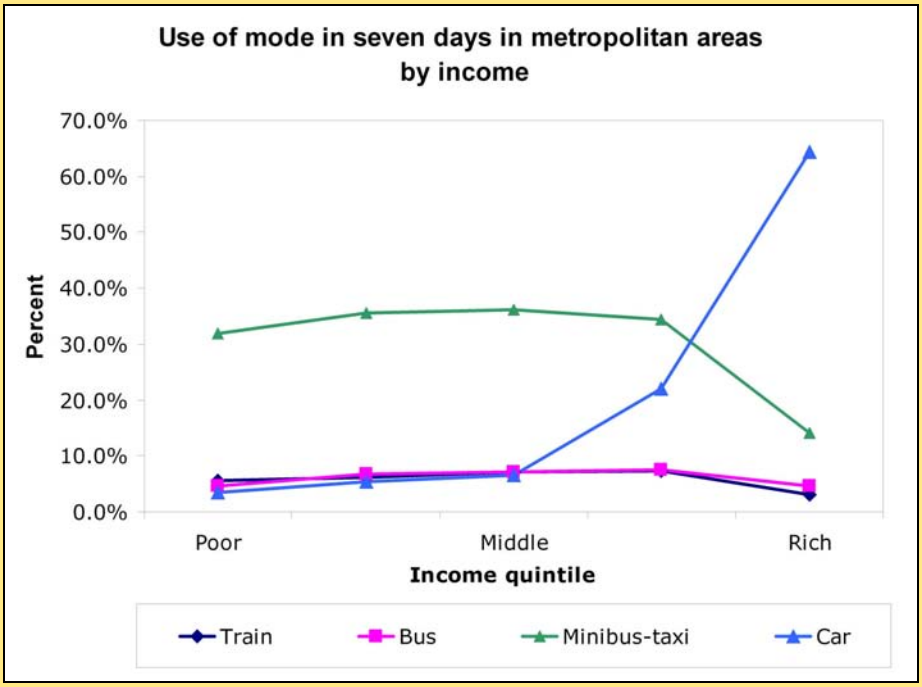
7. Public transport

7.1 Overview

While public transport is a huge field and can't possibly be covered in a few pages, the benefits for cities of a move towards improved public transport are so significant that the sector must be addressed, if fairly broadly. In this section we provide an overview of the key issues and hopefully strengthen the case for prioritizing public transport in South African cities.

The focus of this section is on how to achieve a transport modal shift in South Africa. Modal shift should be viewed from two perspectives:

- a shift from private to public or non motorized transport of daily commuters.
- optimizing the use of public transport.



The choice of transport mode in South Africa is generally based on income, with the poor dependent on non-motorised transport and public transport and the rich having access to private vehicles.

A large percentage of commuters use private vehicles. In the large metropolitan cities, the modal split is generally 50% private to 50% public transport going into the CBD. Generally these are single occupancy vehicles which lead to increased congestion and inefficient fuel consumption with associated high levels of carbon emissions. The transport sector is responsible for 25% of carbon emissions in South African cities.

Available public transport services differ across cities. In most cities there are bus and minibus taxi systems, with rail found in the main metropolitan cities, but not in the smaller cities. City bus and train systems provide the most efficient forms of transport in terms of energy per commuter kilome-

ter. However, even though these are by and large the same price or cheaper than minibus taxis, they are underutilized. This is due to

- Inconvenience. Bus and train systems do not service many informal settlements and are often not well linked in to an efficient network of transport systems.
- Unreliable reputation.
- Perception that they are slower than taxis.
- Safety concerns, particularly on trains.

There is a need for large scale infrastructure to improve the current public transport system in order for it to improve its current share of commuters.

This set of photos demonstrates how the use of public transport or private motorbikes over the use of private cars can reduce congestion in a city. Each option will transport the same amount of passengers!

