes, and major repairs. Chapa owners are also supposed to pay FEMATRO a daily fee of Mtc 20 for each vehicle to cover the cost of the association's inspectors; in practice, drivers pay these fees. The owner's daily rental fee, therefore, must be sufficient to cover the costs of major repairs, depreciation, licenses and taxes; provide a reasonable return on investment; and provide compensation for time spent in administering the business (which in practice is minimal). It is unlikely that current charges are sufficient.

It is in the driver's interest to understate revenue earned and overstate expenditure to persuade the owner to charge as little as possible. Similarly, it is in the owner's interest to overstate spending on major repairs to minimize tax liability. Determining precise costs and revenues would require a detailed study that cannot be carried out in the time frame of this study, but on the basis of observed vehicle use and current fare levels, we conclude that revenue is barely adequate to cover the full costs of operation, maintenance, and fleet replacement.

In 2005, fares were Mtc 5 for trips of up to 9 km, Mtc 7.5 up to 30 km, and, on some routes only, Mtc 10 for 30 km. On long routes, short-distance passengers are charged the lower fare and long-distance passengers the higher fare. To prevent over-riding, short-distance passengers are issued reusable tickets that are collected when they disembark. A passenger who cannot produce a ticket must pay the full fare. This simple system is said to be effective.

A fare increase was approved in February 2008. The Mtc 5 fare was increased to Mtc 7.5, and the Mtc 7.5 fare to Mtc 10. However, a public outcry prevented operators from implementing the increase. Operators, however, have managed to charge higher fares through such tactics as splitting routes, so that passengers must pay twice. This is common at peak times if a chapa has a full load of passengers wishing to travel the full length of the route, which would mean that only 15 fares (in practice more than this since standing passengers are carried) would be collected for the journey: if most passengers were traveling short distances more fares would be collected and revenue would be higher. Passengers are often doubly inconvenienced by having to disembark

from one chapa and board another (or board the same one again), rather than remain on board and pay a second fare. At off-peak times the passenger turnover is higher so that routes are more profitable without having to resort to such tactics. In effect, therefore, crews charge according to the market, with higher fares at peak times on some routes. This makes economic sense and should be formalized so that passengers know exactly what fares they will be charged.

Fares increases have not kept pace with the cost of inputs, particularly fuel. In 2002, fuel cost Mtc 8.5 per liter, and the fare was Mtc 5 for a journey of any distance. In 2005, fuel increased to Mtc 27.5 per liter but the fare remained the same. The short0distance fare is still Mtc 5, although fuel has quadrupled in price since 2002.

TPM fares are lower than those charged for chapas for social reasons, to provide affordable transport for poor people. However, this social benefit is not generally available, since TPM operates only a few routes. A flat fare of Mtc 5 is charged on all TPM routes except for those to Boane and Marracuane, for which the maximum fare is Mtc 10; passengers traveling shorter distances on these routes pay Mtc 5. Weekly and monthly tickets may be purchased at a discount, while certain categories of passenger such as the disabled and the elderly travel free of charge. It is estimated that about 20 percent of passengers fall into this category. Chapas do not carry passengers free of charge or at concessionary fares.

Although government policy is not to subsidize bus operators, the government does offer subsidies to public and private sector operators. To enable the public sector companies to charge low fares, and also to make good losses incurred because of their inefficiency, the government pays them substantial subsidies as well as assisting by buying new buses. TPM's charter operation is said to be profitable and contributes to the cost of running the urban services, but this contribution is probably insignificant. Each month TPM applies to the government for assistance in meeting its most urgent obligations, especially fuel and wage bills. TPM's subsidy is approximately 40 percent of its total expenditure. Government plans to reduce TPM's subsidy, but if 100 more buses are provided that are operated at fares that do not cover costs, the losses will increase.

In the case of private sector operators providing urban services, the government offers a subsidy in the form of a rebate on fuel tax. This was introduced in February 2008 in response to the public protests against the proposed increase in fares. Initially this took the form of a 30 percent rebate of the tax. Operators were required to submit claims through FEMATRO, accompanied by receipts for all fuel purchased. Most operators, however, were reluctant to submit claims because they thought that this would allow the government to estimate the number of kilometers operated, and hence the revenue earned, and that this might result in demands for additional sales tax payments. The drivers were also probably reluctant to provide information to the owners that would enable them to estimate the revenue earned.

The system was changed to one in which operators are entitled to a rebate of Mtc 4.35 per liter on the normal price of Mtc 35.25 per liter. There is a daily limit of 40 liters for vehicles seating up to 25, and 60 liters for larger vehicles. Even within these broad parameters, however, operators are still unwilling to submit receipts, and only approximately 1,400 of a total of approximately 3,400

operators in Maputo and Matola submitted claims in the first month. Fewer claims were submitted in the second month, and by the third month fewer still.

The Ministry of Transport manages a fund to which 5 percent of fuel tax revenue is contributed. This fund is intended for financing transport activities for the whole transport sector, but in practice has been used only for road passenger transport and ferries, mostly to pay the fuel subsidy to urban chapa operators and for spare parts for TPM. It currently has no plans to subsidize services operated under concessions in the future.

6. Policy Objectives and Options

POSSIBLE OBJECTIVES

To develop an appropriate public transport policy it is necessary to first decide what the policy should achieve. Whatever policy is developed must be achievable under the prevailing conditions, and each objective must be considered in light of its desirability and feasibility: what is desirable is not always affordable. The most likely objectives for transport policy in an urban environment in a country such as Mozambique are as follows:

- Affordability
- Safety
- Coverage
- Reliability
- Convenience
- Comfort
- Environmental considerations
- Traffic congestion
- Sustainability.

Affordability

Services clearly must be affordable, but this term must be defined. To be affordable by people on extremely low incomes, fares would have to be very low indeed—so low in most cases that they would not cover operating costs and would therefore have to be subsidized; at the same time, the majority of passengers who could afford to pay higher fares would benefit, at the expense of the taxpayer. If the fare is insufficient to cover costs, a subsidy is essential: the question is how much subsidy the government is prepared to pay. Policymakers must decide on the minimum level of income below which bus fares will not be affordable, and who the subsidy will target. If the subsidy is meant for only the poorest users, policymakers must devise a strategy to ensure that only the poorest users benefit. If policymakers decide not to provide any subsidy, but to minimize fares, then the standard of service must be correspondingly low so that fares still cover costs.

Many passengers are able and willing to pay higher fares than the poorest passengers can pay. Such passengers may be offered a higher-quality service at higher fares. In many cities, for example, air-conditioned buses charge higher fares than buses that are not air conditioned and that carry more standing passengers.

