FORMULATION OF A
FARES POLICY FOR BUS TRANSPORT SERVICES

Committee on Fares Policy,
Ministry of Transport,
Colombo.

August 2001
FOREWORD

This report is submitted to the Hon. Minister of Transport through Secretary, Ministry of Transport. It is the Technical Report of the Committee set up by Secretary, Ministry of Transport by letter dated 19th December 2000 under the title ‘Implementation of an appropriate fare policy for passenger transport services’.

The members of the committee were:
- Mr. Channa Amerasinghe   Chairman, National Transport Commission
- Mr. John Diandas,   Public Transport Specialist
- Dr. Amal S. Kumarage,   Senior Lecturer, University of Moratuwa
- Dr. Sanath Jayanetti,   Economic Advisor, Ministry of Finance & Planning
- Mr. AMD Bandusena,   Deputy Director, Dept. of National Planning
- Mr. PM Guneratne Banda,   Director General, National Transport Commission
- Mr. KGDD Dheerasinge,   Director (Public Debt), Central Bank
- Dr. DS Jayaweera   Deputy Director (Planning), Ministry of Transport and
- Mr. CPA. Karunatilleke,   Senior Asst. Director (Statistics Dept), Central Bank.

Dr. Jayaweera and Mr. Karunatilleke were co-opted to the committee, while Mr. MA Jeffrey, Director (Policy), National Transport Commission (NTC) and Mr. WKS Ratnayake, Asst. Director, (Policy), also of the NTC, assisted the work of the committee. There were eight meetings of the committee. These were chaired by Mr. Amerasinghe and in his absence by Dr. Kumarage. In addition some members of the committee participated in several meetings held with the officers of the NTC, SLCTB, Cluster Bus Companies and the Private Omnibus Operators Associations.

August 15, 2001
Colombo, Sri Lanka
1. INTRODUCTION

Public transport is a very important sector in the economy, as its performance affects the economic activity in various ways. Therefore, an efficient public transport system is considered a mostly required condition for faster economic growth and social progress. However, the public transport sector in Sri Lanka, especially the bus transport, suffers many deficiencies due to lack of effective and consistent policy to guide the sector to maintain it has a viable economic venture. Ad-hoc fare revisions introduced from time to time has resulted in anomalies in the fare structure which has led to imbalances and inefficiency in the service.

Having understood for prevailing problems and the need to rectify them with a scientific system of fare revision, the Secretary to the Ministry of Transport under the instructions of the Hon. Minister appointed a committee to study the matter and design an appropriate cost and fare index to implement a fare policy for passenger transport services.

Constructing the Cost Index

The responsibility of the committee was to construct a representative index of the cost of operating bus service in Sri Lanka. This index should reflect the changes in the operating cost of bus service due to changes in the cost components, so that it can be used as guiding indicator to revise bus fares whenever it is deemed necessary.

The index is an average of all representative elements in the total. Accordingly, a representative cost index is a composite index of all the components of operating costs under different operating conditions.

The construction of the cost index was the outcome of a sequential process of thirteen stages. The details of those stages are given in the following chapters. The first in this process was to identify the cost components of operating a bus and the factors affecting those cost components. The committee has identified the following twelve (12) cost components of operating the bus service:

- Fuel
- Crew
Fares Policy for Bus Transport Services

- Oil and Lubricants
- Tire and Tubes
- Air Conditioning
- Repairs
- Daily Overheads
- Monthly Overheads
- Annual Overheads
- Depreciation
- Interest on Capital
- Risk on Enterprise

The operating cost can also vary according to the different operating conditions, such as type of the bus, type of the route and speed etc. Among those different conditions the route type has been identified as the prime factor, which affect other determinants of costs indirectly. As such, constructing a representation route condition was a major task.

Road conditions in Sri Lanka are not identical and hence, route conditions for operating bus service also vary considerably. Therefore, ten typical route types have been identified to examine how different route conditions affect the operating cost. The ten selected route types are:

A. Long Distance Low Country
B. Long Distance Low Country (AC)
C. Long Distance Up Country
D. Long Distance Up Country (AC)
E. Regional
F. Urban Line Haul
G. Urban Line Haul (AC)
H. Urban Cross Town
I. Urban Feeder
J. Rural

There are several dimensions, such as service type, operable days distance, speed, type of bus and age of bus etc. of the cost of operating a bus in a selected route. Therefore, each route type was analysed under all dimensions. The Charts 1 and 2 in the report provide the details of those analyses.

After identifying all aspects of determining the cost of operating the bus service, the selected ten route types were examines with twelve components of cost. The methods of estimating each cost component is given in the report. The Chart 4 (A to J) shows how each cost component for revenue kilometre varies under different route conditions.
Since the final objective of the whole project was to arrive at a single index to represent the operating cost, the ten different cost scenarios had to be aggregated to form a single cost situation. The weighted average method in index calculations was used to arrive at this final stage of the process.

Accordingly, each cost scenario under each route condition was assigned a weight where the weight was the ratio of the number of buses operating under each road condition to the total number of operating buses. For example if route type A had 500 operating buses out of 5000 buses running under all types of routes, the weight assigned to the route type A was 0.1 (500/5000). Similarly each route type was assigned a representative weight.

The last column of the Chart 5 gives the twelve cost components where each component is a weighted composite of the same under each different route type. The values of each of the cost components (for Routes A to J) in Chart 5 are taken as representative cost components for all types of routes. This is the final stage of computing the cost index.

The last was to arrive at a single cost figure, which is representative of all cost components under all route types and other cost related dimensions. The routes (A – J) in the Chart 5 gives twelve cost components representative for all route types and other cost related dimensions. Hence, combing these twelve cost components to get a single figure in a more representative way was the final task. The weighted average method was used to arrive at this final number.

Here each representative cost component was assigned as weight, where the weight was the share of each representative cost component in the total representative cost of operating the bus service under all route types. For example, the cost on fuel accounts for Rs.8.76 per km out of Rs.35.36 of overall operating cost per km. Accordingly, the share of the fuel is around 25 per cent {(3.76/36.36) x 100}. If fuel prices increase by 10 per cent the total operating cost does not increase by the same rate. It increases by only 2.5 per cent (10 x 25% = 2.5%) because fuel represents only 25 per cent of the total operating cost. This method can be applied to price changes of all cost components in a given period to arrive at a representative overall change in the operating cost of operating the bus service.
A very important characteristic of the index calculation is to treat the index value as 100 for the base period. The base period used for the calculation of the cost index was May 2001. Accordingly, the percentage shares of all cost components were aggregated to arrive at the base period index of 100. The change of this index due to changes in any of the twelve cost components can be taken as a representative change in the cost of operating the bus service economically. Accordingly the movements of this index can be taken as the guiding indicator for revising bus fares.

