

# MFM Project

## REVIEW AND ASSESSMENT OF PUBLIC TRANSPORT IN TERNOPII

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## 1. INTRODUCTION

In response to the request of the city of Ternopil, USAID is providing technical assistance to the city's public transportation sector through the Research Triangle Institute (RTI). This report summarizes the findings of Olgun Ersenkal, transport specialist and Zeki Avci, financial analyst, during their visit to the city over the period from February 22 to March 4, 1995.

The purpose of this assignment was to:

- 1) review the operation of the electric bus system;
- 2) assess the management and administration of the system;
- 3) determine what can be done to improve operational efficiencies;
- 4) reduce costs, and to increase revenues;
- 5) review the public transportation needs and services in order to recommend the optimal mix of transportation modes;
- 6) consider future demands; and,
- 7) make recommendations on how to reduce the overall subsidies to public transportation by the City.

The data and information upon which the report is based were obtained through a series of meetings with various departments of the city, the management of transport companies and through field observations.

While in Ternopil, the consultants met with senior officials and staff of the Department of Transport and Communication, the Department of Finance, the Economic Department, Electric Bus Company "Ternopilelectrotrans" and Ternopil Bus Garage to identify issues to be examined and to discuss prevailing plans and strategies for municipal transport in the city.

At the conclusion of the visit, the consultants made a presentation on their findings and recommendations to the Mayor and the City officials and Dr. Paul Hoover, RTI Resident Advisor (MFP).

In light of the foregoing tasks, the consultants have prepared this report which summarizes the findings and recommendations concerning the public transport system in Ternopil and provides policy alternatives for optimizing public transportation delivery and reducing the overall subsidy level. The report also covers next steps and what needs to be done in immediate future in terms of technical assistance, training, and financial support.

The consultants would like to express their appreciation to the officials and the staff of the Department of Transport and Communication, the Department of Finance of the City, the Economic Department, the Electric Bus Company, Ternopil Bus Garages, and the management and the staff of the RTI field office in Ternopil for the assistance and support provided during their visit.

## **2.0 INSTITUTIONAL SETTING**

### **2.1 Institutional Setting**

In Ternopil, motorized bus transport, including intra and inter-city bus service, is owned and controlled by the oblast, while the city owns and operates the electric bus network.

### **2.2 City Administration and Provision of Regulatory Functions**

The administration and management of public transport services for the City of Ternopil resides in the Office of the Deputy Major on Housing & Communal Property, Construction and Architectural Problems. The Department of Transport and Communication, headed by Mr. Stepan V. Fronts, has the municipal charge and responsibility for managing and monitoring the services delivered by each of the public transport companies.

The director of the City's Department Transport and Communication coordinates the activities of the operating company, monitors the level of service provided each day, and acts as the intermediary with all of the service providers. This office's duties and responsibilities inter alia are as follows:

- Design routes and determine schedules and level of service
- Provide dispatching services and monitor, on a daily basis, the on-street service delivery by the bus and the electric bus companies
- Validate data submitted by the various companies.
- Maintain the primary point of contact between the City and the managers and directors of the various public transport service providers.
- Handle passenger and customer complaints, and respond to emergency situations such as severe accidents and service disruptions.
- Coordinate supplemental modal services in case of break-downs, power outages, or other related events.
- Develop, coordinate, and manage the emergency plan for public transport services.
- Advise the mayor and the department heads on policy issues such as fare policy, service contracts, subsidy levels, and other public transport issues.
- Review the operating budgets provided by the transport companies and submit for approval to the Office of Mayor .
- Review request for capital funds provided by the transport companies and submit for approval to the Office of Mayor .
- Review requests for operating licenses from private operators and issue such licenses when appropriate.

### **2.3 Transport Enterprises and Provision of Service**

Public transportation services are provided via service contracts between the City and the two transport companies. The contracts are cost plus fixed fee contracts for a specified level of service determined by the City. The operating companies are responsible for fare collection and an agreed amount of fare revenue. In addition, the operating companies provide the city with an annual operating budget updated on a monthly basis. This budget is reviewed and approved by the City. Based on this approved budget, the city agrees to pay the difference between the cost of service and the revenue. Although there are some disincentives for the transport companies not to enforce fare collection, this arrangement offers no incentives to the companies for efficiency, cost reductions, or increased or higher quality of service. The actual service levels delivered by the transport enterprises are monitored through the Dispatching Unit of the Department of Transport and Communication. Each enterprise is responsible for route service, operational service, and maintenance service for their respective companies. The two companies providing bus, and Electric bus services are listed below:

1. Ternopilelectrotrans (Electrical Bus Company)
2. Ternopil Bus Garage

The public transportation fleet operating in the City totals 202 vehicles, 100 buses for urban and suburban routes and 102 electric buses.

### **2.4 Other Providers of Transport Services**

In addition to the bus and electric bus service, the Taxi Garage with 100 taxis and 15 minibuses, and about 200 privately owned taxis provide service in the city. Moreover, there are 200 buses belonging to the industrial enterprises, used for transporting their workers. Further, there are about 23,000 privately owned cars in the city. However, majority of the private vehicles are not being used due to high operating costs and insufficient incomes.

### **2.5 Comments on the Organizational Setting**

The municipal officials responsible for public transport are knowledgeable, dedicated and committed to providing a safe, efficient, and reliable public transport system for the citizens of Ternopil. However, the Department of Transport and Communication in addition to its regulatory responsibilities, appears to share some of the operational functions with the operating entities. The consultants believe that efficiency and better management can be achieved if the Department of Transport and Communication is to be responsible solely for regulatory functions.

### **3.0 DEMAND AND SUPPLY OF PUBLIC TRANSPORTATION TERNOPIL**

#### **3.1 An Overview**

Ternopil, a city of 230,000 people, is located in the western part of the Ukraine close to the Polish border. The City's population growth is presented below. From 1960 and until 1988 the population increased at a rapid rate. During the last 7 years, however the City experienced a decline in the rate of population growth.

**Table 3.1  
Population Growth  
Ternopil 1960-1994**

<b>Year</b>	<b>Population</b>
1960	51,600
1970	84,298
1980	146,800
1985	179,676
1986	187,076
1987	198,175
1988	201,376
1989	202,659
1990	210,255
1991	216,300
1992	222,754
1994	229,954

Ternopil offers 120,000 jobs, of which 10,000 are taken by persons living outside of the city. It should be noted, however that the majority of the enterprises operating in Ternopil are in the process of restructuring, and not operating at full capacity. Consultants were not able to obtain information on actual number of full time employees. There are 20,000 retired persons and 40,000 students attending primary, and secondary schools, and higher education institutions in the city.

The average monthly salary is 2,500,000 kuopons. The majority of the population lives below subsistence level and receives foodstuff from relatives living in the rural areas. The consultants were also informed that there is some migration from the city to the rural areas.