Safety

Safety is also important, but again the standards set affect the cost of service. In practice, some compromise must be made. For example, if for safety reasons all passengers are required to be seated and wear seat belts, many more vehicles will be required, and their capacity will be much smaller, than if standing passengers are permitted. This will increase costs substantially, and in most cities the need for buses to carry standing passengers is accepted even though this increases the risk of injury in the event of an accident. In a city such as Maputo, basic safety standards should mandate that the brakes, steering, lights, and tires be in good condition, and periodic inspections should ensure that standards are met.

Coverage

Network coverage, or accessibility, is another policy issue: the denser the route network, the better the coverage and the shorter the walking distance to and from the nearest bus. This means more routes with lower frequency. It may also mean that smaller vehicles must operate on narrow roads in residential areas. Finally, a denser network increases the cost of operation, and the greater complexity complicates control. A balance must therefore be achieved between good network coverage and the costs of provision and control.

Reliability

Services should be as reliable as possible—but again, reliability has a cost. Up to a point, improved maintenance standards improves reliability and reduces cost, but if, for example, every scheduled journey must be operated without fail, the keeping more vehicles kept on standby to replace defective vehicles will result in increased costs. A decision must be made as to what level of failure is acceptable, bearing in mind the effect on costs, and therefore on fares and/or the extent of the subsidy required.

Convenience

Convenience, in terms of waiting time and of transfers required for a journey, also has a cost. Higher-frequency service will reduce the time passengers must wait at stops but will result in lower load factors or will necessitate the use of lower capacity vehicles, either of which will increase the cost of operation and therefore the fare or subsidy. Similarly, reducing the number of transfers passengers must make during the course of their journeys will improve convenience but will require a more complex route network and increase costs.

Comfort

Comfort also has a cost. The more passengers carried on a vehicle, the lower the cost per passenger—but so too the level of comfort. Comfort, in terms of the proportion of seated to standing passengers and the maximum number of standing passengers in a vehicle of a given size, should be specified after cost is taken into account. Similarly, greater spacing between seats increases comfort but reduces capacity. Comfortable upholstered seats cost more to provide and maintain. Air conditioning significantly improves comfort in a hot climate, but at substantially increased cost. All these factors must be considered. As discussed, offering different levels of service at different levels of comfort may be feasible at appropriately differentiated fares.

Environmental Considerations

The effect of public transport services on the environment must be considered in determining policy. In particular, standards for exhaust emissions and noise levels must be specified, while other considerations, such as the visual impact of public transport vehicles, may also be considered. As always, higher standards have cost implications, and the effect on costs and fares must be taken into account when a policy decision is made.

Traffic Congestion

Public transport has an important influence on traffic congestion. It is true that public transport vehicles may contribute to congestion in certain circumstances. If they are too small so that a large number is required to provide the required capacity, or if they are poorly or inconsiderately driven, they will inconvenience other road users and add to traffic congestion. But the greatest cause of traffic congestion on city streets is private transport, and if private transport is discouraged, and commuters use public transport instead, this will reduce congestion substantially. Policy regarding the control of private transport must be carefully considered.

Sustainability

Public transport policy must ensure that the system is sustainable. In particular the system's income must be sufficient to fully cover all costs and to maintain the fleet in a safe and roadworthy condition (which means replacing vehicles when required). There must also be a sufficient surplus to encourage investment in the industry, not only to sustain services but to fund expansion as demand increases.

POLICY ELEMENTS

The institutional and regulatory framework for achieving policy objectives must take into account certain elements: regulation and competition, industry ownership and structure, division of responsibility, funding, vehicle type, route network, and infrastructure.

Regulation and Competition

The basic policy options with regard to competition, and the degree of regulation required, are

- Competition in the market between modes and operators; and
- Competition for the market but not in the market.

Competition in the market is common in developing countries and involves all operators and drivers competing with one another on the road. It requires minimum intervention by government but results in an unplanned and uncoordinated system in which the operators decide the routes to be operated, the level of service to be provided on each, and the types of vehicles used. Busy routes tend to be oversupplied, while less-busy routes have inadequate service. A theoretical benefit is that market forces keep costs to a minimum, but in practice this is at the expense of the overall quality of the service. Competition in the market in a public transport context in particular results in undesirable practices such as drivers racing each other to stops, obstructing each other to maximize their loads, overloading of vehicles, and other kinds of dangerous driving.

Competition for the market combines the benefits of competition with those of a planned and coordinated system. It involves operators in bidding competitively for exclusive concessions to operate each route. In ideal circumstances it provides a public transport service planned and operated to meet in full the requirements of the users in each city. It requires a strong planning capability on the part of the authority and robust regulatory and enforcement systems than can ensure that services are operated in accordance with the plan. This will be difficult to achieve in Mozambique in the immediate future but is infinitely preferable to the first option and should be the ultimate goal.

Industry Ownership and Structure

There are various options for ownership and structure of the public transport industry, not all mutually exclusive:

- All transport operators under public ownership
- All transport operators under private ownership
- Mix of public and private ownership (in various proportions)
- One monopoly operator
- Few large operators
- Many small operators
- Mix of sizes

In theory, public or private ownership is not important. However, if there is a mix of public and private ownership, they must operate on equal terms. For example, if services are subsidized, all operators must be equally eligible, regardless of ownership. Similarly, if private sector operators are expected to operate commercially and cover their costs fully from revenue, public sector operators should be expected to operate on the same basis. In practice, public owners have been unsuccessful in providing efficient, cost-effective services in either developed or developing countries, and in the past few decades, the trend has been worldwide for publicly owned transport operators to be replaced by private sector companies.

A transport operator may be jointly owned by public and private sectors, with either having a majority shareholding, and hence effective control. If the public sector has control, private sector investors are normally reluctant to risk putting money into an organization that may be unprofitable and over which they have no control, and therefore in practice this situation is very rare around the world. When the private sector has nominal control through a majority shareholding, government representatives often make unrealistic demands, and this situation does not work well in practice either. Several public-private sector partnerships have already been tried in the transport sector in Mozambique (maritime, rail, ports, and aviation) but none has resulted in profitable organizations.

In terms of size, large and small operators have advantages in different circumstances, but in general, the greater the demand for a service, the more appropriate it is for operating units to be large, to a size beyond which organizations become difficult to manage. The minimum size for an operating unit (whether it is a cooperative, company, or other form of organization), in terms of the number of vehicles operated, should be the number of vehicles required to run one entire route. There may be a mix of operator sizes in a large urban area, with some running only one

route each, and others running several routes. Alternatively, several operators of a similar size may each run several routes.