*Constructing the Fares Index*
2. METHODOLOGY

This chapter sets out the summary of the methodology used in the computation of the cost index and the fares index. The method can be set out as a thirteen-stage sequential process.

**Step 1:** Identification of the major variants in the cost of bus operations such as bus types, route type, route length etc. The type of route is identified as a primary variant of operating costs. Most other variants are derivatives of the route type.

**Step 2:** Ten typical route types have been identified for calculating bus operating costs in Sri Lanka. The type of bus recommended for use on a particular route has been identified together with the typical operating distance, speed of travel and working hours for crew etc.

**Step 3:** Twelve different cost components have been identified, as inputs required for the purpose of operating a bus service. The rates of utilization for each of these inputs (e.g. fuel consumption) have been standardized on the basis of formulae or rates that have either been determined in previous research or developed during the course of this study.

**Step 4:** Thereafter, the report deals with the formulation of the total cost of operating a bus over one km on any one of the typical routes. For this purpose, each route is designated a particular set of pre-determined operating conditions and standardized operational inputs at present (May 2001) price levels. The costs are calculated in terms of Rs per revenue bus km, Rs per day and Rs per month for each route type. The prices for May 2001 are considered as the Base Year Prices for the Index.

**Step 5:** Each of the typical route costs calculated in Step (4) are weighted by the approximate number of buses operating on that route type in Sri Lanka. The weighted cost so determined is referred to as the ‘Base Year Bus Operating Cost’ \(C_b\) for Sri Lanka. This is determined in Rs per revenue bus km operated.

**Step 6:** In this step the Bus Operating Cost can be revised for any year (or month) for which a revised fare is required by applying the prices at that time of revision. Changes in
operating condition may also be applied at the time of revision. The weighted cost so determined is known as the ‘Revised Bus Operating Cost’($C_r$).

**Step 7:** The next step is wherein the ‘Revised Bus Operating Cost’($C_r$) (Calculated in Step 6) is calculated as a percentage of the ‘Base Year Bus Operating Cost’ ($C_b$) (Calculated in Step 5). This percentage is referred to as the Bus Operating Cost Index. This index will show the increase in costs from the Base Year as an index.

**Step 8:** The next step attempts to identify and include the Qualitative Parameters of bus travel in the cost calculation. The quality of bus travel is presently best represented by the loading level. This is referred to as the Load Factor measured as the average number of passengers observed being carried on the route as a percentage of the average number of seating spaces provided. This has a direct bearing on the revenue from bus services provided. For an assumed fare profile for each route type, the average passenger carry distance, average fare paid and the total revenue per bus-km operated have been calculated.

**Step 9:** Based on the revenue and cost for an operated bus km, a Benefit-Cost Ratio (BCR) can be computed for each of the route types for the Base Year. It is seen however, that presently, there are varying BCR values between the different route types. Shorter routes have a higher than required cost recovery, while longer routes cannot recover costs for the desired operational characteristics of the route.

**Step 10:** In this step, a fare structure is evolved for the computation of the fare for each section. It is assumed in this report, that the cost includes an initial ‘step on cost’ (for stopping and starting after pick up, issue of ticket etc) and a further ‘distance-based carrying cost’ for each passenger. After comparing several models used around the world, this report uses the step on cost as being equivalent to the carriage of a passenger a distance of 3 kms. Thus the cost of carrying any passenger is computed by a simple formula as ‘distance plus 3’.

**Step 11:** If the boarding profile for each route type is known, then the average fare profile can also be calculated for each route. Weighting this by the numbers of buses on each type of
route, we can obtain the total increase in revenue by type of route and for the entire fleet. This as a percentage of the Base Year revenue will comprise the **Fare Index**.

**Step 12:** The report also identifies the existence of fare anomaly between the Fares calculated for the Base Year (May 2001) and the actual fares existing at that time. In general shorter distances are found to be over-priced, while longer distances are found to be under-priced. Therefore, this step constitutes the formulation of a **fare anomaly readjustment program** whereby the anomaly between the calculated fare and existing fare is gradually corrected over four years (or four individual fare increases) so that the benefit cost ratio of all routes is one or nearly equal to one.

In carrying out the fare anomaly readjustment, a fare structure has been formulated and comparative weights given for different km carriage of passengers. There are four unit fares depending on length of carriage. In the readjustment process, these weights are varied on a trial and error basis so that

(a) The overall weighted revenue increase resulting in an increase in the Fare Index will be equal to the Bus Operating Cost Index.
(b) The Benefit Cost Ratio of the different route types will be equal
(c) That individual increase in the fare of any section is not very much more than the Fare Index.

**Step 13:** Furthermore, the committee identifies, that the there are a number of anomalies in the existing fare sectioning where there is no uniformity between routes in the distance constituting a fare section. The report uses the following distances per fare section until more accurate basis is derived.

- On any length of a route in elevation over 300 meters, but below 600 meters, above mean sea level (referred to as mid-country routes) – 1.8 kms per fare section
- On any length of a route in elevation above 600 meters – 1.7 kms per fare section.
- All other routes – 2 kms per fare section
3. COMPUTATION OF COSTS AND COST INDICES

This chapter deals with the computations identified in the previous section. Each of the steps and results of such computations are dealt with separately in the sequential process as given in Section 2.

3.1 VARIANTS OF BUS OPERATING COST (BOC)

The cost of bus operations has a number of variants. The most significant parameters identified for specified consideration in calculating the BOC in this study are:

V.1. **Type of Service:** While there are several fare levels in public bus services, there are two different quality of bus operations where operating cost are concerned. These are identified as:
   - Normal Services
   - Air Conditioned Services

V.2. **Type of Route:** The terrain of a route, road and traffic conditions result in variations to operating costs. All bus operation in Sri Lanka needs to be classified to fall within an identifiable route type for which a common BOC can be calculated. This is further discussed in Section 3.2

V.3. **Bus Size:** There are different sizes and makes of buses in the industry. While there are significant cost variations between makes, this study intends only to differentiate between the most common size categories of buses and the country of manufacture.