Geographically, the City is very compact and fits within a radius of 4-5 km's. Four major districts surround the central city (downtown): Druzkba, Novy Svit, Sonyachny and Shidny. The compact layout of the city, combined with the present lack of private vehicles on the roads, allows efficient provision of public transport services without causing congestion.

However, a lack of funds for purchasing spare parts and replacement units during the last several years is largely responsible for the decline in the quality and level of public transport services in Ternopil causing long waiting times, and excessive crowding.

### 3.2 Current Demand for Public Transport

Statistics relating to the demand for public transport in Ternopil in 1994 are presented in Table 3.2. The figures below reflect the data provided to the consultants by the Department Transport and Communication.

**Table 3.2**  
**Demand for Public Transport**  
**Ternopil, 1994**

	Bus	Trolley
<b>Trips/Year(millions)</b>	14.6	35.7
<b>Passenger Trips/Day(000)</b>	40	100
<b>Average Trip distance in Km.</b>	4.5	2.3
<b>Passenger Km's/Day(000)</b>	180	225
<b>Trips/Year/Inhabitant</b>	64	156

Source: Department of Transport and Communication, City of Ternopil

The key operating demand statistics presented in the above table appear to be very low compared to other cities with similar characteristics, indicating a considerable unmet demand. However, due to compact layout of the city, many residents walk to work, schools and shopping. In addition, considering that some of the enterprises transport their own workers, the demand for public transport presented above may be reasonable.

As a result of closing of three out of four major industrial complexes in the City, the demand for public transport over the past several years dropped to a daily average of 140,000 passenger trips. Riders using the system are workers, pensioners and students.

Due to the 48% availability rate of electric buses, the lowest in the Ukraine, during peak hours and most of the mid-day period, electric buses, and intra-city buses are crowded. As expected, there is a substantial drop in ridership after the peak hours.

The existing electric bus and oblast owned bus fleets are far from able to meet the current demand. Overcrowded bus stops and buses are daily phenomena. To remedy this situation and to ease the peak-hour overloads, industrial enterprises and schools start at different hours.

The average monthly wage in the city of Ternopil is approximately 2,500,000 Krbs. or about \$17 US at the current exchange rate. Based on the present average wages and transport fares, it is estimated that households spend 9 -10% of their income on public transport. This level of spending on public transport is as high as that of Western European families.

The existence of 23,000 private cars has little impact on demand patterns. These cars are not widely used for daily transportation even on the weekends. It is simply too expensive to drive a private car. The consultants do not expect this trend to change drastically in the near future.

### **3.3 Future Demand:**

Presently, the City of Ternopil is undergoing the same economic and social transformation as the rest of the country. As in other parts of the Ukraine, Russia and Eastern European countries, there is growing middle class whose preferences for public transport as their primary mode of travel may change. In some Eastern European countries, ridership has dropped as much as 30 percent over the last few years. Given the current low levels of demand for public transport in Ternopil, the consultants do not anticipate any further drop in the future. However, Ternopil will need to implement a number of measures to improve the quality, standards and level of transport services. Major investments will also be required in equipment, technical and managerial training, planning, scheduling systems, physical plants, and human resources. This is especially important now that a push to increase operating revenues is being undertaken

### **3.4 Supply of Public Transport in Ternopil**

Public transport service in Ternopil is provided by the City and the Oblast. The City operates the Electric buses serving 70% of the total demand and covering 80% of the land area while the Oblast operated motorized buses provides service to 30%.

#### **3.4.1 Motorized Buses**

The Oblast operates the system through its Bus Garage. The Bus Garage also provides intercity and international passenger transport services. The municipal bus service, provided under a cost plus contract is subsidized from the City budget. The management of the Bus Garage reports to the City's Department of Transport and Communication.

There are 100 motorized buses allocated for municipal transport of which 55 serve on 19 routes primarily connecting industrial areas to the residential districts. About 15 out of 55 buses provide express service. The fleet make-up of the motorized bus system is as follows:

**Table 3.3**  
**Distribution of the Fleet by Type**  
**Ternopil Bus Company**

Bus Type	Percentage of Fleet
Ikarus (200, 280)	40%
Liaz	30%
Laz	30%

Source: Ternopil Bus Company

Approximately, only 2% of the fleet is 2-3 years of age while 18% of the fleet is 3-5 and 80 % is 8 to 12 years old. The Bus Garage employs 800 persons of which 380 are responsible for the municipal operations.

### **3.4.2 Electric Bus System**

Ternopil Electric Bus Authority was established November 1, 1975. and started operation on December 31, 1975. In this city the electric bus system serves an approximate area of 30 sq km's, 90% of the city's geographic area, and an estimated 70 % of the city's residents make use of the system.

Ten Electric bus routes comprise 70 km of power lines. Eight substations with a total capacity of 14,500 KVs supply power for the electric bus system. Out of 102 electric buses, 50-55 operate regularly, averaging five on each route. In the electric bus garage there are 102 electric buses most of which are in total disrepair due to primarily lack spare parts. The 48% availability rate of electric buses is the lowest in Ukraine. Therefore, the most urgent and immediate need is to provide spare parts to increase the vehicle availability from 55 to about 70 vehicles daily.

The Electric bus system route lengths range from 10 to 16 kilometers per route. Vehicles operate at an average speed of 16 Km/hour.

### **3.5 Utilization of the Public Transport Fleet**

Tables 3.4 and 3.5 below provide information on utilization of the public transport fleet in Ternopil. The aggregate supply of vehicles in Ternopil is extremely low considering the city's population and levels of trip demand. Field observations by the consultants during the AM peak, the base period, and PM peak revealed overcrowding on both buses and Electric buses. It is readily accepted by all transport officials in Ternopil that the fleet utilization rates are very high and that the supply of vehicles must be increased.

Although, actual peak period and maximum load point data was not available, estimates were provided by various transport enterprises and the Department of Transport and Communication. Drawing on these estimates, fleet utilization in Ternopil was analyzed. As presented in Table 3.5, the peak(static) utilization and average(dynamic) utilization ratios for all modes of public transport indicate overcrowding during the typical working day.

In order to reduce overcrowding and delays, and to bring the level of service to an acceptable standard, it is estimated that 60 midi-buses are needed. This requires, at a minimum, an investment of 20 billion rubles. (\$1,500,000 US) Currently, the electric bus company plans to add ten new electric buses to the fleet during 1995.