A monopoly is not desirable or practical for various reasons. In a large city such as Maputo, a monopoly would probably have to operate more than 1,000 buses to meet demand. Companies of this size tend to be difficult to manage, particularly if management skills are undeveloped. More significant is the fact that a monopoly may abuse its position, exploiting users by providing poor value for money, unless effective controls prevent it. In practice, in a city such as Maputo, the maximum fleet size for an efficient operation is likely to be about 300 large buses.

Division of Responsibility

Several institutions are involved in delivering transport services: in the public sector, central and local governments, and in the private sector, transport operators and vehicle owners. Each has a role to play and each must be made responsible for the areas for which it is most suitable.

An appropriate allocation of responsibilities depends on the circumstances. In a small country, for example, the central government may be able to control all transport services; an intermediate level of authority may not be needed. In a large country such as Mozambique, it may be more appropriate for different tiers of government, such as central, provincial and municipal, to be responsible for different aspects of regulation. Similarly, in certain circumstances it may be appropriate for government to be responsible for operating transport services and own the vehicles and infrastructure; in others the private sector is probably better suited to this role.

Responsibility among the various institutions should be divided so that services are operated in the best interests of users. The interests of operators, operators' associations, enforcement officers, and others should never over-ride the public interest.

Funding

Transport operators' income must be sufficient to cover the full costs of providing the service, including maintaining vehicles to an acceptable standard and replacing vehicles when the time comes. This may be achieved from fares and secondary revenue sources such as the sale of advertising space on buses or through a combination of fare revenue and financial assistance from government.

Government financial assistance may take various forms. Operators may receive subsidies to make good any losses that are incurred. In effect, publicly owned companies receive this type of assistance, with government funding essential expenditure, such as wage and fuel bills, which cannot be fully covered from fare revenue. Such assistance carries the risk that it provides no incentive to the operator to be efficient: failure to control costs will incur no penalty because any resulting loss will be made good. It gives such operators an unfair advantage over those who minimize costs by being efficient.

Another form of assistance is the purchase of vehicles by the government for the operators to manage. Although in theory this measure may be effective, in practice, government purchasing procedures often result in the purchase of vehicles that are unsuitable for their purpose: the

operators themselves are in a better position to know exactly what types of vehicles are required and which makes and models are most suitable.

Another form of subsidy, reducing taxes paid by operators, can be a useful form of assistance provided that it is applied effectively and equitably, and in fact the government is planning to simplify taxation for small businesses to help them in this way. In practice, however, the administration of tax concessions can be difficult, and although such measures can help by reducing costs, they will not solve the problem completely. A rebate on fuel duty is given to bus operators in some countries, but the administrative procedures are complex and subject to abuse. Waiving of certain taxes levied on businesses may be easier to administer, but preventing abuse can also be difficult.

A form of subsidy that is increasingly common in developed countries is the granting of exclusive concessions for routes or groups of routes on a net cost or gross cost contract basis. This possibility should be considered for Mozambique when a concessionary system for urban transport is introduced. Under a net cost contract, if the service is unprofitable, the operator retains all fare revenue and the authority pays a subsidy to the operator, on a predetermined basis, to cover the shortfall between cost and revenue. If the service is profitable, however, the authority receives a proportion of the revenue, or all revenue above a predetermined level. Potential operators bid on the basis of the payment required from the authority in the case of an unprofitable service or, in the case of a profitable service, the payment the operator is prepared to make to the authority for the right to operate the concession. In practice it is rare for an operator to pay for a concession.

Under a gross cost contract, the operator gives all revenue to the authority and receives a payment from the authority for operating the service. This payment is typically greater than the amount of revenue collected, and the difference between the two sums is the subsidy. Bids are based on the total payment an operator requires for providing the service, and other things being equal, the concession is awarded to the bidder asking for the lowest payment. Gross cost contracts are increasingly common, in preference to net cost contracts.

Concessionary fares are another important policy issue. At present the publicly owned bus companies provide free travel for certain categories of passenger, and the cost of carrying these passengers is, in effect, reimbursed as part of the subsidies that these companies receive. Private sector operators, however, do not provide such benefits. If the government required private operators to carry passengers free of charge or at reduced, concessionary fares, it must set up an effective means of reimbursing the operators for carrying them.

Substantial subsidies are paid to public transport operators in many other countries, but the majority of these are developed countries where incomes are high, so that the tax base can support a much higher level of subsidy than is possible in most developing countries, including Mozambique. In addition, the rate of car ownership is also high, so that the requirement for public transport services is considerably less, particularly in the smaller cities.

Vehicle Types

Many options are available for the types of vehicles that can be operated on urban public transport services. These range from small vehicles such as the 15-seat chapas that provide the majority of services in the cities in Mozambique to large articulated double-deckers carrying 250 passengers or more on a single bus.

There is no ideal size for a public transport vehicle. Small vehicles are appropriate in certain circumstances, for example where roads are narrow or poorly surfaced, or demand is low so that a larger vehicle is only partly filled. At the other extreme, where demand is high and road conditions are good, it is much more efficient, in terms of cost and the use of road space, to operate larger vehicles. In a large urban transport system consisting of many routes with different characteristics, a fleet of buses of various sizes and configurations is often appropriate.

Choices are available for configuration, too. The principal choices involve the proportion of seated to standing passengers, the number of entrance and exit doors, floor height, rigid or articulated, and single- or double-deck. The choice depends on circumstances. For example, on long routes it may be desirable for all passengers to be seated, although this will reduce the capacity of the vehicle and therefore increase the cost per passenger; where road conditions are poor, a high-floor bus may be necessary to avoid chassis damage; where roads are wide and straight an articulated bus may be suitable; overhead obstructions may prevent the use of double-deck buses, but if a high proportion of seated passengers is required this may otherwise be the best choice for busy routes.

The type of propulsion is another important consideration. The basic options are diesel, gasoline, compressed natural gas (CNG), electric power, and hybrid using two sources of power. In general, gasoline is impractical for public transport vehicles, mainly because of the cost: a gasoline engine consumes up to twice the fuel required for a diesel engine for the same number of kilometers. CNG is becoming more popular, but is still not always available and has technical limitations: for example CNG engines are prone to overheating, particularly in hot climates, which could be a problem in Mozambique. Electric power for buses is practical only using a power supply from overhead cables; battery technology is insufficiently advanced to permit the widespread use of batteries as a sole source of power. Buses are being developed that use a combination of diesel engine and battery, but the technical development is still at an early stage. The advantages and disadvantages of the alternative sources of power must be assessed carefully before a commitment is made to any particular one.