V.4. **Country of Manufacture:** Most buses used in Sri Lanka are of Indian or Japanese make. There are cost variations based on the country of manufacture. This study will categorize buses by country of manufacture as:
   - Indian
   - Japanese

V.5. **Age of Bus:** The operating cost also changes with the age of the bus particularly with respect to depreciation and running repairs.
V.6. Speed: Different routes have typical operating speeds. The speed is important for inputs such as fuel consumption. This is calculated by taking for each representative route type and length specified:
- The non-stop travel speed for a bus
- The number of authorized stops for the route and service
- The time per authorized stop.

The non-stop travel time is taken on the basis of the terrain and condition of route. In this respect no distinction is made between slow, express and luxury buses as it is held that all buses should travel at a safe and legal speed and not base their non stop speed on type of service. The number of authorized stops of course will vary depending on the type of service. A luxury service will be considered to stop once every 5 kms or so, while a long-distance express bus would be assumed to stop every 2 kms and a urban feeder services will be assumed to have around 3 stops per km. It is also assumed that every stop would on average delay a vehicle by 15 seconds.

V.7. Trips per day and Hours of Operation: The hour of operation of a bus depends on the type of route and the supply level of buses on a route. Some urban routes require double shift crew, while other may require a single shift extending over 8 to 12 hours (plus one hour for lunch break) in general. The trips operated for a day would then be a function of both the speed of the route and the hours of operation per day. Each of the ten representative routes have been ‘built up’ for a typical route length, speed and number of trips. In general, a single duty time period of 9 to 13 hours is considered for all routes. However when the route supply level exceeds the number of buses required for optimal operation, the idle time between successive trips increases, thus increasing the idle time of the crew.

V.8. Distance & Travel Speed: The distance for each route and the travel speed have a distinct bearing on operational costs in terms of fuel consumption rate and trips and kms operated per day, which determine the fixed costs such as financing and insurance when apportioned per km.

V.9. Hours of Operation: In addition to the speed of travel, the number of stops allowed, the turn around time, the dead run time all add up to determine the hours of operation for a bus crew. Turn around time (layover time) is based on the legal requirement for providing rest for continuous driving. This is allowed at a minimum of 15 minutes (for both ends) in short trips while for a single trip long-distance route it is allowed at 90 minutes.
**V.10. Kms Operated:** The kms operated per bus per day is a function of the number of one-way trips multiplied by the one-way distance. This would be termed the revenue kms. In addition there are dead run kms involving empty runs between depot (or garage) to the bus terminal. The operational cost of this running has to be distributed over the revenue kms.

**V.11. Number of Buses on a Route Type:** The number of buses on each route type will influence the determination of a composite bus operating cost, where the cost of each route is weighted by the number of buses on that route type.

**V.12: Route Supply Level:** Most routes today have more buses than are required to maintain the optimal service for the existing conditions. This results in buses idling at both ends as well as en route thus reducing their productivity. The supply level will also determine the number of trips made per bus per day and also the hours of working for the crew.

**V.13: Number of Days Operated:** The number of days operable on a route depends on the age of the bus, the route supply level and crew off days. This is calculated in the following manner:

<table>
<thead>
<tr>
<th>Number of Days</th>
<th>30 per month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off days for Crew</td>
<td>4 per month</td>
</tr>
<tr>
<td>Servicing</td>
<td>1 day per month</td>
</tr>
<tr>
<td>Repairs</td>
<td>0.25 days per month for every year of age of bus</td>
</tr>
<tr>
<td>Oversupply</td>
<td>1 day for every 10 percent oversupply on route</td>
</tr>
</tbody>
</table>

**V.14: Load Factor:** The average number of passengers carried in a bus is also a variant in determining bus operating cost. Each type of route and time of day would have typical load levels. Load Factor is determined as the percentage of passengers to seats available.

### 3.2 FORMULATION OF THE TEN REPRESENTATIVE ROUTES

The following ten (10) bus route types have been identified in this study.

**R.1: Low Country Long Distance:** A route between two urban centers of more than 80 kms in length (one-way), and almost entirely in level terrain.
R.2: **Low Country Long Distance (A/C):** Ibid. Air-conditioned services.

R.3: **Up-country Long Distance:** A route of more than 80 kms in length between two urban centers with a significant portion of its length in hilly terrain.

R.4: **Up-country Long Distance (A/C):** Ibid. Air-conditioned services.

R.5: **Regional:** A route of between 30 to 80 kms in length in any terrain, with at least one end in an urban center.

R.6: **Urban Line Haul:** A route with one end in an urban center and the other end in a suburban center, where the route length would generally not exceed 30 kms.


R.8: **Urban Cross Town:** A route length from one suburban center to another while passing through part of the respective urban center, where the route length would generally not exceed 20 kms.

R.9: **Urban Feeder:** Routes that are of distance less than 6 kms in length typically in urban or suburban areas plying between line haul corridors or serving as collectors to suburban centers.

R.10: **Rural:** Routes that have at least one end in a rural area of less than 20 kms in length.

Charts 1 and 2 illustrate the operating conditions assumed for each of the ten representative routes.

### 3.3 COST COMPONENTS

The components of bus operating costs have been identified in this study to be made up of the following categories.

- Fuel
- Crew
- Oil & Lubricants
- Tires & Tubes
- Air Conditioning
- Repairs
- Daily Overhead
- Monthly Overheads
Fares Policy for Bus Transport Services

- Annual Overheads
- Depreciation
- Interest on Capital
- Risk on Enterprise

The prices of these individual inputs have been computed using market prices and consumption rates. Market prices have been determined by taking the average from a sample of three prices from reputed dealers for prices that are not regulated (e.g. diesel).

C.1. Fuel Cost: Fuel cost is calculated by multiplying the fuel cost (Rs per litre of fuel) by the fuel consumption rate. The average fuel consumption is derived as a function of
- Size of Bus, measured in terms of (S)
- Speed of Route and Service (V)
- Class of Service

It is given by the equation

\[
Fuel\, Consumption(kms/litre) = FC = \frac{f_{ac}}{(0.15 + \frac{2.75}{V} + 0.00025V^2) \times \left( \frac{7000}{T} \right)^{0.3}}
\]

where
- V is the route travel speed measured in travel time terminal to terminal including halts, but excluding the terminal loading time and stops for meals.
- T is the Tare of the bus measured in kgs.
- The factor \(f_{ac}\) is the fuel adjustment factor for air-conditioned buses. This is taken as 0.85 for all air conditioned bus types.