7.2 The case

Economic

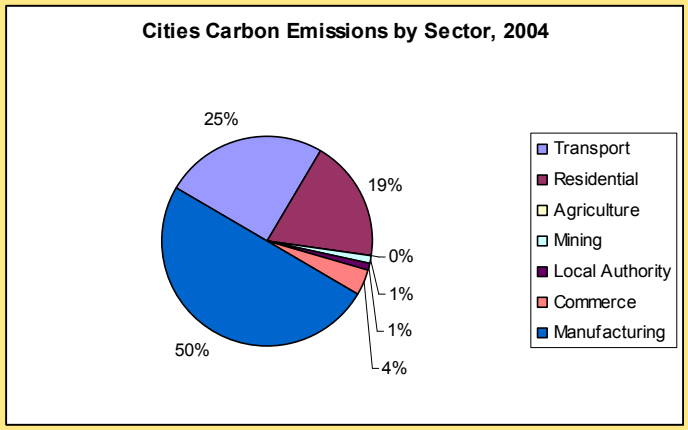
An increased use of public transport will result in commuter savings on fuel and maintenance costs. In addition, lower traffic volumes will result in reduced road maintenance costs for cities and provinces. Our heavy dependence on oil imports (some 70% of all liquid fuels) with long supply lines renders South Africa vulnerable to fluctuations in international oil prices and supply disruptions. In an era when oil supplies appear to be 'peaking' this is likely to mean a substantial upward trend in the price of oil, with enormous consequences for our city economies.

Mode of Transport	Person / hour / lane	Total cost per person km (US cents (2001))	Total emissions per passenger km (gram)
Walking	1 800	Negligible	None
Bicycling	1 500	0.12	None
Motorcar	440 800	8.6	18 965
Bus: Mixed Traffic	10 000	1.4	102
Bus Rapid Transit	54 000	2.4	Coal : 4.97 Gas : 0.23 Fuel Oil : 0.17

Environmental

The transport sector is a significant source of greenhouse gas emissions in South African cities (25%) and a major source of local air pollution. It is also responsible for 50% of energy consumption in South African cities.

A modal shift will mean less traffic on our roads, and a substantial reduction in fuel being used. This in turn leads to significantly less CO_2 emissions and local air pollution within cities.



Public transport reduces the amount of green space that must be paved over for new roads and parking lots. It also makes cities cleaner, quieter, safer and more convenient for getting around

Social benefits / Poverty alleviation

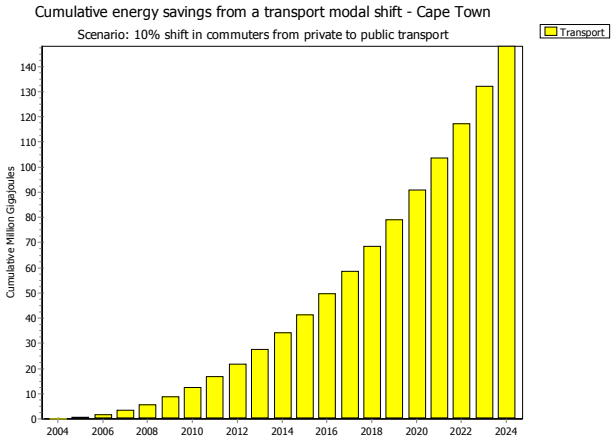
South Africa is currently experiencing high levels of unemployment, while many of those who are employed are receiving very low wages. Accessible, cheap and safe public transport for access to employment, education, health and other essential services and opportunities, is important for the development of poor communities.

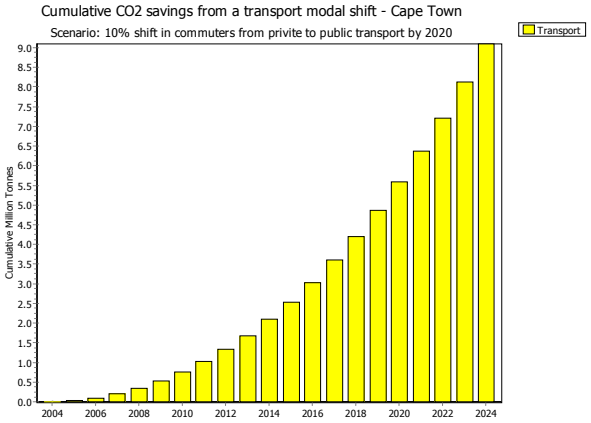
A modal shift will decrease air pollution in a city substantially, which will have large scale public health benefits. The people most affected by local air pollution from transport fuels are those walking along busy roads to work and school. As indicated in the graph above, this is predominantly poorer people without resources to cope with ill health and the economic consequences thereof.