The choice of appropriate vehicle for each route thus involves several operational factors, as well as consideration of the effects of the vehicle on congestion, pollution, and safety. Finally, when size and configuration have been decided, selection of manufacturer and model must also take several factors into account. Initial cost is clearly important, but even more important is the total cost of the vehicle over its life. A vehicle with a low initial cost may incur high maintenance costs, give poor reliability, and have a shorter life than a more expensive vehicle, so that over its life it is less economical. Availability of spare parts is another vital consideration. An otherwise suitable model that is not widely used in the country may be impractical because the time needed

to source spare parts may result in an unacceptable proportion of time spent out of service, or maintaining an adequate spare parts inventory to minimize downtime may be too expensive.

Route Network

Several options are available regarding the route network. The network may be dense, covering a many roads of all kinds or it may be restricted to main corridors. The former will provide greater coverage and convenience for users but will result in operational complexity and reduced frequency on each route. A much less dense network will be simpler to control and will enable higher-frequency service with larger buses, and costs per passenger will be lower. A compromise is likely to be the best option but must take all factors into account.

A network may comprise a large number of routes between points within the city centre and outlying points, with routes converging on a common corridor. This enables most passengers to complete their journeys without having to transfer from one vehicle to another. A disadvantage is that if large buses are operated, they may have difficulty in operating on poor roads in residential areas, while frequency at the outer ends of the routes will be lower than if smaller vehicles were used. Alternatively, if small vehicles are used for the entire route, large numbers of small buses will be operating in the city centers, thus increasing total costs and contributing to traffic congestion.

If services are operated under concessions, several concessions operated by different companies may operate along the same main corridors, and unless effective controls are put in place, this may result in undesirable competition between the operators concerned. Some of these problems may be overcome by separating the routes into trunk routes operating along the main routes, with feeder routes running from outlying points to transfer points on the trunk routes. Each type of route could be operated by the most suitable type of vehicle, typically with large buses on the trunk routes and smaller ones on the feeder routes. Measures must be taken to minimize inconvenience to passengers, for example, by providing through ticketing and convenient facilities at interchange points.

In addition to the routes themselves, consideration should also be given to the quality of service provided. On routes serving higher-income areas, passengers may be able to afford higher fares and may be willing to pay more for better service. There may be potential for introducing premium service using vehicles offering greater comfort and charging higher fares, in addition to standard service using basic vehicles operating at minimum cost and charging lower fares.

Infrastructure

Efficient bus service requires good roads, effective traffic management, terminal facilities of adequate capacity and suitable design in appropriate locations, bus stops and shelters where required along each route, and adequate and suitably equipped depot and workshop facilities.

Roads must be suitable for the efficient operation of public transport vehicles. Widths and alignments must meet the requirements of public service vehicles of appropriate size and design, and the surface must be maintained to a standard adequate to permit vehicles to operate without

incurring unnecessary damage. Many of the roads in Maputo and other cities in Mozambique do not meet these basic requirements.

Traffic management must also facilitate the operation of public transport. Traffic signaling and other means of controlling moving traffic must optimize the flow of traffic, and where public transport accounts for a high volume of passenger movement, consideration should be given to giving priority to buses over private vehicles. Control of parked vehicles must also be adequate to provide unobstructed movement of other traffic and must take into account the requirements of pedestrians. This is a problem in many streets in Maputo: Parked cars obstruct not only the roadways but also pedestrian footpaths. Transport policy must cater to all road users, but with the highest priority given to the needs of the greatest number of people.

The location of terminals must take into account the requirements of passengers as well as the availability of land. They must be convenient for passengers, and their impact on other traffic must be taken into account. An important choice to be made is whether extensive terminal facilities should be located in the central area, occupying expensive land and potentially contributing to traffic congestion, or whether most routes should operate across the city center from one outlying terminal to another.

Bus stopping places must also be provided. These should be marked clearly, with signs indicating the routes and destinations of buses serving each stop. Car parking should be prohibited at each stop so that buses have unobstructed access to the footpath. At some busy stops it may be desirable to provide lay-bys so that buses can stop out of the stream of traffic. It is also appropriate to provide shelters for passengers at some stops. Such facilities cost money, and the government must decide on an acceptable spending level.

Depots and workshops are required for the off-road parking of buses that are not in service and for the routine servicing and maintenance of all vehicles. It is not desirable for vehicles to be parked or serviced on public streets, and this should be reflected in government policy.

7. Recommendations

Solving the public transport problems of Maputo and other cities will require substantial changes, particularly how the government regulates the sector and enforces regulations. These changes may be difficult to implement, but if no action is taken, problems will worsen as the city grows. Present inefficiencies will become more pronounced, quality will deteriorate substantially, and costs to users will continue to rise in real terms.

The 2006 report suggested that improving enforcement of regulations would result in substantial benefits, including improved driving standards, safer vehicles, and more reliable services; passengers would not be overcharged, and operators would be protected from illegal competition. But improved enforcement alone is not enough. The public transport system is functioning only because rules can be broken: some problems would worsen if all regulations were strictly enforced and no other measures were taken. Many vehicles are unroadworthy, and strict enforcement of regulations would mean that those that are beyond economic repair would cease to operate altogether, while others would require considerable expenditure to be restored to a roadworthy condition. This would result in a decrease in the total capacity of the system and an increase in costs that would be reflected in higher fares.

Enforcement standards must be improved, but other changes are required at the same time. Government must first develop a policy that is clear, consistent, and appropriate to the requirements of the cities, taking into account the considerations discussed earlier; it must then amend regulations to conform with this policy, and most important (and most difficult), it must ensure that regulations are effectively enforced.

THE VISION

A pragmatic approach is to develop a vision of the type of service desired and that can be achieved in the long term, and to develop a program to work towards it, commencing with immediate, short-term action. The vision should include the following basic characteristics:

- Well-planned route network
- Service levels adequate to meet demand
- Appropriate vehicles on all routes
- One operator per route
- Well-organized and efficient operation that is profitable at affordable fares

This vision has not yet been achieved in any of the great African cities but it is achievable. If it can be achieved in Mozambique it will set an example for the rest of Africa. The measures that will be necessary to achieve this vision are described below.