**Table 3.4**  
**Key Utilization & Operating Statistics**  
**Ternopil, 1994**

	<b>Bus</b>	<b>Electric bus</b>
<b>Passenger Trips/Day\1</b>	40,000	98,000
<b>Average Trip Distance in Km.</b>	4,5	2.3
<b>Passenger Kms/Day</b>	180,000	225,000
<b>Number of Route Lines</b>	19	10
<b>Number of Vehicles in Fleet</b>	100	102
<b>Vehicles Available Per Day</b>	55	50
<b>Availability rate</b>	55%	49%
<b>Vehicles Trips/Day</b>	1,870	2,400
<b>Total Vehicle Kms/Day</b>	8,000	10,000
<b>Average Breakdowns/Day</b>	20	15
<b>Vehicles in Maintenance/Day</b>	30	20
<b>Number of Employees</b>	380	550
<b>Employees Per Vehicle</b>	3.8	5.5
<b>Employees/Operating Vehicle</b>	7.0	10.0

Source: Department of Transport and Communication, City of Ternopil

### 3.6 Maintenance Procedures and Physical Plants

The bus and electric bus enterprises all follow standard maintenance procedures. The critical deficiency in the maintenance programs is the lack of spare parts. Each of the enterprises must hand-tool and manufacture some critical spare parts because funds for their purchase spare parts are not available. While mechanics appear to be adequately trained and knowledgeable, they must work with a shortage of decent tools and spare parts. As in other parts in the Ukraine and Russia, each year a few vehicles must be “cannibalized” for spare parts and the fleets are continually shrinking. Further, the bus garage in Ternopil is in disrepair and requires either modernization or replacement.

Solving the spare parts problem and increasing the availability of modern tools and improving the facilities at the bus depot would contribute significantly to the supply of vehicles on the street. Giving high priority to these items would vastly upgrade the quantity and quality of public transport in Ternopil.

**Table 3.5**  
**Vehicle Utilization & Ridership**  
**Ternopil Municipal Passenger Transport System**  
**1994 Estimates**

	Bus	Electric Bus
1 Passenger trips per working day	40,000	98,000
2 Passenger trips per peak hour	12,000	20,000
3 Passengers at the most busy part of the lines	9,000	15,000
4 Average capacity per vehicle @ 8 pass./sqm	100	110
5 Actual number of vehicles during peak	60	55
6 Capacity per peak hour	6,000	6,050
 Static utilization ratio (3/6)	 <b>150.00%</b>	 <b>247.93%</b>
 7 Average trip distance per passenger	 5	 3
8 Average operational speed (km/hr)	20	16
9 Total vehicle kilometers per peak hour (8*5)	1,200	880
10 Capacity-kilometers at 8 pass./sqm (9*4)	120,000	96,800
11 Passenger kilometers per peak hour(7*2)	54,000	54,000
 Dynamic utilization ratio (11/10)	 <b>45.00%</b>	 <b>55.79%</b>

Note: Utilization ratios are based on urban trips only. Data for utilization calculations are estimates provided by the transit companies.

### **3.7 Fleet Availability and Operational Analysis**

The fleet availability rates for bus and electric buses, are 55% and 50% respectively, extremely low by western standards. The rates reflect the overcrowded conditions and low levels of service on all modes and further indicate a myriad of problems facing the public transport sector in Ternopil including:

- Poor overall quality of rolling stock (vehicles)
- Shortage of spare parts
- Inadequate mechanical tools and repair facilities
- Lack of funds to purchase new, high quality vehicles
- Lack of familiarity with modern management techniques
- Lack of contract management expertise in city departments
- Disincentives of cost-plus contract agreements

Available time and resources did not permit a detailed analysis of operations. However, the consultants can offer several comments on public transport, based on field observations and limited analysis of available data.

- The number of employees per vehicle in both the electric and motorized bus companies is very high, unnecessarily driving up operating costs.
- The equipment is of poor quality, and inefficient
- The routes, operating schedules and vehicle utilization must be examined further to improve efficiency. The bus fleet should include more small and medium size vehicles.

## **4.0 FINANCIAL ANALYSIS**

### **4.1 The Electric Bus Company**

A rapid increase in input prices, insufficient funds, operational inefficiencies and lack of spare parts inventory has led to the financial deterioration of transport enterprises in recent years.

Low cost recovery ratio emanating from low fares, heavy dependence on subsidies, inability to buy spare parts necessary to maintain a decent fleet are most common and concurrent themes at the "Ternopilelectrotrans", i.e., the Electric Bus Depot.

In compliance with the agreement between the Electric bus Company and the City, the electric bus Company prepares a monthly budget, which is submitted for a review to the Department of Transport and Communication. After the approval of the Department of Transport and Communications funds are disbursed by the City. Monthly estimates are based on the previous month's actual cost figures. During the course of the month several advances are usually made toward the submitted budget. Final settlement is made according to the actual figures at the end of the month.

#### **4.1.1 Revenues**

Fare revenues are the major source of income. Currently, a single full fare is 5,000 Krbs. for all transport modes. After adjusting for monthly passes and other discounted fares, the average fare is estimated as 2,160 Krbs. The new fares for the electric buses and motorized buses were set to achieve 30% cost/recovery ratio, only later and in compliance with the IMF agreement, to be readjusted to achieve 40% and 60% cost recovery, respectively.

As can be seen from the Table 4.1, fare revenues increased significantly in the fourth quarter of 1994 due to a fare adjustment following a sharp increase in electricity price. Similar increases in fare revenues are anticipated for the foreseeable future.

About 25% of the population is exempt from paying fares while an estimated 25% of the systems users evade fares.

#### **4.1.2 Expenses**

Cost per passenger in Ternopil during the first 9 months of 1994 was the lowest in the country. The principal cost components for the Electric Bus Company are electricity, and wages and charges on wages combined, each making up 29% and 28% of the total operating cost respectively in 1994. However, for 1995 electricity cost is projected to increase to 36.9% while wages and charges on wages are projected to make up 11.9% of the total operating cost. There are 550 employees at the Electric Bus Garage, about 6 employees per bus which is quite high by any standard.

Considerable increases in the cost of water and heating, tires, and repair expenses during the last two months of 1994 have been experienced due to rate adjustments and price hikes.

Repairs include small, extensive, and capital repairs. Together they make up about 12% of the total operating cost, an acceptable percentage by industry standards. Water and heating, and tires, as seen in the above table, make up about 9% and 8% of the total operating cost, respectively.

Other expenses include bonuses, telephone, postage, interest on loans, etc. It should be noted that a 28% VAT is included in the cost of materials and equipment.

Quarterly revenues and expenses for the year of 1994 are presented below.