The cost of fuel is calculated by dividing the unit cost of diesel by the fuel efficiency. Since at present the price of fuel at Rs 27.50 per litre (Base Year price) is controlled by the State, the cost of diesel is obtained from the formula.

\[
Fuel\, Cost\, (Rs/km) = \frac{Cost\, of\, Diesel\, (Rs/litre)}{Fuel\, Efficiency\, (kms/litre)}
\]
C.2 Crew Cost: While many variations in cost of crew have been observed between operators, the total crew cost has been identified into three sub costs in this study. These are:

C.2.1 Fixed Remuneration
C.2.2 Overtime
C.2.3 EPF/ETF/Gratuity etc.

C.2.1: Fixed Remuneration is calculated on the basis of a monthly wage (paid monthly or daily). The hourly rate is taken from 160 hours per month after deducting for leave, training and other duties. In certain cases, this may include a part of the target in the case of the State sector.

C.2.2: Overtime is usually calculated at 150% of the hourly rate for that portion of service beyond 8 hours per day, when the hourly rate is calculated for a 191 hour month. However, when deductions are made for holidays, leave entitlements and other duties, the month reduces to around 145 hours, the over time rate and hourly rate are less unequal and thus over time may be calculated at 1.15 times the hourly rate. It should be noted that while the private sector does not generally identify a specific overtime payment, this is represented by allowances paid for meals and higher wages.

C.2.3: EPF/ETF and Gratuity (inclusive of other welfare costs) is calculated at 18% of the hourly wage rate calculated on for up to 8 hours a day. Not payable on overtime earnings.

The total crew cost is then calculated by multiplying the hourly rate by the amount of time and thereafter summing up the three sub totals C.2.1, C.2.2 and C.2.3. The variables for calculating this and the crew wage structure for the Base Year (2001) is made up as follows.

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>(S.D.)Salary for Driver in 2001(Rs/month)</td>
<td>7,000</td>
</tr>
<tr>
<td>(S.C.) Salary for Conductor in 2001 (Rs/month)</td>
<td>5,000</td>
</tr>
<tr>
<td>Hours per month of working hours (8 hours x 5½ days/wk x 4.33 weeks/month)</td>
<td>191</td>
</tr>
<tr>
<td>Effective Hours per Month (adjusted for leave, holidays, other duties)</td>
<td>145</td>
</tr>
<tr>
<td>Overtime Rate (ratio of normal rate)</td>
<td>1.15</td>
</tr>
<tr>
<td>EPF/ETF/Gratuity (percent of salary)</td>
<td>18</td>
</tr>
</tbody>
</table>
C.3: Service & Lubricants: The cost of regular service of a vehicle and change of oil, replacement of all types of lubricants and fluids has also been calculated as follows:

C.3.1 Oil Changes (including filters)
C.3.2 Cost of Servicing
C.3.3 Topping up Oil

C.3.1 Oil Changes are specified for each type of vehicle according to the frequency in terms of kms operated by the vehicle between changes. This is found to vary between Indian and other makes. The manufacturers specifications are used for this purpose. The amount of oil is dependent on the size of the vehicle. The cost of oil filters is taken after consideration of the number of filters, the frequency of changes and price as shown below.

<table>
<thead>
<tr>
<th></th>
<th>Indian</th>
<th>Japanese</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kms per oil change</td>
<td>7,000</td>
<td>4,000</td>
</tr>
<tr>
<td>Oil changes per service</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Oil Changes per change of filters</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Litres per Oil Change</td>
<td>14</td>
<td>10-14</td>
</tr>
<tr>
<td>Cost of Lubricants (Base Year Rs/litre)</td>
<td>95</td>
<td>95</td>
</tr>
<tr>
<td>Cost of Filters (Base Year Rs)</td>
<td>416</td>
<td>3,000</td>
</tr>
</tbody>
</table>

C.3.2 Cost of Servicing is provided for by taking the cost per seat and frequency of servicing given as a function of a number of oil changes for a service. For air-conditioned vehicles the cost per seat is increased to a factor of 1.25. The service costs used for the Base Year 2001 are given as

<table>
<thead>
<tr>
<th></th>
<th>Cost per Seat per service (Rs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal Buses</td>
<td>60</td>
</tr>
<tr>
<td>A/C Buses</td>
<td>75</td>
</tr>
</tbody>
</table>

C.3.3 Topping up of engine oil is provided for at 1 litre per 30 hours of operations. This is further adjusted for size of the vehicle.

C.3.4 Oil Filters are provided for replacement as follows

<table>
<thead>
<tr>
<th></th>
<th>Frequency of Change</th>
<th>Cost (Rs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indian</td>
<td>7,000</td>
<td>416</td>
</tr>
<tr>
<td>Japanese</td>
<td>8,000</td>
<td>3000</td>
</tr>
</tbody>
</table>
C.4. **Tires and Tubes:** The cost of tires and tubes has been considered by taking several industrial norms. First the cost of new and rebuilt tires has been considered. In cases where the locally manufactured CEAT tire can be used the new and rebuilt tire shall be used for pricing and lifetime kms. The mix of tires (usually new for the front and rebuilt for the rear) has been considered. The life of each type of tire has also been considered. This is further adjusted by the road roughness factor to account for road surface condition and grade for each route type as shown in Chart 1.

<table>
<thead>
<tr>
<th>Tire Size</th>
<th>New Tire (CEAT) 14 ply</th>
<th>(Average of DAG &amp; Rebuilt)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Base Year Cost (Rs)</td>
<td>Maximum Lifetime (kms)</td>
</tr>
<tr>
<td>TS1</td>
<td>900 x 20</td>
<td>8,574</td>
</tr>
<tr>
<td>TS2</td>
<td>750 x 16</td>
<td>7,835</td>
</tr>
<tr>
<td>TS3</td>
<td>825 x 20</td>
<td>9,535</td>
</tr>
</tbody>
</table>

In addition to the above, the cost of new tube and collar for each change of tyre is taken as Rs 876 in the Base Year.