REGULATION AND COMPETITION

Experience in other countries has shown that competition on the road never results in a satisfactory public transport system, and that a planned and regulated system is required that delivers the benefits of competition through a concession system involving competition for the market but not in the market. Such a system would be appropriate for urban public transport services in Mozambique. If policymakers decide that services should be subsidized, concessions may be awarded on a net or gross cost contract basis.

Concessions giving private sector operators the exclusive right to operate on a specified route have been part of Mozambique government policy since 1996, although no concessions have been awarded. FEMATRO recently held discussions with the Ministry of Transport with a view to putting the policy into effect and proposes the formation of cooperatives of owners to become the initial concessionaires; these cooperatives should evolve into formal companies, eligible to hold concessions for several routes.

The details of concessions must be carefully thought out before the government enters into contracts with transport operators. (1) Should concessions be awarded by route, route group, area, or network? Each approach has advantages and disadvantages. The Maputo Municipality proposes to combine profitable and unprofitable routes in each concession; this package approach has merit, but estimating the profitability (or lack of profitability) of each route is difficult and allocations may end up being inequitable. In any case, the principle of cross-subsidization inherent in this approach has its own disadvantages, and its implications must be considered fully. Initially, separate concessions for each route, with trunk and feeder routes treated as separate routes, are preferable.

The duration of the concessions must be realistic. Current regulations specify a 20-year term, but a much shorter period is normally appropriate for a bus service concession: five years is more typical and more in line with the economic life of the vehicles used.

Each route should be managed as a separate entity to enable service to be scheduled in accordance with demand; for example, with increased frequency at busy times, reduced frequency at less-busy times, and tapered frequency, with higher frequency on the busier inner portion of the route than on the outer portions. This means some buses will be used more intensively than others. If buses are individually owned, with each owner interested in maximizing revenue, the allocation of some buses to duties that are more profitable than others can create problems, and in general, owners are unwilling to cooperate to provide such a scheduled service. For a properly organized service, therefore, each route must be managed as a whole, and this is best achieved by making one operator responsible for an entire route.

In some countries antitrust legislation precludes the awarding of exclusive route concessions, but it is becoming more widely recognized that such legislation is inappropriate for urban public

transport. It will be necessary to ascertain whether such a situation applies in Mozambique, for example whether SADCC rules about deregulation of the transport sector would be infringed by controlling market entry by issuing concessions. If this is the case, the legislation must be amended accordingly.

The concept of route concessions should first be tested and demonstrated by means of a pilot project in Maputo.

INDUSTRY OWNERSHIP AND STRUCTURE

The operation of bus service should ultimately be the sole responsibility of the private sector. Public sector companies should be offered for sale as going concerns to private investors or be dissolved.

Sale of the public sector operators as going concerns might present problems. The terms and conditions of employment of their employees are likely to be onerous to a private sector employer; this has been an obstacle to privatization in other countries. A potential obstacle to the dissolution of the public companies could be the requirement under the labor laws for compensation for termination of employment of one month's salary for every year of service. In the long term, dissolution is likely to be the preferable option: the cost would be a one-time restructuring cost, whereas maintaining the public sector company could have adverse repercussions indefinitely. Assets could be disposed of at market value to private sector operators. Staff would be eligible for positions with private sector organizations, which would require bus management and maintenance expertise.

Urban bus services should be provided by a relatively small number of medium-sized to large operators. The Municipality of Maputo has already carried out a study of urban transport policy, which also concluded that urban public transport is best provided by large operators operating under concessions rather than by many small operators as at present. Because each route would be operated by a single operator, the companies must be at least large enough, in terms of the number of buses owned, to operate one route in its entirety. This would be in the order of 20 buses. In practice, in the longer term, each operator will operate several routes, and the ultimate structure for Maputo is likely to be made up of four to six operators with 150 to 300 buses each. Each operator should be a formal entity, such as a cooperative or company. It should have a formal management structure with appropriately qualified full-time management officers, and adequate office, depot, and workshop facilities.

Some of the operators' associations, while endorsing the concept of concessions in principle, have expressed concerns that must be addressed. The Nampula operators' association said that chapa owners would be reluctant to join forces to buy one or more large buses but would wish to retain full ownership of their vehicles. The association is promoting the concept, based on a model introduced by the World Bank in Ghana, of a small group of operators (typically four or five) joining forces to obtain credit to purchase a similar number of vehicles, each of which would be owned by an individual member of the group. This could be an appropriate first step, provided that the groups are able to evolve into bigger companies operating vehicles of suitable

size. The association accepts that some members would have to leave the industry, although not all members may accept this.

The Nampula operators' association also said that finance is easier to obtain from private investors than from banks, which do not favor transport operators; even if an operator had a concession that guaranteed an income, the banks would still be reluctant to lend. This may be correct in view of the present performance of the industry, and it will probably take several years of successful operation of concessions before the banks are convinced that public transport is not a high-risk business. In the meantime, the government should ensure that financing is available to operators on appropriate terms to enable them to invest in suitable vehicles and equipment.

DIVISION OF RESPONSIBILITY

The central government should be responsible for overall policy and for regulations that are applicable throughout Mozambique, while provincial and municipal governments should be responsible for regulations reflecting local requirements. Transport services often cross boundaries, however, and may come under the jurisdiction of more than one authority. This is more of an issue for long-distance services but applies to some urban services also.

Ideally, a single authority is responsible for all public transport in an urban area. For Maputo and Matola and neighboring municipalities, which in effect constitute a single urban area, one authority should plan and regulate a coordinated system. Such an authority should be formed of representatives of all municipal governments in the combined urban area. A transport committee made up of representatives of all municipalities concerned has already been proposed, which could form the basis of such an authority.

A similar approach might also be adopted for long-distance services. Services operating within one province are regulated by the provincial government while those operating from one province to another are regulated by the national government through the Ministry of Transport. Therefore it is difficult to coordinate the two types of service, even though an interprovincial route is likely to follow the same roads and serve part of the market that is served by shorter routes along the way. A National Transport Authority set up to regulate all nonurban transport would facilitate planning, coordination, and regulation of services.

The operation of bus services should be entirely the responsibility of the private sector. Although government, whether national or local, must be responsible for setting policy, making and enforcing regulations, planning and, if appropriate, administering subsidies, it is not suited to operating transport services. In Mozambique, and in all other African countries, governments have been unsuccessful in running efficient transport services. Virtually all have been unprofitable and have required large subsidies; they have been unable to maintain their vehicles effectively so that only a small proportion of the fleet is operational, and vehicle lives are short; many services have become bankrupt and ceased to operate altogether. TPM is typical of such an operation.