**Table 4.1**  
**Quarterly Revenues and Expenses**  
**Ternopil Electric Bus Company, 1994**

Months	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
Revenues	517,330	532,453	596,831	4,056,065	5,702,680
<b>Total Operating Cost (Mil.)</b>	<b>4,058,109</b>	<b>4,736,932</b>	<b>6,249,978</b>	<b>19,437,194</b>	<b>34,482,213</b>
<b>Operating Costs:</b>					
Electricity	1,211,437	1,312,783	1,329,165	6,016,318	9,869,703
Water and Heating	218,604	39,974	86,398	2,711,985	3,056,961
Fuel-Lubrication	47,613	70,420	99,768	250,328	468,129
Tires	181,952	142,660	328,701	2,004,473	2,657,786
Depreciation	130,402	159,720	241,904	336,990	869,016
Wages	653,293	768,474	1,507,644	2,480,466	5,409,877
Charges	526,551	629,878	1,010,087	1,806,102	3,972,618
Regular Repair	141,840	268,768	262,854	577,387	1,250,849
Extensive Repair	28,206	45,851	59,720	364,421	498,198
Capital Repair	261,050	350,634	230,468	1,520,897	2,363,049
Materials, Equipment(incl.V.A.T.)	454,368	513,853	374,296	407,045	1,749,562
Maintenance, Power Lines, etc	8,456	308,310	87,365	149,238	553,369
Other Expenses	185,030	109,184	588,570	673,042	1,555,826
Inno. Fund, Labor Pro. Road Main.	9,312	16,428	43,040	138,502	207,282
<b>Total subsidies</b>	<b>4,420,000</b>	<b>9,500,000</b>	<b>10,100,000</b>	<b>11,800,000</b>	<b>35,820,000</b>
Subsidies for Operating Cost					27,579,000
Subsidies for Capital Expenditures					8,241,000

Source: Ternopil Electric Bus Company

### 4.1.3 Profits and their Allocation

A profit margin of about 20% is added to the total operating costs. These profits are distributed at the discretion of the company for various purposes. In 1994, for example, workers received an additional remuneration of 1,916 million Krbs. Through additional wages and wage bonuses. Another large portion of the profit, however 2,109 million Krbs was spent on purchasing facilities and equipment. An additional, 1,369 mil. Krbs. was allocated for housing and other lodging facilities.

The breakdown of the profit amount is as follows:

**Table 4.2**  
**Allocation of Profits, Ternopil Electric Bus Company, 1994**  
**(in 000's Krbs)**

<b>Wages</b>	1,826,000	1,826,000	31%
<b>Workers</b>	1,512,000		
<b>Clerks</b>	314,000		
<b>Contingencies</b>	101,000	101,000	2%
<b>Workers</b>	89,000		
<b>Clerks</b>	12,000		
<b>Wage Bonus</b>	91,000	91,000	2%
<b>Health Insurance</b>	32,000	32,000	1%
<b>Workers</b>	24,000		
<b>Clerks</b>	8,000		
<b>Vacation</b>	64,000	64,000	1%
<b>Workers</b>	59,000		
<b>Clerks</b>	5,000		
<b>Social-cultural fund</b>	170,000	170,000	3%
<b>Nutrition</b>	105,000	105,000	2%
<b>Housing</b>	1,369,000	1,369,000	23%
<b>Purchasing equipment and facilities</b>	2,109,000	2,109,000	36%
<b>Miscellaneous</b>	2,000	2,000	0%
<b>TOTAL</b>		5,869,000	

Source: Ternopil Electric Bus Company

#### **4.1.4 Projected Revenues and Expenses, 1995**

Projected income and expenses for 1995 are presented below. Please note that the cost components used in projections for 1995 are inflation adjusted.

In 1995, fare revenues are projected to be 34,558 mil. Krbs., nearly a 500% increase from 1994. Projections are based on scheduled fare increases and targeted cost recovery ratios. It should be noted that these revenue projections are based on a fare of 2,000 Krbs. During consultants visit to Ternopil, the regular fare was raised to 5,000 Krbs. Thus, the total projected revenues from fares have already deviated from the levels planned.

Total operating cost for 1995 is also much higher than 1994, an increase over 400%.

Estimated total cost for 1995 is 152,239 million Krbs. The share of electricity in the total operating cost for 1995 is 36.89% while wages and charges on wages make up 11.86%. The company anticipates profits to be 35132 million Krbs in 1995, 23% of the projected total operating cost.

**Table 4.3**  
**Projected Revenues and Expenses**  
**Ternopil Electric bus Company, 1995**

<b>REVENUE</b>	34,558
Other Revenue	0
<b>Total Revenue</b>	<b>34,558</b>
<b>EXPENSES</b>	
Wages	14,400
Benefits	7,488
Reserves for Holidays	1,440
Labor Protection	518
<b>TOTAL LABOR</b>	<b>23,846</b>
Electric Power	48,385
Ethly Gas	617
Gasoline	938
Diesel	100
Lube oil	234
<b>TOTAL Energy Lueb. Oil</b>	<b>50,274</b>
Tires	8,670
Daily Inspection	5,798
Weekly Inspection	3,684
Small Repairs	2,345
Extensive repairs	1,656
Capital Repairs	5,565
Cable Network Repair/Maintenance	645
Sub station Repair/Maintenance	1,054
<b>TOTAL Maintenance</b>	<b>20,747</b>
Heating and Water	10,443
Innovation Fund	432
Deductions for the Roads	518
subtotal	115,362
Other expenses	396
Depreciation	1,349
Enterprise Profit/Fee	35,132
<b>Total Cost</b>	<b>152,239</b>
<b>Required Subsidy</b>	<b>117,682</b>

Source: Ternopil Electric Bus Company

#### 4.2 Bus Company:

Although the review and assessment of the motorized bus operations in Ternopil, is not included in the scope of work under this task order, the consultants allocated a limited period of time to the bus operation . In examining estimated operating costs provided by the Bus Company for 1995, it was determined that the cost of fuel and lubricants together account for 48% of the total cost. Given the inefficient engines of the aging bus fleet, significant saving can be achieved by replacing the old buses with modern and efficient equipment. It is estimated that the savings on the energy cost alone could be as high as 14 billion Krbs a year.

**Table 4.4**  
**Estimated Operating Cost**  
**Ternopil Bus Company 1995**

Driver's Salaries	2,483	3%
Bonus for fare collection	392	1%
Charges on salaries	1,437	2%
Salaries(maintenance)	88	0%
Salaries(engineers)	74	0%
Salaries(cashiers)	4	0%
Charges	83	0%
Fuel	33,618	46%
Lubrication	1,390	2%
Tires	4,710	6%
Maintenance	5,561	8%
Depreciation	1,889	3%
Other expenses	9,017	12%
<b>Total</b>	<b>60,746</b>	<b>83%</b>
<b>Profit (20%)</b>	<b>12,149</b>	<b>17%</b>
<b>Total Operating Cost+Profit</b>	<b>72,895</b>	<b>100%</b>

Source: The Ternopil Bus Company and the Department of Transport and Communication, City of Ternopil

#### **4.6 Summary Remarks on Financial Analysis**

The main problems facing the transport sector in Ternopil are: low passenger trips, low fares, cost inefficiencies, low fleet availability rate.