C.5. **Air-Conditioning:** The cost of providing air conditioning to the appropriate bus type is based on the cost of reconditioning the equipment at regular periods, the cost of refill of gases at regular periods and a cost for the increased wear and tear of the engine. The latter also provides for the cost of operating an additional engine for the air-conditioning plant to be found in some Very Large buses. The cost per km is calculated by

\[
\text{(cost of servicing a/c equipment/ kms between reconditioning + cost of refill of gases/kms between refills + 25% cost of engine recondition/kms between engine reconditioning) x (N/57)^{0.2}}
\]

The input costs for air conditioning for a 40-seater bus are provided as follows:

<table>
<thead>
<tr>
<th></th>
<th>Cost (Rs)</th>
<th>Frequency (kms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Servicing of A/C</td>
<td>3,283</td>
<td>20,000</td>
</tr>
<tr>
<td>Refill of Gases</td>
<td>5,750</td>
<td>40,000</td>
</tr>
</tbody>
</table>

C.6. **Repairs:** Repairs to buses have been categorized in to three types in this study. These are:

C.6.1 Major Repairs to Engine and Transmission
C.6.2 Major Body Repair inclusive of seats and painting
C.6.3. All other Repairs inclusive of replacement and repair of suspension, brakes, batteries, and day to day running repairs.

C.6.1. Major Repairs to Engine and Transmission is taken from the cost of reconditioning an engine the average life time in kms of such an engine and the costs and life time of repairs to the gear box and clutch plate.

Cost of Repair/Average use (kms or years) between repairs

The base year cost of repairs is provided as follows:

<table>
<thead>
<tr>
<th></th>
<th>New gear Box &amp; Clutch Plate</th>
<th>Reconditioned Engine</th>
<th>Body Work</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cost (Rs)</td>
<td>Lifetime (kms)</td>
<td>Cost (Rs)</td>
</tr>
<tr>
<td>Indian</td>
<td>27,000</td>
<td>50,000</td>
<td>83,333</td>
</tr>
<tr>
<td>Japanese</td>
<td>47,000</td>
<td>60,000</td>
<td>173,000</td>
</tr>
</tbody>
</table>

C.6.2. Major Repairs to Bodywork is similarly provided for by taking the cost of the bodywork and the lifetime in years as shown in table above.

C.6.3. Other Running Repairs is provided as a cost per km for parts and cost of per km for labor. The entire cost here is thereafter further increased at a rate of 5 percent for each year of the age of a bus.

\[
((\text{Cost of Parts/km}) + \text{Cost of labour/km}) \times ((\text{Seats}/42)^{0.8}) \times 1.05^{(\text{age in years})}
\]

The unit costs for a new 40-seater bus, the Base year 2001 is taken as follows:

<table>
<thead>
<tr>
<th></th>
<th>Rs/km</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of Parts</td>
<td>0.50 (CIF)</td>
</tr>
<tr>
<td>Cost of Labor</td>
<td>1.00</td>
</tr>
</tbody>
</table>

C.7. Daily Overheads: These refer to all other expenses not included in above that are of a daily nature. These are namely:

C.7.1 Cost of Tickets
C.7.1 Cost of Tickets is taken from the cost of a book of tickets divided by the number of tickets in a book and multiplied by the number of passengers estimated for the day. The present cost of a ticket book is taken as Rs 30 for a 1,000-ticket book.

C.8. Monthly Overheads: Overheads that are of a monthly nature (i.e. usually made through a single monthly payment) have been included under this category. Monthly overheads too have been further categorized to two types. These are:

C.8.1 Administration
C.8.2 Regulation

C.8.1 Administration refers to all expenses pertaining to the administration of buses. These would typically include the wages for management and clerical staff, cost of fixed assets and their maintenance other consumables such as electricity and water, also bank charges, stationary, postage, telephones etc. The present cost is taken as Rs 6,500 per month per bus in the Base Year.

C.8.2 Regulation includes all payments of a monthly nature for log sheets issued by a transport authority. This is taken as Rs 400 (Rs 650 in the case of NTC permit) per month for the issue of a log sheet.

C.9. Annual Overheads: These refer to payments that are of an annual nature. These are further identified as:

C.9.1 Revenue License
C.9.2 Route Permit
C.9.3 Insurance
C.9.4 Fitness Certificate

C.9.1 Revenue License fees are those payable to the Commissioner of Motor Traffic usually based on the cost per seat. This is presently Rs 80 per seat per year.

C.9.2 Route Permit fees are that payable to the relevant transport authority for obtaining a route permit. These fees vary between authorities. A weighted average for the whole island has been calculated and provided for at Rs 2,400 per year at the present time.
C.9.3 **Insurance** costs are for the purpose of obtaining insurance cover for the vehicle, passengers, crew including cover against riots and civil commotion, terrorist action and flooding. This is calculated on the basis of percentage of the depreciated value of the vehicle for a given year and at the following rates, which include all taxes payable

- Vehicle - 1.3% of present value p.a.
- Crew/Passengers provided at 1,200/= p.a. for the crew and Rs 40 per passenger p.a.
- Terrorism/RCC - at 1.2% of present value p.a.

C.9.4. **Fitness Certificate** has to be renewed annually. This is taken as Rs 250 at the present time.

C.10. **Depreciation of Bus**

This component provides for the depreciation of a bus. The lifetime of a bus (after importation) is taken as 8 years and assuming no resale (residual) value at this time. Depreciation of a bus is considered to be proportional to its use that is best measured in terms of kilometers operated. However, since it is generally expected that a newer bus would operate more days and longer trips, the usage would also decrease with age. An equation to assess depreciation has been calculated based on the availability of a bus and the estimated use per day both as a function of age of the bus. This is given in Chart 3.

Accordingly, a new bus is assumed to operate 25 days a month at 280 kms per day, while an 8-year-old bus is assumed to operate 23 days at 162 kms per day. This yields a total 503,646 lifetime kms. Thus the value of a new bus is apportioned by this km, to obtain the depreciation per km operated.