We therefore recommend that the responsibility for public bus transport in Mozambique be divided as follows:

- Planning of services—Municipalities
- Licensing of services—Municipalities
- Setting fares (if no subsidy)—Bus operators
- Setting fares (if subsidized)—Municipalities
- Provision of terminals and bus stops—Municipalities
- Provision of depots and workshops—Bus operators
- Vehicle selection, purchase and ownership—Bus operators
- Enforcement of regulations—Municipalities
- Management of operations—Bus operators

FUNDING

Given the demand for public transport in Maputo, most if not all bus services in the city probably could cover their costs charging fares similar to those charged at present, without subsidy, if the services were operated efficiently as part of a well-planned and regulated system.

It is, however, important to ensure that fare levels and the fare structure are appropriate to local requirements, and that total revenue is adequate to cover costs. If the costs of operation and numbers of passengers to be carried are known, calculating the average fare required is easy. But unless a flat fare is charged—one fare, regardless of distance—the fare structure must be designed carefully to ensure that total revenue is adequate. This is a complex exercise, particularly initially when the data are limited. The flat fare system is easiest to administer but in some respects is inequitable: passengers traveling short distances pay a much higher fare per kilometer than those traveling long distances. Basing fares on distance traveled is often more equitable. Besides varying fares according to distance, differentiating between peak and off-peak travel is often appropriate. Some operators reduce fares at off-peak times to encourage passengers who can travel at these times to do so.

Initially the fare structure should be kept simple, with fares differentiating only between long and short routes. A zonal fare system, with a flat fare within each zone and a higher fare for journeys crossing zone boundaries, would meet this requirement. As the system develops and becomes more organized, more sophisticated fare collection systems may be introduced, enabling more complex fare structures to be implemented. Ultimately it would be possible, using such technology as smart cards, to have distance-based fares with peak and off-peak differentials and other refinements, including intermodal ticketing, but such sophisticated systems should not be considered in the immediate future.

Government may decide, as a matter of policy, that fares should be set at a level that is insufficient to cover costs. In these circumstances, operators should be subsidized so that costs are covered and a reasonable return is earned on the capital invested. If services are subsidized, government should control fares. Otherwise, operators must have some control of fare levels so that they are able to earn sufficient returns to sustain the operations. However, to ensure that they do not abuse their monopoly positions as concession-holders, some form of safeguard must be put into place. A suitable formula linking fares with the costs of inputs, agreed and specified in the concession contract, would meet this requirement. An equitable means of compensating operators for carrying passengers at concessionary fares or free of charge must also be established.

Finally, the policy should permit fares to be increased when necessary to compensate for increases in costs. Relatively frequent, small increases are preferable to infrequent large increases, which can result in public unrest.

ROUTE NETWORK

A detailed review of routes should be carried out to determine a suitable route network, both to improve the efficiency of the existing operation and to prepare for the introduction of route concessions. Changing routes during the life of a concession is unsatisfactory because it involves renegotiating contracts and could obligate operators to make significant fleet changes. At the same time, to estimate vehicle requirements, the capacity of each route in terms of passengers per hour in each direction should be estimated on the basis of a survey of traffic flows. This estimate would have to be reviewed from time to time, as the new, more efficient route system may well generate new demand and change travel patterns. The route system should be kept as simple as possible, and should be designed so that each route is operated with the vehicles most suited to demand and road conditions.

For most of the system a trunk-and-feeder type of network will be appropriate, with trunk routes operating along the main corridors and feeder routes operating from outlying residential areas to points along the trunk routes where passengers may transfer from one to the other. In general, the trunk routes would use large, high-capacity vehicles, carrying between 50 and 100 passengers, and in some cases more, while the feeder routes would use smaller vehicles, typically 15- or 25-seaters initially (to use existing vehicles), but these should be replaced by larger vehicles when financially feasible. An additional benefit of such a route structure would be that on many routes a single flat fare can be charged without creating problems of affordability for the passengers or inadequate revenue for the operators.

Some outlying points may have high demand and road conditions suitable for large vehicles, so that through services to the city centre without interchange would be more appropriate. Each route must therefore be examined individually, and all factors taken into account: the trunk-and-feeder concept should not be applied rigidly to every route regardless of circumstances.

Where possible, routes should operate across the city center from one outer terminal to another. This will minimize the need for terminals in the city center and improve bus use by reducing total turnaround times. Because Maputo is a coastal city, its layout will necessitate some cross-city routes that enter the city along one corridor and leave by another parallel corridor, or routes that operate in loops in the central area, returning along the same corridor to the outer terminal. On long routes, such as Maputo-Boane, some journeys should be operated on a limited-stop basis, stopping only at the principal points, to minimize journey times for passengers traveling long distances. Buses operating on shorter sections of the route, stopping at all points, would cater to short-distance passengers. All options must be examined.

VEHICLE TYPES

The most efficient type of vehicle for busy urban services is normally the largest that can be legally and safely operated on the route. On routes with poor road conditions or low demand,

smaller vehicles are more appropriate, to cope with road conditions in the case of poor roads and to enable higher frequency in the case of routes with low demand.

Road conditions in Maputo are generally poor, as are traffic management and parking control. Initially, therefore, rigid single-deck buses of approximately 12 meters in length, with medium-height floors, two or three passenger doors for entry and exit, and capacity for approximately 35 seated and 65 standing passengers, should be the standard for trunk routes, and rigid, single-deck buses of approximately 8 meters in length, with medium-height floors, one or two passenger doors for entry and exit, and capacity for approximately 20 seated and 30 standing passengers should be the standard for feeder routes. All buses should be diesel powered, but with engines conforming to European emission standards. The models selected should be sufficiently robust to withstand local conditions, and spare parts for the selected models must be readily available in Mozambique.

When road conditions and traffic management in Maputo improve, larger buses can be introduced on trunk routes, and low-floor buses providing easier access will also become more practical. The possibility of using articulated buses on the busiest routes should be considered, and double-deck buses carrying a high proportion of seated passengers may be considered for the longest routes such as those operating between Maputo and Matola. Very large buses may not be practical in the short term because they require longer times at bus stops, but when more advanced fare collection systems become practical, boarding times may be reduced, enabling bus sizes to be increased.

As technology improves, and the ability of local bus operators to maintain vehicles to a high standard improves, the introduction of cleaner sources of power, such as CNG or electricity may be considered. Such technologies are still developing, so the costs and other disadvantages must be carefully considered before experimenting with such vehicles. It is preferable to wait until technologies have been fully developed and proved in operation in other countries before their introduction in Mozambique is contemplated.