To ease the financial hardship, non-fare revenue enhancement should be a goal while at the same time emphasizing cost reduction, efficiency, waste prevention, and retiring the portion of the fleet that is inoperable and beyond repair, etc.

In addition, with the purchase of more spare parts and increasing the number of electric buses in service, there will be a decline in overhead cost per vehicle and corresponding increase in overall revenues.

Monetary and fiscal policies are prescribed by the IMF for Ukrainian State Enterprises in order to reduce subsidies and accordingly ease the burden on the general budget and the balance of payments. To comply with these policies the City of Ternopil must take financial and policy measures and set new cost recovery ratios by July 1st. The targeted cost recovery ratio of 60% will be difficult to achieve, considering the limited options available for the city to reduce cost, and increase revenues. A major structural adjustment is required in order to make the transit system financially more independent and achieve cost recovery targets.

## 5.0 FARE POLICY AND SUBSIDIES

### 5.1 Fares

Fares are the single major source of revenue for the municipal transport operations in Ternopil. Only 20% of the operating cost, however, is recovered from fares. In order to increase the cost recovery, over the January 94 to February 95 period, single ticket fares were raised fifty fold. As result, it is estimated that families now have to spend as much as 10% of their income on public transport, a high proportion given the low incomes in Ternopil. According to a World Bank study, monthly transportation expenses as a percentage of income have risen from 1.5% to almost 8% in Poland during the last 5 years. In some Western European countries, with incomes substantially higher than the Ukraine, 10 to 15 % of income is spent on transportation. Thus, attention must now be given to the issue of affordability when setting future fares and the transportation needs of low income families must be addressed.

**Table 5.1**  
**Increase in Transport Fares**  
**Ternopil, January 1994-February 1995**

	<b>Single Ticket</b>	<b>Secondary Schools</b>	<b>Monthly Passes Higher Education</b>	<b>Adults Electric Bus</b>	<b>Adults Combined</b>
<b>Jan-94</b>	100	2500	3600	6000	7500
<b>Oct-94</b>	1000	25000	36000	60000	75000
<b>Dec-94</b>	2000	50000	70000	120000	150000
<b>Feb-95</b>	5000	125000	175000	300000	375000

Source: Ternopil Electric Bus Company

It is estimated that 25 % of the riders are evading fares. The enforcement of fares in Ternopil at the moment is very difficult because of crowded conditions on the buses. Successful enforcement requires ticket control prior to entrance onto the buses. However, to implement this method, at least 15 major stops throughout the city, must be redesigned to serve more vehicles at any given time and to avoid delays related to ticket control.

Bus and electric bus tickets are sold separately by each company through kiosks, agents, individuals and enterprises. A total of 150 persons are employed for selling tickets between the two companies.

An examination of information regarding the tickets sold during 1994 by the electric and motorized bus companies reveals fluctuations in ridership throughout the year. It is also important to note that significant amount of revenue is generated from selling single tickets. With better enforcement of fare collection, the fare revenues can be increased substantially, thus reducing the need for subsidies.

**Table 5.2**  
**Tickets Sales, Ternopil Bus company, 1994**

<b>MONTHS</b>	<b>Single Tickets</b>	<b>Monthly Pass Regular</b>	<b>Monthly Pass Students</b>	<b>Monthly Pass Pupils</b>
<b>January</b>	182,920	8,443	894	228
<b>February</b>	182,075	9,050	1,262	698
<b>March</b>	241,160	7,087	1,531	696
<b>April</b>	255,239	7,186	1,673	756
<b>May</b>	252,868	6,966	1,426	658
<b>June</b>	260,345	7,108	1,182	344
<b>July</b>	357,837	6,534	627	197
<b>August</b>	285,647	7,161	402	79
<b>September</b>	229,146	7,505	1,553	566
<b>October</b>	324,002	8,786	1,893	839
<b>November</b>	226,055	5,152	983	505
<b>December</b>	244,217	5,230	880	480
<b>TOTAL</b>	<b>3,041,511</b>	<b>86,208</b>	<b>14,306</b>	<b>6,046</b>
<b>Average</b>	<b>253,459</b>			
<b>Daily</b>	<b>8,333</b>	<b>14,368</b>	<b>2,384</b>	<b>1,008</b>

Source: Ternopil Bus Company

**Table 5.3**  
**Electric Bus Ticket Sales, Ternopil 1994**

Month	Single Ticket	Children A/E	Students A/E	Normal E	Normal A/E	Enterprises E
January	375,890	776	1,462	739	4,691	5,014
February	353,224	1101	2,308	732	5,435	10,326
March	436,074	1293	2,428	734	5,362	4,658
April	446,371	1253	2,564	734	6,081	4,135
May	486,848	1106	2,446	666	6,788	4,699
June	520,431	566	1,793	632	5,436	4,578
July	588,838	243	1,067	433	5,954	8,182
August	561,929	381	1,148	530	5,828	9,679
September	522,381	1418	3,091	643	5,930	8,166
October	642,385	1416	3,364	704	6,816	4,657
November	513,060	1219	2,365	546	2,614	8,703
December	471,870	1000	1,737	496	3,129	6,963
<b>TOTAL</b>	5,919,301	11,772	25,773	7,589	64,064	79,760
<b>Monthly Average</b>	493,275	981	2,148	632	5,339	6,647

A/E : Valid on Bus & electric bus

E : Valid only on Electric bus

Source: Ternopil Electric Bus Company

## 5.2 Subsidies

In 1994, the transit system received 35,820 mil. Krbs. in subsidies from the city budget. Of this amount 8,241 mil. Krbs. was spent on capital expenditures, and the rest on operating expenses. Capital expenditures included funds earmarked for the construction of the second electric bus garage, purchasing of electric buses, and purchasing of apartments for employees. Of this amount , 7,101 mil was spent for purchasing new electric buses.

Subsidies for the motorized bus system is also handled at the city level. In 1994 subsidies from the budget for this system amounted to 13.15 billion Krbs. and are estimated at 36 billion Krbs. in 1995.

Traditional dependence on subsidies, and a wide range of fare exemptions for more than 25% of the riders has created an unbearable burden on the City budget. The rise in fares is not likely to bring about much improvement in the financial picture, however because of a discernible decline in ridership in January 1995 from the January of the previous year. Efforts to decrease subsidies will have to include several other measures than simply raising fares.

Decreasing subsidies must involve drastic measures to lower cost, among which are reduction in staffing, increase in efficiency, redesign of routes, better management of the spare parts inventory and reduction in overhead through increased fleet size, etc.

One major option for improving service levels and quality without subsidies from the State, is the provision of upscale, slightly higher priced midibus service, which could operate at higher frequencies than electric buses. In Exhibit 1, monthly ridership, revenue and cost estimates are provided for a single midibus, using current information gathered in Ternopil. These estimates reveal that even based on very conservative ridership estimates, such operations would be profitable. Clearly, for such an operation to succeed, routes must be carefully planned, with buses properly scheduled and maintained.