Accordingly depreciation is provided for under the apportionment of the cost of a new bus under the estimated lifetime kms of a bus. Thus the annual depreciation provided would be calculated as

\[ \frac{V}{k} \]

Where

- \( V \) is the value of a bus in today’s prices, new or at importation as the case may be,
- \( K \) is the lifetime kms estimated for the bus over eight years normal operation.
C11. Interest on Capital

Interest on the capital cost of a bus based on the interest payable on the market value of the depreciated asset (i.e. present value of new asset depreciated over the age of the vehicle). The rate of interest depends on the source of financing. A bus financed by borrowings would require a higher rate of interest usually in keeping with the Prime Lending Rate plus a surcharge for bank/leasing services provided. If the purchase of the bus is made from savings, then the opportunity cost may be considered equal to a zero risk investment usually comparable to Treasury Bill rate. The report provides for interest on capital assuming financing in equal parts i.e. 50 percent using borrowings and 50 percent using savings. Thus the annual cost of financing would be

\[ V_n \times \frac{(b + s)}{200} \]

Where \( V_n \) is assumed as the present depreciated cost of the bus and \( b \) is the total interest on borrowings comprising the Prime Lending Rate plus surcharge on leasing and all other taxes payable on the interest payment such as defense levy and \( s \) is the ‘lost’ interest from alternative savings in terms of Treasury Bills. In the case of the Prime Lending Rate as well as the Treasury Bill Rate an average for the period over which the revision is made will be used to avoid sudden changes in rates.

<table>
<thead>
<tr>
<th>Rate (p.a - %)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Prime Lending Rate (Av: Dec 2000 to May 2001)</td>
<td>22.18</td>
</tr>
<tr>
<td>Leasing Surcharge</td>
<td>3</td>
</tr>
<tr>
<td>GST on Interest</td>
<td>0</td>
</tr>
<tr>
<td>Defense Levy on Interest</td>
<td>7.5</td>
</tr>
<tr>
<td><strong>Total Borrowing Rate (b)</strong></td>
<td><strong>27.07</strong></td>
</tr>
<tr>
<td>Treasury Bill Rate (s) (Av. Dec 2000 to May 2001)</td>
<td>19.09</td>
</tr>
</tbody>
</table>

C12 Provision for Risk:

In general profit is payable on capital, and entrepreneurship. Since the cost of capital has been provided for in the above, the profit due from entrepreneurship will be provided as a percentage
of the depreciated market value of the bus. If profit level provided is $p$ percent per annum, the profit per month would be given as

$$V_n \times \frac{p}{100}$$

The present profit level is set at 3 percent p.a. on the value of the asset deployed and where $V_n$ is assumed as the present depreciated cost of the bus.

### 3.4 COST OF BUS OPERATIONS BY ROUTE

The resulting cost of bus operations on each of the ten representative routes have been calculated and given as Chart 4 ((a) to (j)). The cost is given in terms of cost per revenue km operated, cost per day and cost per month.

### 3.5 BASE YEAR BUS OPERATING COST

The base year bus operating cost is calculated by taking the weighted average cost of all the ten route types given in Charts 4 ((a) to (j)). The number of buses in each route type is given in Chart 1. The resulting Base Year Bus Operating Cost is given in Chart 5.

### 3.6 REVISION OF PRICES

In order to revise the bus operating cost, the cost of inputs at that time needs to be estimated. While some of these are published prices (such as diesel, lubricants or permit fees), others vary with market forces, taxes etc (e.g. price of buses, price of servicing etc). On the other hand wages and spare parts may be tied with general price indices and exchange rates respectively.

Cost at a time of revision may be considered as follows:
U.1. Cost of Bus: The cost of a bus may be taken from market prices. This generally does not vary for a similar type of bus. The Base Year prices as provided by the suppliers is given in the following table.

<table>
<thead>
<tr>
<th>Code</th>
<th>Seats</th>
<th>A/C</th>
<th>Country of Manufacture</th>
<th>Make</th>
<th>Model</th>
<th>Age (years)</th>
<th>Value (Rs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1</td>
<td>30</td>
<td>Yes</td>
<td>Japanese</td>
<td>Mitsubishi</td>
<td>Rosa</td>
<td>5</td>
<td>1,850,000</td>
</tr>
<tr>
<td>B2</td>
<td>40</td>
<td>No</td>
<td>Indian</td>
<td>Leyland</td>
<td></td>
<td>0</td>
<td>2,200,000</td>
</tr>
<tr>
<td>BT</td>
<td>45</td>
<td>Yes</td>
<td>Japanese</td>
<td>Fuso</td>
<td></td>
<td>5</td>
<td>2,300,000</td>
</tr>
<tr>
<td>BT</td>
<td>31</td>
<td>No</td>
<td>Indian</td>
<td>Tata</td>
<td>909</td>
<td>0</td>
<td>1,525,000</td>
</tr>
</tbody>
</table>

U.2. Duties & Taxes: Taxes and duties existing at any given time could be ascertained from the relevant departments and circulars issued for this purpose. Those in effect in the Base Year are given below.

<table>
<thead>
<tr>
<th>Item</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Import Duty on Buses</td>
<td>0</td>
</tr>
<tr>
<td>Import Duty on Motor Spares</td>
<td>13.75(^1)</td>
</tr>
<tr>
<td>GST</td>
<td>12.5</td>
</tr>
<tr>
<td>Defense levy</td>
<td>7.5</td>
</tr>
</tbody>
</table>

U.4. Controlled Prices: State-controlled prices existing at any time such as for fuel, lubricants, fees and log sheet can be obtained from the relevant authorities or sales outlets. Some of these for the Base Year are:

<table>
<thead>
<tr>
<th>Item</th>
<th>Rs/Litre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel</td>
<td>27.5</td>
</tr>
<tr>
<td>Lubricants-Oil</td>
<td>95</td>
</tr>
</tbody>
</table>

U.5. Price and Rate Indices Used: General price indices and rates are calculated for input that generally vary with price levels and rates and are difficult to measure in the open market. An index in terms of the average for the period under revision is used for this purpose as shown in the table below. The Colombo Consumer Price Index (CCPI) is used for some inputs such as wages and labour for repairs. The US$ is used for determining the price increase on spare parts.

<table>
<thead>
<tr>
<th>Item</th>
<th>Index</th>
<th>Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Running Repairs (parts)</td>
<td>US$</td>
<td>0.75</td>
</tr>
<tr>
<td>Labor-inclusive of EPF/ETF etc</td>
<td>CCPI</td>
<td>0.98</td>
</tr>
</tbody>
</table>

\(^1\) Assuming 75 percent of spare parts are on the 10 percent tax band and 25 percent of spares are on the 25 percent tax band.
It should also be noted that as indicated in the above table, the rate of change is proportional but not pro-rated. Historical analysis comparing price indices and prices have shown that a factored relationship exist. For example for a 10 percent increase in the CCPI, wages for drivers and crew appear to increase by around 9.5 percent. The following table given the average CCPI and US$ values for the Base Year.