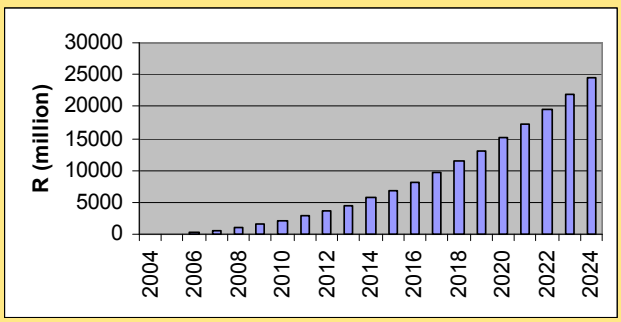
Quieter roads mean a decrease in daily traveling time and a subsequent increase in an individual's free time.

7.3 Potential for rollout

There is great potential for a transport modal shift in cities around South Africa. To demonstrate the impact of this, 5 South African cities have been modeled using LEAP (See 'How to use this Manual'), firstly using a business-as-usual (no modal shift) scenario, then using an energy intervention (modal shift) scenario. For the purposes of this manual, we will consider the case of Cape Town.







To see the complete set of outputs from LEAP for all the cities modeled, visit the Sustainable Energy for Cities website at www.sustainable.org.za/cities

The impact of a transport modal shift in a city: the case of Cape Town

Cape Town has set the following target for achieving a transport modal shift:

- 10% shift in commuters from private to public transport by 2020.

Energy savings

If the city achieves its targets by 2024, 148 million gigajoules of energy will have been saved. This is the energy equivalent of 4.7 billion litres of petrol saved.

Carbon savings

If Cape Town achieves its targets, 9 billion tones of CO_2 will have been saved by 2020

Financial analysis

If Cape Town meets its targets, nearly R25 billion of fuel will have been saved based on today's fuel prices. Note that this graph does not take into account the huge infrastructure costs required to achieve a modal shift.

7.4 Barriers to implementation

- A shift towards increased use of public transport in South Africa will require a major upgrade and improvement in terms of the equipment, quality of service and reliability of service. This is an extremely expensive undertaking. It is also a long term undertaking. Achieving a modal shift over 20 years is thus challenging, given short-term political horizons.

- Management of public transport services is highly fragmented, which leads to competition, rather than cooperation, between the different modes.

- A current lack of public transport network integration makes for cumbersome and lengthy commutes. Unless this is addressed the commuter will prefer to make use of their private vehicle, because of convenience, even if the cost is higher.

- There is a perception amongst commuters that public transport is unsafe. Security issues need to be addressed.

- Transport strategies and approaches, originally developed in the late 1950s, remain today and don't generally look at managing demand but continue to focus on the problem of traffic congestion and the construction of new roads and highways to alleviate the problem. Integrated land use and transport planning is not yet taking place, although some municipalities have acknowledged the need for such an approach.

- Due to apartheid planning, the previously disadvantaged sectors of society have been placed on land that is situated far from formalized public transport nodes.

There are a number of projects that are currently taking place around the country, many of which are linked to the 2010 Soccer World Cup. These include the Gautrain and Rea Vaya in Johannesburg and a proposed Bus Rapid Transit system in the Nelson Mandela Metropolitan Municipality. Most public transport upgrades or new developments require large capital investment as well as large scale marketing and educational awareness programmes that will inform commuters about changes.

7.5 How to go about implementation

It is necessary to develop the public transport system from what already exists. This involves a combination of regulation, integration, investment and step-by-step improvement. As passenger usage increases, income expands and re-investment in new systems and technologies becomes a realistic option.

Addressing institutional fragmentation: development of a Transport authority

The current trend in South African cities is to develop a Transport Authority, made up of transport officials from different spheres of government, the relevant transport agencies and the transport operators. The Transport Authority should help overcome institutional fragmentation and allow for integrated planning and decision-making amongst all role players.

Ethekwini was the first municipality in South Africa to have a Transport Authority. Tshwane Metropolitan Municipality and the City of Cape Town are now exploring this approach.

Improvement of the public transport system

It is important to upgrade the public transport system in order to increase the use of public transport by commuters who are currently using private vehicles. The upgrade is generally in terms of

the subsidized public transport services (rail and bus), but the taxi recapitalisation process is playing a role in upgrading the minibus taxi system.

There are two possible options:

1. The upgrade of the current system with new equipment, improving the service by changing the frequency of trips, based on the commuter's needs, and a marketing programme to encourage public transport use.
2. The development and implementation of new public transport infrastructure/system, such as a Bus Rapid Transit (BRT) system, which will require some infrastructural changes including dedicated public transport lanes, stations and public transport nodes, for the feeder systems.