However, cost reduction is not the sole prescription for solving the problem. In addition to controlling deficits and reducing the need for subsidies, transit revenues can also be increased by improvements in collection efficiency, generation of non-fare revenues through the sale of advertising space on motorized and electric buses, bus stops, tickets and route maps, and the leasing of commercial space at major transit stops.

Recently, parking, registration fees and various other measures to increase revenue were levied by the Ukrainian government. These fees and taxes are collected by the State Tax Agency, and pooled in an account from which funds are disbursed to various government entities including municipalities. Ukrainian cities have no authority to either levy or collect such revenues.

Transferring the responsibility and authority to levy and collect local taxes and fees and to issue municipal bonds, to local governments, would greatly reduce their dependence on state budgets and improve level and quality of services they provide.

## **6.0 RECOMMENDATIONS FOR IMPROVING PUBLIC TRANSPORT**

### **6.1 Recommendations**

The transportation system in Ternopil currently suffers from an insufficient number of vehicles, an aged fleet, a lack of funds to purchase spare parts and replace old vehicles. If this situation continues, transport capacity provided by the electric bus system will drop from its current level of 100,000 passengers/day to about 50,000 by the year 1997 (Exhibit 2). Clearly, this situation would adversely affect citizens confidence in their governments ability to provide basic services.

To maintain at least the its current level of service, the municipality is planning to purchase 10 new Ukrainian made electric buses this year. Additional buses must be purchased in the future to replace the aging fleet. Based on the age distribution of the existing fleet, a replacement schedule for the electric buses was prepared (Exhibit 3). In preparing this schedule average useful life of electric buses was assumed to be 15 years. If the old buses are replaced by the Ukrainian manufactured vehicles, the capital cost of this replacement program between 1995 and 2005 is estimated at \$3,000,000 US. Assuming that fares are maintained at the current level, it is the consultants' view that no major reduction in subsidies can be achieved by implementing this program.

Rather, improving the service level and reducing transport subsidies in Ternopil requires a new approach which includes the following actions.

- 1) The immediate purchase of spare parts increase the daily number of available electric buses from 50 to 70. This will increase the capacity by about 20%.
- 2) Replacement of the transportation fleet with more efficient vehicles. This is necessitated by the high cost of operation for motorized and electric buses (\$.28 US and \$.30 US per km respectively). In Exhibit 1, the operating cost for a midibus is estimated based on local costs. These estimates, prepared in collaboration with the Electric Bus Company and the Bus Garage, indicate that the total cost to operate a midibus is \$.12 US per km.

Replacing the existing electric bus fleet in part with motorized minibuses would reduce operating costs, provide a more flexible route design capability and increase frequency of service at a substantially reduced capital cost. In line with this approach, a replacement schedule (Exhibit 3) for electric buses and a purchasing program for the minibuses was prepared. A mixed fleet offers several advantages:

- ◆ Reduced operating and capital cost
- ◆ Reduced subsidy requirements
- ◆ Increased service capacities
- ◆ Improved service quality
- ◆ Reduced average vehicle age

These savings and impacts of the program on quality and level of service are presented below.

**Table 6.1**  
**Estimated Impacts of the Recommended Program**

<b>YEAR</b>	<b>TOTAL SUBSIDY REDUCTION ( USD)</b>	<b>TOTAL TRANSPORT CAPACITY (Passengertrips)</b>	<b>TROLLEY FLEET AGE (Years)</b>	<b>BUS FLEET AGE (Years)</b>
1995	257,000	97,350	10.75	0.00
1996	377,000	106,500	9.36	2.50
1997	711,000	99,900	10.50	3.00
1998	661,000	118,800	7.80	4.00
1999	661,000	118,800	8.43	5.00
2000	661,000	118,800	8.04	6.00
2001	386,000	123,400	8.44	7.00
2002	551,000	120,600	5.47	8.00
2003	771,000	117,800	6.76	9.00
2004	466,000	116,400	7.87	8.50
2005	466,000	115,000	8.15	7.83
<b>AVERAGE</b>	<b>542,545</b>	<b>113,941</b>	<b>8.32</b>	<b>5.53</b>

3) In addition to the above changes it is recommended that:

- ◆ Tickets sales for motorized and electric buses should be consolidated, and brought under one organization. Moreover, the contracting of ticket sales through kiosks and agents should be expanded to eliminate ticket related payroll costs.
- ◆ Ticket kiosks should be redesigned to allow for other commercial uses. A new multi-purpose design, would generate additional revenues for the municipality from rents and offer shopping convenience for the citizens as they wait for the buses at the stops.
- ◆ Maintenance services should be contracted out in order to generate some savings and also raise employee incomes.
- ◆ The option of privatizing or operational leasing some of the bus service should be considered, especially for international, inter-city and suburban routes.

- ◆ The 36-fare-exempt categories should be rationalized and reduced in order to increase the base of paying passengers thus increase revenues.
- ◆ An image building program should be implemented to include designing a logo, painting of buses using an identifiable color scheme, adopting a uniform style for drivers and other related items. The program would improve the image of public transport.
- ◆ High priority should be placed on the development of a performance monitoring and evaluation system to properly assess the operational needs and performance of each mode. It should also include the design of a traffic (passenger) monitoring program that will provide a basis for adjusting service requirements in the level of service provided. Such a system would also include a component to determine the cost relative to service quality and level of service provided by each contracting enterprise and provide a basis for the developing a better contract for services.
- ◆ Management, operations and maintenance, and administrative systems should be computerized and automated in order to improve efficiency, service levels and quality

## **6.2 Recommended Next Steps for USAID Assistance:**

It is anticipated that the proposed improvements would enhance the quality and level of transport service while reducing the subsidy burden on local governments. With such changes, it is estimated that subsidies can be reduced by a minimum of \$2-3 US per capita each year at the same time the level and quality of service can be improved. Based on these estimates for Ternopil, the average annual reduction in subsidies could be as high as \$500,000-600,000 US. These estimates, however, are preliminary in nature and should be viewed only as targets to be achieved. Nevertheless, they illustrate the significant opportunity for reducing transport subsidies.

It is in this context that the following activities should be considered for future USAID assistance in Ternopil and in any roll-out program in Ukraine.

- ◆ Provide support in the purchase of spare parts
- ◆ Develop the capacity to monitor the delivery of services provided by the two companies. A comprehensive traffic data collection and analysis system should be designed and implemented for measuring the performance and adequacy of service.
- ◆ Design of Capital Improvement Program (CIP) to be incorporated in the overall fiscal planning process. Presently, all of the existing fleets and physical plants need modernization.
- ◆ Develop financing strategies and identify funding sources for the Capital Improvement Program
- ◆ All of the administrative, accounting, management, technical services, and maintenance systems require computerization.