<table>
<thead>
<tr>
<th>Monthly Wage</th>
<th>Driver</th>
<th>CCPI</th>
<th>0.95</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conductor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administration</td>
<td>Clerical</td>
<td>CCPI</td>
<td>0.95</td>
</tr>
<tr>
<td>Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Land/utilities</td>
<td></td>
<td>CCPI</td>
<td>0.95</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The inputs prices, price indices and exchange rates for several years between 1980 up to and including the Base Year have been shown in Chart 6.

3.7 CALCULATION OF REVISED BUS OPERATING COST

The revised bus operating cost for cost inputs existing at December 2000 have been computed as shown in Chart 7. This shows the extent to which bus operating cost has increased in terms of market prices from December 2000 to May 2001.
4. COMPUTATION OF FARES AND FARE INDEX

The cost of bus operations is recovered through the fare collection from passengers. At present the fares are computed on a boarding fee and an incremental fare for each section of travel. Each bus route has at present a set of sections. These sections are not uniform though it is believed they are approximately 2 kms in length. The fare increment is also not uniform, as both the section length and the increments have been based on historical trends and not on a set of quantified criterion. The manner in which the cost is recovered is therefore dependent on both these parameters.

4.1. FARE PROFILE

The fare profile of a route is the composition of the different value of tickets that are typically sold on such a route. As such, a fare profile can be set out against the sections and the distance of carriage on that route.

The fare profile for each of the ten routes used in the cost calculation is assumed as shown in the Chart 8. This shows the anticipated distribution of passengers travelling different fare stages. For example, in an Urban Feeder Route, it is assumed that 30 percent would travel 1 section, 40% two sections and 30% 3 sections. Thus the average fare paid per passenger, the average distance traveled by each passenger can be calculated for each route.

4.2. FARE STRUCTURE

The present fare structure is given in terms of fare sections. The first section presently costs Rs 3.00 and increases at a decreasing rate to stabilize at around 66 cents per section after 50 sections (i.e. around 100 kms). The historical fares for different section from 1980 to date are given in Chart 9.

It is observed that the present fare structure has a heavy step-on fare and a tapering per km fare structure. The existing tapering fare has been modeled into a step on fare and four different unit fare stages.
Fares Policy for Bus Transport Services

- Step on Fare  5 kms (at 52 cents per km)
- Up to 4 kms  52 cents per km
- 5 to 14 kms  50 cents per km
- 15 to 29 kms  22 cents per km
- Over 30 kms  28 cents per km

The investigation of benefit cost analysis of the different types of operations show that in the future, this should ideally have the following composition.

- Step on Fare  3 kms (at \(x\) cents per km)
- Up to 4 kms  say \(x\) cents per km
- 5 to 14 kms  0.9 times \(x\) cents per km
- 15 to 29 kms  0.75 times \(x\) cents per km
- Over 30 kms  0.65 times \(x\) cents per km

4.3 FARES INDEX

The Fares Index is the amount arrived at when the projected revenue after a fare increase is taken as a percentage of the revenue at the Base Year. This is computed by taking the projected revenue in each of the representative routes and thereafter considering a single weighted revenue for all routes. This then represents the value of tickets sold in the entire bus transport system in Sri Lanka based on the fare profile by section as shown in Chart 8.

The fares revision should then be based on maintaining the balance between total revenues and costs in the manner that

\[
Bus Cost Operation Index = Bus Fares Index
\]

Both Indices being set at 100 as at May 2001 can be calculated for time of revision and compared when fares stages are set.

4.4 BENEFIT COST RATIO (BCR)
When compared with the Benefit Cost Ratio (BCR) when the existing fares are applied it is seen that there is a sharp drop in the BCR for routes operating over 14 kms. In fact for a distance of 15 kms (i.e, from 15 to 30 kms) the average fare increases by only Rs 4. As shown above the fare structure appears quite irrational and appears to favor short distance revenues at the expense of mid-distance and longer distance travel.

The latter is shown in Chart 10, where it can be observed that the BCR which is presently varying between 62 and 135 percent. It is clearly observed that longer distance routes are unable to recover costs while shorter distance routes have surplus profits. This situation leads to longer distance buses carrying a high proportion of shorter distance passengers and over loading, while surplus profits attract more buses on shorter routes so that the productivity reduces to finally increase loading levels per trip. In either situation, the level of service enjoyed by the passenger drops drastically.

4.5 FARE ANOMOLIES

There are a number of fare anomalies that are evident when the present fare structure is studied. These may be summarized as:

(a) The per km fare for longer distance is much less than for shorter distances
(b) The per km fare should change with terrain (e.g. up country by about 17 percent and mid country by about 11 percent)
(c) The per km fare for rural areas should also increase by about 30 percent.

These anomalies can be corrected by the following adjustments.

1. **Air Conditioned Services**- Presently set at 2 times the normal fare, can be retained.
2. **Up country Factor** – In determining fare sections, those routes that are at elevations of over 600 meters, will have a 17 percent surcharge on costs. This can be achieved by proportionately reducing the distance by 17 percent so that section lengths are 1.7 kms instead of 2 kms.
3. **Mid country Factor**-In determining fare sections, those routes that are at an elevations of between 300 meters and 600 meters, will have a 11 percent surcharge on costs. This can be achieved by proportionately reducing the distance by 11 percent so that section lengths are 1.8 kms instead of 2 kms.
4. **Rural services** - in order to ensure cost recovery of rural operations caused by a combination of increased costs and reduced revenue due to lower population density and demand, a surcharge of 30 percent may be applied. This also can be achieved by reducing the length of section or by the provision of a subsidy for such routes, as is the practice today. However since it is the Government’s policy to subsidize unremunerative rural routes, the latter will not be applied.

It is proposed that these anomalies be eliminated over four staged fare increases. Thus if fare revisions are to be made annually, this would mean over the year 2001 to 2004.

### 4.6 CRITERION FOR FUTURE FARE REVISIONS

Taking into account the above observations, when a fare revision is to be made in future the following criterion could be adopted.