An important aspect that will need to be looked at is improved safety for the commuters, which is currently one of the reasons why people are not using public transport.

In addition, associated infrastructure around the public transport nodes, such as secure parking lots at stations for people who will "Park-and-Ride", require attention. This includes ensuring covering that will protect commuters from inclement weather when waiting for the service at bus stops, stations or minibus transfer nodes.

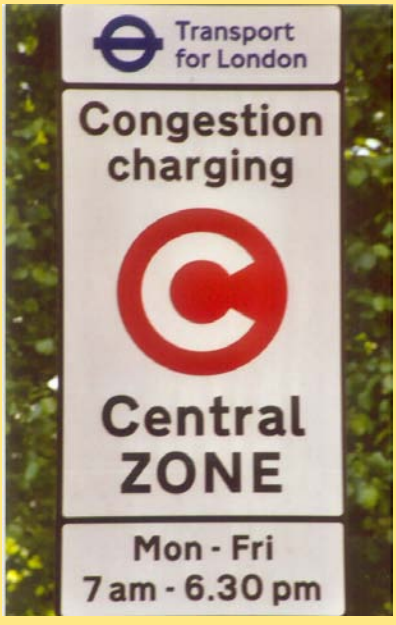
Promotion of travel demand management strategies to minimize single occupancy vehicles

The upgrade of a public transport system to a more reliable, convenient and safe system can encourage people to change to public transport. Other strategies need to be put in place to encourage movement away from automobile dependence.

These strategies include:

- Implementation of high occupancy vehicle lanes, which mean that cars with three or more occupant can have access to a dedicated lane. This lane usually moves more quickly during the peak periods, with free flowing traffic rather than the bumper-to-bumper traffic that is common in the peak periods.

- Employer programmes which aim to encourage the use of alternative transport, such as public or non-motorised transport or car-pooling, to get to work. This could include preferential parking for those carpooling, subsidies for public transport tickets, guaranteed ride home and moving away from subsidized parking for single occupancy vehicles.



Congestion charging in London
To enter the centre of London in your car, you will be expected to pay a congestion charge. This has resulted in 15-20% congestion reduction in most areas.

- Park-and-Ride schemes allow people to park their cars at public transport interchanges and continue the journey on public transport. An important aspect here is the need for security

at the site, in order to ensure the safety of the commuters as well as making sure that the cars are secure.

- The cost of traveling by private vehicle should also be looked at, including the need for accurate parking charges in the CBD. An international trend, which has been successful in London, is the implementation of a congestion charge for access into certain areas of the CBD. The money taken from the charge covers the operational costs of the service as well as upgrading aspects of the public transport system.

The travel demand management strategies can only work if there are suitable alternatives put in place for the commuter.

7.6 Case studies

City of Johannesburg – Bus Rapid Transit (BRT)

The City of Johannesurg is building a Bus Rapid Transit (BRT) system. The system is expected to cost about R2 billion and will be the first unsubsidized public bus system in South Africa.

The first phase of the BRT system is expected to be operational by April 2009. The system will use 18m articulated vehicles running from 5:00am till midnight and will be operated by private contractors to the city. The BRT system will also make use of feeder systems and will link with existing rail stations. The city's goal is eventually to have the bus route accessible to 85% of the city's population.

The BRT will be part of "Rea Vaya Joburg" the city's plan to address growing traffic congestion. Rea Vaya ("we are going") will feature 325km of special public transport lanes and intersections and 40 transport interchange nodes where commuters can switch from one mode of transport to another.

TransMilenio – Bogotà, Columbia

Bogotà is one of the most densely populated cities in the world. In the 1990's, many of the main road ways were heavily congested and the traffic speed during rush hour was only 10km/hour. The use of private cars was a major cause of congestion. Although ± 71% of motorized person trips were made by bus, 95% of road space was used by private cars, which transported only 19% of the population.

By the end of the decade, a new mass transit system, named TransMilenio was designed and partially implemented to solve these large inefficiencies of mass transit in Bogotà.

TransMilenio is a flexible bus system that uses exclusive busways to feed people into and out of the central business district (CBD). The stations are located in the middle of the road to facilitate the transfer between buses in both directions. The bus stops are 57 stations, located every 700 meters