- ◆ A new route network should be designed and incorporate future expansion plans for motorized and electrical bus systems. In developing the new network, the city should determine the most appropriate mix of bus and electric bus service.
- ◆ Integrate the schedules of all modes of public transport in Ternopil, including the suburban service. This will optimize the resources of each mode, reduce travel and transfer times, and thus improve the overall quality of public transport services..

## **EXHIBIT 1**

### **FINANCIAL PROJECTIONS FOR A MIDIBUS BASED TRANSPORT OPERATION IN TERNOPIL**

The following assumptions were used in making the cost and revenue estimates.

#### **RIDERSHIP**

Based on existing levels of patronage, 800 single passenger trips were projected per midibus per day assuming a 16 hour operating period. for comparative analysis.

#### **VEHICLE KM PER YEAR**

Each midibus would average 100,000 km/year based on 16 hours a day and 330 days of operation a year.

#### **REVENUE**

Midibus fares will be set at 8000 Krbs per passenger trip.

In addition, to the revenue from fares, additional revenue from contract services is assumed to be generated in an amount equal to 10% of fare revenue.

#### **OPERATING EXPENSES**

##### **Administration**

Administration costs, including salaries for management and administration as well as rent and other expenses related to management of the operation, are estimated at 1.5 million Krbs per vehicle per month.

##### **Driver Salaries**

Salaries are assumed to be 7.5 million Krbs per month per driver. Assuming 2.5 drivers are assigned to each bus, a total of 18.750 million Krbs are allocated for salaries.

##### **Maintenance**

Daily checks will be performed by drivers , however, service and repairs would be performed by either the company or under a service contract with a private garage at an average cost of 30 million Krbs per vehicle per month.

##### **Tires**

Assuming a 30,000 km life and 4 sets of tires per vehicle per year, tire expenditures are estimated at 15 million Krbs per vehicle per month.

**Fuel and Lube**

Assuming 110,000 vehicle kms per year, and present prices of 34,000 Krbs per liter, fuel cost is estimated at 43.4 million Krbs.

**Insurance**

Insurance premiums are estimated at 3 million for each vehicle per month.

**OTHER REVENUE**

**Advertising Revenue**

Revenues of 3.750 million Rubles per month are assumed to be generated by the sale of advertising display space on buses.

**OTHER EXPENSES**

**Depreciation** Vehicles are assumed to be purchased at \$20,000 US each and a straight line five year depreciation schedule is assumed.

**Contingency**

An amount equal to 4% of total expenses is allocated for contingencies

**Taxes**

Revenue and cost estimates are presented in constant 1995 Krbs before taxes.

### Estimated Cashflows for a single Midibus, Ternopil (in 000's Krbs)

	Jan-95	Feb-95	Mar-95	Apr-95	May-95	Jun-95	Jul-95	Aug-95	Sep-95	Oct-95	Nov-95	Dec-95
<b>No of new vehicles</b>	1	1	1	1	1	1	1	1	1	1	1	1
<b>Passengertrips/Bus/Day</b>	800	800	800	800	800	800	800	800	800	800	800	800
<b>Cost/km</b>	18											
<b>Cost/km USD</b>	0.12											
<b>REVENUE</b>												
<b>Fares</b>	179,200	160,000	179,200	172,800	179,200	172,800	179,200	179,200	172,800	179,200	172,800	179,200
<b>Contract Services</b>	1,792	8,000	8,360	8,640	8,960	8,640	8,960	8,960	8,640	8,960	8,640	8,960
<b>Total Revenue</b>	180,992	168,000	188,160	181,440	188,160	181,440	188,160	188,160	181,440	188,160	181,440	188,160
	1,207											
<b>Less Expenses:</b>												
<b>General &amp; Administrative</b>	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
<b>Driver Salaries</b>	18,750	18,750	18,750	18,750	18,750	18,750	18,750	18,750	18,750	18,750	18,750	18,750
<b>Maintenance (Parts/Labor)</b>	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000
<b>Tires</b>	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000
<b>Fuel and Lube</b>	43,470	43,470	43,470	43,470	43,470	43,470	43,470	43,470	43,470	43,470	43,470	43,470
<b>Insurance</b>	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000
<b>Total Expenses</b>	111,720	111,720	111,720	111,720	111,720	111,720	111,720	111,720	111,720	111,720	111,720	111,720
<b>Operating Profit</b>	69,272	56,280	76,440	69,720	76,440	69,720	76,440	76,440	69,720	76,440	69,720	76,440
<b>Other Income</b>												
<b>Advertisement</b>	3,750	3,750	3,750	3,750	3,750	3,750	3,750	3,750	3,750	3,750	3,750	3,750
<b>Other Expenses</b>												
<b>Interest</b>	0	0	0	0	0	0	0	0	0	0	0	0
<b>Depreciation</b>	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000
<b>Contingency</b>	4,469	4,469	4,469	4,469	4,469	4,469	4,469	4,469	4,469	4,469	4,469	4,469
<b>Know-how/Management</b>	0	0	0	0	0	0	0	0	0	0	0	0
<b>Net Operating Profit/(Loss)</b>	18,553	5,561	25,721	19,001	25,721	19,001	25,721	25,721	19,001	25,721	19,001	25,721
<b>Loan Repayment</b>	0	0	0	0	0	0	0	0	0	0	0	0
<b>Net Cash-Flow</b>	18,553	5,561	25,721	19,001	25,721	19,001	25,721	25,721	19,001	25,721	19,001	25,721

**EXHIBIT II**  
**SCENARIO A : NO REPLACEMENT OF TROLLEY-BUSES**

	NO OF VEHICLES OF THIS AGE																	AVERAGE FLEET		TOTAL	IN SERVICE CAPACITY	
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	AGE	W/Off Purch.	RATIO		IN SERVIC	
1994	14				3	17				10		10	10	15	23		11.46		102	50.00%	96,900	
1995		14	-	-	-	3	17	-	-	-	10	-	10	10	15	-	10.75	23	79	50.00%	75,050	
1996			14	-	-	-	3	17	-	-	-	10	-	10	10	-	10.52	15	64	50.00%	60,800	
1997				14	-	-	-	3	17	-	-	-	10	-	10	-	10.50	10	54	50.00%	51,300	
1998					14	-	-	-	3	17	-	-	-	10	-	-	9.11	10	44	50.00%	41,800	
1999						14	-	-	-	3	17	-	-	-	5	-	10.64	5	39	50.00%	37,050	
2000							14	-	-	-	3	17	-	-	-	-	10.85		34	50.00%	32,300	
2001								14	-	-	-	3	17	-	-	-	11.85		34	50.00%	32,300	
2002									14	-	-	-	3	17	-	-	12.85		34	50.00%	32,300	
2003										14	-	-	-	3	17	-	12.53		34	50.00%	32,300	
2004											14	-	-	-	3	-	12.71	17	17	50.00%	16,150	
2005												14	-	-	-	-	13.00	3	14	50.00%	13,300	