(a) The Increase in the average operating cost is applied to the fares to obtain the revised fares. That is the Cost Index is equated to the Fares Index and

(b) The Benefit Cost Ratio (BCR) of the different types of routes is brought closer to 100 percent.

(c) All existing anomalies are gradually eliminated.

(d) Load factors are gradually reduced.

### 4.7 EXAMPLES OF APPLICATION

In order for the manner in which this can be applied, two examples are given in this report where in the first instance, it is assumed that the cost index will rise at approximately 6 percent per year for the period May 2001 to 2004. In the second instance it assumes that the cost index will rise by approximately 9 percent per year for the same period. Chart 11A&B show the derivation of the Weighted Fares Index for these two sample cost increases. This is derived as explained in Section 4.3.

### 4.7.1 APPLICATION FOR A SAMPLE 6 PERCENT COST INCREASE
Chart 11A shows the application of the fares index for the period 2001 to 2004 for an approximate 6 percent annual increase in operating costs. In this example the following computations have been effected.

- The Step on Fare has been reduced from 5 kms at present to 3 kms by the year 2004.
- The A/C Luxury Fare has been kept at a factor of 2 (i.e. double the normal fare).
- Mid country fare sections has been adjusted by taking a section as being 1.8 kms in length
- Upcountry fare sections has been adjusted by taking a section as being 1.7 kms in length
- Fares on rural sections are adjusted by 30 percent either in the form of an operating subsidy of 30 percent of costs or by reducing the distance per fare section or as a combination of both as per existing Government Policy concerning rural transport.
- That the per unit fare charged will be increased from 52 cents per km to 70 cents for each of the first four kms over the four years as shown in the table and that other fare stages will also increase so that the relationship between the different per km unit fares will subscribe to the recommendation made in Section 4.2.
- The cost increase assumed is 6 percent per annum
- The overall increase in fare revenues is 7.5 percent ; 7.4 percent; 7.2 percent and 8.8 percent for the yearly increases for the period 2001 to 2004.
- The excess provided is for reducing the load factor. It is seen that overall load factors will reduce from 117 percent to 111 percent after the first fares revision.
- Accordingly, the first stage fare (Rs 3.00) will remain unchanged for four years, while the second and third stages (Rs 4.00 and Rs 5.00) will remain unchanged for three years, the fourth stage (Rs 6.00) will remain unchanged for two years as indicated in Chart 11A by the shaded sections.

4.7.2 APPLICATION FOR A SAMPLE 9 PERCENT COST INCREASE

Chart 11B shows the application of the fares index for the period 2001 to 2004 for an approximate 9 percent annual increase in operating costs. In this example the following computations have been effected.

- The Step on Fare has been reduced from 5 kms at present to 3 kms by the year 2004.
• The A/C Luxury Fare has been kept at a factor of 2 (i.e. double the normal fare).
• Mid country fare sections has been adjusted by taking a section as being 1.8 kms in length
• Upcountry fare sections has been adjusted by taking a section as being 1.7 kms in length
• Fares on rural sections are adjusted by 30 percent either in the form of an operating subsidy of 30 percent of costs or by reducing the distance per fare section or as a combination of both as per existing Government Policy concerning rural transport.
• That the per unit fare charged will be increased from 52 cents per km to 80 cents for each of the first four kms over the four years as shown in the table and that other fare stages will also increase so that the relationship between the different per km unit fares will subscribe to the recommendation made in Section 4.2.
• The cost increase assumed is 9 percent per annum
• The overall increase in fare revenues is 7.5 percent ; 7.4 percent; 7.2 percent and 8.8 percent for the yearly increases for the period 2001 to 2004.
• The excess provided is for reducing the load factor. It is seen that overall load factors will reduce from 117 percent to 109 percent after the first fares revision.
• Accordingly, the first stage fare (Rs 3.00) will remain unchanged for three years, while the second and third stages (Rs 4.00 and Rs 5.00) will remain unchanged for two years, the fourth stage (Rs 6.00) will remain unchanged for one year as indicated in Chart 11B by the shaded sections.

The stagewise fares after this increase as per example, is shown in Figure 1.
5. COMPARISON OF HISTORICAL TRENDS IN COSTS AND FARES USING FARES INDEX

Historical costs have been computed using the index for the year 1980, 1985, 1990, 1995 and 2001 January. The latter been when the last fare increase was granted. The composite cost for each of these years, together with the Base Year are given in Chart 12.

A further analysis is made of the rate of increase of selected cost items and selected fare stages for this same period. It has been shown as a rate for a 1980 price base and also for a 1990 price base. This too is shown in Chart 12.

This analysis clearly shows that
(a) the value of buses, fuel and overall cost of operations has increased by between 6 to 7 percent per annum over a 20 year average.
(b) The wage components tied to the Cost of Living Index (CCPI) and the inputs ties to the US$ have increased at a rate higher than this.
(c) Tires and regulatory charges have increased at less than the average amount.
(d) the fares for shorter distance travel have had increases much higher than for longer distances, the reason for some of the existing anomalies.
(e) The fares increase over the last 20 years for the first five fare stages have been at a rate higher than the increase in costs, while the fare increases for other section (i.e.6 and up) have been less than the increase in costs.

6. NATIONAL BUS OPERATING STATISTICS

As across check of the results against existing operational statistics, the Costs and Fare Index for Bus Operations (CFIBO) has derived the following operational statistics for the country for the Base Year as shown in Chart 13.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of Buses in Operational Fleet</strong></td>
<td>20,923 buses</td>
</tr>
<tr>
<td><strong>Number of Buses Operating per day</strong></td>
<td>15,732 buses (75 percent)</td>
</tr>
<tr>
<td><strong>One-way Bus Trips Operated per month</strong></td>
<td>4.2 million trips</td>
</tr>
<tr>
<td><strong>Bus kms Operated per month</strong></td>
<td>89.5 million kms</td>
</tr>
<tr>
<td><strong>Passenger Trips Carried per month</strong></td>
<td>321 million trips</td>
</tr>
<tr>
<td><strong>Passenger kms carried per month</strong></td>
<td>3,437 million kms</td>
</tr>
<tr>
<td><strong>Average Trip Length (kms)</strong></td>
<td>10.7 kms</td>
</tr>
<tr>
<td><strong>Revenue per month</strong></td>
<td>Rs 2,354 million per month</td>
</tr>
</tbody>
</table>