The introduction of larger and more efficient buses to replace small vehicles will reduce the total number of buses required in Maputo and Matola to about 1,000 if they are used efficiently. If appropriate models are selected, an effective preventive maintenance program is implemented, vehicle use is optimized, and the number of staff employed is no more than is adequate to manage and operate the service, total operating costs will be reduced substantially.

Although the total number of people employed in the transport industry will be reduced through the replacement of small buses by larger ones, the benefits to be derived by the population of Maputo as a whole from a more efficient and cost-effective service will outweigh the temporary disadvantage to those who will lose their employment. The primary role of a public transport service should be to provide the best service at lowest cost. If public transport is treated as a means of creating employment, this primary role will never be achieved.

INFRASTRUCTURE

The municipality should provide bus terminals and bus stops. Terminal facilities are required at the end of each route. They must be of adequate capacity, laid out to optimize the movement of

buses and passengers, with minimal conflict between the two, and located in accordance with the requirements of the route network. The location of the terminals must be determined during the route network review, which will also provide data on likely vehicle and passenger throughputs to enable the size of each to be determined and outline layout to be designed.

The number and size of terminals in the city center should be kept to a minimum. The majority of terminals should be at the outer points, except for those for some routes between Maputo and Matola, which will require city center terminals. Most outer terminals will cater to one trunk route and a number of feeder routes. All should provide a paved area for buses to park between trips, passenger boarding bays for each route, shelters and facilities such as toilets, and basic office accommodation for supervisory staff.

Facilities required at stopping points along the route will depend on the number of passengers using them. At heavily used stops and points where passengers transfer between feeder and trunk routes, there should be adequate shelters for waiting passengers, and lay-bys to allow buses to stop out of the traffic stream may also be required. Smaller shelters may be provided at less-busy stops, and some stops will require only a sign indicating the stop. Private sector involvement in the provision of bus stop shelters, for example allowing them to be funded by the sale of advertising space, should be considered.

Operators will also require parking garages and workshops where buses can be parked when not in service, and where they may be cleaned and maintained. These should be provided by the operators, although it may be appropriate for the municipalities to construct them and make them available to operators, on either a commercial or subsidized basis. They must be suitably located (typically nearer the outer ends of routes rather than near the city center), of adequate size, and adequately equipped.

The roads in Maputo are being rehabilitated under the Pro Maputo program, and that all roads to be served by bus routes must be upgraded to a good standard in terms of width, alignment, and surface condition. Maputo Municipality has no immediate plans for exclusive busways but is making provision for them on main corridors in case they are needed in future; this is sound policy.

In addition, traffic management must be improved: better signaling and lane markings at junctions, and control of parking to ensure that main roads and footpaths are unobstructed by parked cars. This is likely to require off-street parking facilities and enforcement of parking regulations. On busy bus routes, giving priority to buses over other traffic should be considered, perhaps through the provision of bus-only lanes so that buses can move faster than other traffic, particularly at peak times; not only will this reduce journey times for passengers, but it will also improve bus use, thus reducing operating costs.

APPLICATION TO OTHER CITIES

It was possible to visit only one other city, Nampula, in carrying out this study, to compare the public transport requirements and operating environment with those of Maputo. It became apparent from that visit and from general discussion, that although the scale may be smaller, the

conditions and problems are similar throughout Mozambique, and in broad terms the transport policy and recommendations appropriate to Maputo will also be relevant in other cities.

Municipal governments must have the primary role in planning and regulating public transport services in all cities; this involvement will ensure that local variations are taken into account within a common framework.

8. Next Steps

Achievement of the vision must be a gradual process, and it is important that the program be carefully planned and that decisions be made only after careful consideration of their implications. All parties concerned must be fully involved, with consultation at every stage. The following actions should be taken immediately:

- Improve enforcement of regulations (government)
- Encourage owners to form into cooperatives or companies (FEMATRO)
- Encourage the use of larger buses (government, municipalities, and FEMATRO)
- Review of route network (municipalities)
- Review of fare structure and levels (municipalities and FEMATRO)
- Review the position of the publicly owned bus companies (government)
- Pilot project—demonstrate concessions on selected routes (government, municipalities, and FEMATRO)
- Draft and finalize a Public Transport Master Plan (municipalities)
- Clarify public transport policy (government)
- Create urban and national transport authorities (government)
- Strengthen capacity (government, municipalities and FEMATRO)

Some of these processes have already commenced.

IMPROVE ENFORCEMENT OF REGULATIONS

If it is not possible to improve the current standards of enforcement, the effect of changes in other aspects of the operation will be minimal. Enforcement alone, however, will worsen the situation, and cannot be regarded as an adequate short-term measure. Current enforcement procedures must be examined and the responsibilities of the agencies involved rationalized.

ENCOURAGE OWNERS TO FORM COOPERATIVES OR COMPANIES

Eventually every route must be operated by a single operator if services are to be managed effectively. Each operator should be a formal company and four to six companies should serve Greater Maputo. Creating such companies without creating problems for owners and operators will be difficult. Although cooperatives and companies have been formed quickly in some countries, notably in South America, this has often been at the expense of owners. A gradual process should be adopted for Mozambique. First, current owners should be encouraged to form cooperatives, with each owner retaining ownership of their vehicles, which would be controlled

by managers appointed by the cooperative. The associations that manage the routes should be used whenever possible as the nuclei of the new cooperatives.

It will be necessary to set up the requisite management structures, establish operating systems and procedures, and provide the required facilities and equipment. The operating unit (whether a cooperative or company) will have to appoint a management team to ensure that services are properly managed and vehicles properly maintained, and that drivers comply with regulations. In particular, the management team must ensure that services follow the schedules.

ENCOURAGE USE OF LARGER BUSES

Also with immediate effect, owners should be encouraged to replace their vehicles with larger buses. This process has already commenced, but only 25- and 30-seaters are being purchased. FEMATRO has arranged with Millennium BIM for financing for 87 30-seat buses (a condition of the deal is that the buses carry advertising for the bank); the Maputo and Matola Municipalities will in future license no buses with fewer than 25 seats. On the main routes, buses carrying up to 100 passengers should be purchased. Owners with several 15-seaters must be persuaded to replace these with fewer large buses, although the cost of new large buses compared with second-hand small buses will be discouraging. Government should help by facilitating credit.