**EXHIBIT III**

**SCENARIO B : REPLACEMENT SCHEDULE FOR TROLLEY-BUSES**

	NO OF VEHICLES OF THIS AGE																	FLEET AGE	W/OIT Purch.	TOTAL	IN SERVICE RATIO	CAPACITY IN SERVIC	OPERATING CAPITAL		TOTAL
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	SUBSIDIES USD						SUBSIDIES USD	SUBSIDIES USD	
1995	5	14	-	-	-	3	17	-	-	-	10	-	10	10	15	-	10.23	23	5	84	60.00%	95,760	875,000	275,000	1,150,000
1996	10	5	14	-	-	-	3	17	-	-	-	10	-	10	10	-	7.06	15	10	79	80.00%	120,080	875,000	550,000	1,425,000
1997	10	10	5	14	-	-	-	3	17	-	-	-	10	-	10	-	8.06	10	10	79	80.00%	120,080	875,000	550,000	1,425,060
1998	10	10	10	5	14	-	-	-	3	17	-	-	-	10	-	-	6.53	10	10	79	80.00%	120,080	875,000	550,000	1,425,000
1999	5	10	10	10	5	14	-	-	-	3	17	-	-	-	5	-	7.28	5	5	79	80.00%	120,080	875,000	275,000	1,150,000
2000	5	5	10	10	10	5	14	-	-	-	3	17	-	-	-	-	7.33		5	79	80.00%	120,080	875,000	275,000	1,150,000
2001		5	5	10	10	10	5	14	-	-	-	3	17	-	-	-	8.33			79	80.00%	120,080	875,000		875,000
2002	3		5	5	10	10	10	5	14	-	-	-	3	10	-	-	6.51		3	75	80.00%	114,000	875,000	165,000	1,040,000
2003	7	3		5	5	10	10	10	5	14	-	-	-	3	3	-	7.60	7	7	75	80.00%	114,000	875,000	385,000	1,260,000
2004	3	7	3		5	5	10	10	10	5	14	-	-	-	3	-	8.60	3	3	75	80.00%	114,000	875,000	165,000	1,040,000
2005	3	3	7	3		5	5	10	10	10	5	14	-	-	-	-	9.00	3	3	75	80.00%	114,000	875,000	165,000	1,040,000

**EXHIBIT IV A**  
**SCENARIO C : REPLACEMENT SCHEDULE FOR TROLLEY-BUSES**

	NO OF VEHICLES OF THIS AGE														FLEET			TOTAL	IN SERVICE RATIO	CAPACITY IN SERVIC	OPERATING SUBSIDIES USD	CAPITAL SUBSIDIES USD	TOTAL SUBSIDIES USD		
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	AGE							W/Oft Purch.	
1995	-	14	-	-	-	3	17	-	-	-	10	-	10	10	15	-	10.75	23	-	79	60.00%	82,950	788,000		788,000
1996	-	-	14	-	-	-	3	17	-	-	-	10	-	10	10	10	9.36	5	-	74	60.00%	77,700	788,000		788,000
1997	-	-	-	14	-	-	-	3	17	-	-	-	10	-	10	-	10.50	20	-	54	60.00%	56,700	575,000		575,000
1998	10	-	-	-	14	-	-	-	3	17	-	-	-	10	-	-	7.80	10	10	54	80.00%	75,600	575,000	550,000	1,125,000
1999	5	10	-	-	-	14	-	-	-	3	17	-	-	-	5	-	8.43	5	5	54	80.00%	75,600	575,000	275,000	850,000
2000	5	5	10	-	-	-	14	-	-	-	3	17	-	-	-	-	8.04	5	5	54	80.00%	75,600	575,000	275,000	850,000
2001	5	5	5	10	-	-	-	14	-	-	-	3	17	-	-	-	8.44	1	5	59	80.00%	82,600	575,000	275,000	850,000
2002	5	5	5	5	10	-	-	-	14	-	-	-	3	10	-	-	5.47	7	5	57	80.00%	79,800	575,000	275,000	850,000
2003	5	5	5	5	5	10	-	-	-	14	-	-	-	3	3	-	6.76	7	5	55	80.00%	77,000	575,000	275,000	850,000
2004	2	5	5	5	5	5	10	-	-	-	14	-	-	-	3	-	7.87	3	2	54	80.00%	75,600	575,000	110,000	685,000
2005	2	2	5	5	5	5	5	10	-	-	-	14	-	-	-	-	8.15	3	2	53	80.00%	74,200	575,000	110,000	685,000

**EXHIBIT IV B**

**SCENARIO C : PURCHASE & REPLACEMENT SCHEDULE FOR BUSES**

	NO OF VEHICLES OF THIS AGE																FLEET AGE	W/Oft Purch.	TOTAL	IN		OPERATING CAPITAL		TOTAL	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16				SERVICE RATIO	CAPACITY IN SERVICE	SUBSIDIES USD	SUBSIDIES USD	SUBSIDIES USD	
1995	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20	20	90.00%	14,400	(120,000)	500,000	380,000	
1996	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.50	-	20	40	90.00%	28,800	(240,000)	500,000	260,000
1997	20	20	20	-	-	-	-	-	-	-	-	-	-	-	-	-	3.00	-	20	60	90.00%	43,200	(361,000)	500,000	139,000
1998	-	20	20	20	-	-	-	-	-	-	-	-	-	-	-	-	4.00	-	-	60	90.00%	43,200	(361,000)		(361,000)
1999	-	-	20	20	20	-	-	-	-	-	-	-	-	-	-	-	5.00	-	-	60	90.00%	43,200	(361,000)		(361,000)
2000	-	-	-	20	20	20	-	-	-	-	-	-	-	-	-	-	6.00	-	-	60	90.00%	43,200	(361,000)		(361,000)
2001	-	-	-	-	20	20	20	-	-	-	-	-	-	-	-	-	7.00	-	-	60	85.00%	40,800	(361,000)		(361,000)
2002	-	-	-	-	-	20	20	20	-	-	-	-	-	-	-	-	8.00	-	-	60	85.00%	40,800	(361,000)		(361,000)
2003	-	-	-	-	-	-	20	20	20	-	-	-	-	-	-	-	9.00	-	-	60	85.00%	40,800	(361,000)		(361,000)
2004	10	-	-	-	-	-	-	20	20	10	-	-	-	-	-	-	8.50	10	10	60	85.00%	40,800	(361,000)	250,000	(111,000)
2005	10	10	-	-	-	-	-	-	20	20	-	-	-	-	-	-	7.83	10	10	60	85.00%	40,800	(361,000)	250,000	(111,000)