REVIEW ROUTE NETWORK

The present route structure is inefficient and needs review, and this should be done before routes are offered for concession. First it will be necessary to decide on the broad nature of the route network (for example whether a trunk-and-feeder approach is to be adopted or if most routes will operate from outer points to the city center, converging on a common corridor). Initially a broad-brush approach can be adopted, because when the new system becomes established passengers' travel habits are likely to change, constant fine-tuning and updating will be required. Minor changes can be made during the term of a concession and major changes may be made when concessions are renewed.

The exercise should include an assessment of the number and type of vehicle suited to each route, taking into account factors such as road conditions and demand. Some routes should be operated by small buses to begin with to use existing vehicles, but these should be replaced progressively by vehicles most suited to the route in question. This may necessitate some buses being moved from route to route, so the system must be flexible. This supports the argument for a large unit operating a variety of routes.

REVIEW FARE STRUCTURE AND LEVELS

A review of the fare structure and fare levels must be carried out as a matter of urgency. It is important to ensure that fares are adequate to cover operating costs, and to do this, it is first necessary to establish what these costs are. Costs for large buses can be determined from an analysis of TPM's operating costs. Those for chapa operators will be more difficult to ascertain because of the informal nature of their accounting, although actual spending does not reflect what should be spent. For example virtually nothing is spent on preventive maintenance, and because of this the incidence of major repairs is probably higher than it should be. Costs must be

determined by means of a detailed survey of owners and the workshops used for maintaining their vehicles.

Taking into account the government's policy on subsidy, the amount of fare revenue required can then be calculated. It must be decided how this total revenue is to be obtained, for example by means of a flat fare, zonal fares, or distance-graduated fares.

REVIEW POSITION OF PUBLICLY OWNED BUS COMPANIES

An immediate requirement is the need to decide on the future of the publicly owned bus companies. A working group, comprising representatives of other organizations including LAM, has already been established to look into this. The companies have some useful assets, principally vehicles, depots and workshop facilities, as well as valuable expertise in the form of existing management, and it is important that these can be deployed in the most effective manner to the maximum benefit of all parties.

PILOT PROJECT—DEMONSTRATE CONCESSIONS ON SELECTED ROUTES

It is strongly recommended that the concept of route concessions be demonstrated and tested by a pilot project on a small number of routes in Maputo. This would provide an opportunity for owners and users to see the benefits of the concept and for the regulatory authorities to test and amend where necessary, the regulations and procedures required to manage the concessions.

The private and public sectors, local authorities, and police will have to cooperate to ensure that the project works. It may be useful to consider at least two pilots, one operated by the public sector and one by the private sector. The concessions should include trunk and feeder routes, with the latter preferably operated under separate concessions. Some of the buses purchased by the government for the use of public sector operators could perhaps be made available to a private sector operator for one of the trunk routes.

The Maputo Municipality is already proposing to start awarding concessions on the basis of the existing route structure, starting with profitable routes. It would be preferable to review the route network before awarding any concessions, but an initial review to identify suitable trunk and feeder routes for a pilot project need not take much time. The project must be planned, implemented, and monitored carefully, and all regulations on the pilot routes must be fully and properly enforced. Some regulations and procedures probably will have to be waived or amended in respect of the selected routes.

TRANSPORT MASTER PLAN FOR MAPUTO

In the longer term a comprehensive transport master plan will be required for the greater Maputo area, to ensure that future transport requirements met. This should embrace all modes of transport—passenger and freight, public and private, land and water. The plan should commence with a study to identify future passenger and freight transport requirements, taking into account forecast population and income trends and other factors such as increased ownership of private cars. All public transport options should be considered, including bus rapid transit, light and

heavy rail systems, and water transport to determine the most suitable combination of modes to meet future requirements. The plan should also include the road system and alternative means of controlling use of the roads by public and private transport.

Several studies have already been carried out on various aspects of transport in Maputo, and these should be reviewed so that their findings and recommendations can be coordinated and where appropriate, incorporated into the master plan.

CLARIFY PUBLIC TRANSPORT POLICY

Transport policy lacks clarity and is not consistently applied. The government should identify and examine the policy objectives and the implications of each in terms of their benefits and costs, and what is affordable and achievable. Where necessary, legislation and regulations should be amended to conform with the policy. The role of public transport is primarily to provide a safe and efficient transport service at minimal cost, and policy should be aimed at creating an environment in which efficient private sector operators can flourish and in which organizations will tend naturally to reach optimum structure and size.

CREATE URBAN AND NATIONAL TRANSPORT AUTHORITIES

The government should establish urban transport authorities to assume responsibility for regulating local transport services within cities and long-distance services throughout Mozambique. This is particularly important where a contiguous urban area is made up of more than one municipality; in such cases all municipalities concerned should be represented on the authority.

BUILD CAPACITY

An essential part of the implementation process will be capacity building in both public and private sectors. A lack of expertise and experience in all areas contributes to the present problems, and unless this is rectified, the recommended measures will fail. The government needs greater planning, monitoring and enforcement capabilities in particular. In the private sector there is a shortage of general management expertise, and transport management skills.

This shortcoming must be addressed through the appointment of advisers to provide temporary assistance and on-the-job training, internal and external training programs, and technical assistance, particularly in the early stages of implementation. Such expertise as is available, for example in the public sector bus companies, should be used to the fullest extent.

POTENTIAL BENEFITS

These recommendations, if implemented, will benefit all concerned. Public transport users will benefit from safer, more comfortable, convenient, and efficient services at affordable fares. Other road users will benefit from better road and traffic conditions. Transport operators will earn adequate returns on their investment without the risk of being penalized for infringing regulations. And the government will benefit from a substantial reduction, if not complete elimination, of the need to subsidize road transport services.

Appendix. Meetings Held

Meetings were held with the following stakeholders:

- Rogerio Manuel, President, FEMATRO
- Dr Olivio Pinto, National Director of Transport, Ministry of Transport
- Carlos Vasco Sitoe, Corporate Planning and It Manager, LAM (Mozambique Air Lines)
- Ricardo Daniel, Railway Director, CFM South
- Rolando Wane, Economist, International Monetary Fund
- Simiao Mazoi, Commercial Director, Navique
- Pedro Mangue, Operations Director, Navique
- Joao Langa, Town Councilor and Chief of Transport Department, Matola Municipal Council
- Victor Fonseca, Director of Infrastructure and Transport Department, Maputo Municipal Council
- Prof. Antonio Matos, Post-Graduate in Urban Transport, Eduardo Mondlane University
- Abdula Tarmamade Abdula, President, Road Transport Association of Nampula
- Mr Machava, General Manager, TPM, Maputo
- Absalao Siveira, General Manager, TPN, Nampula
- Mr Vasconcelos, President, ASTRA, Nampula