

# Indonesia and India Livable Cities Project and Prioritizing Low and Zero Emission Vehicles for Africa

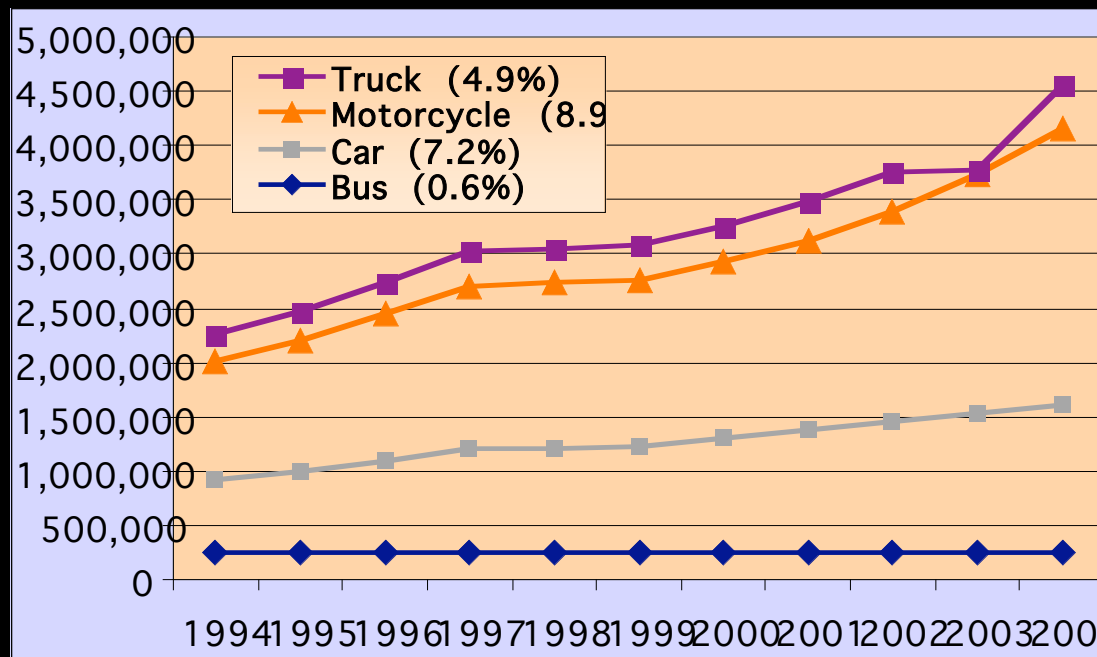


Jakarta

**The Institute for Transportation and Development Policy**

**January 2006**

## Motorization Was Leading to Rapid Increase in Air Pollution in all the cities



**Jakarta**



# Bringing Affordable Latin American Bus Rapid Transit Solution to Asia and Africa



Bogota's TransMillenio





## 2003 ITDP Conference on Human Mobility



# ITDP Brought Bogota Mayor Penalosa to Asia and Africa



**Dar es Salaam Mayor Sykes**



**Chief Minister of Hyderabad**



**Forum in Accra**



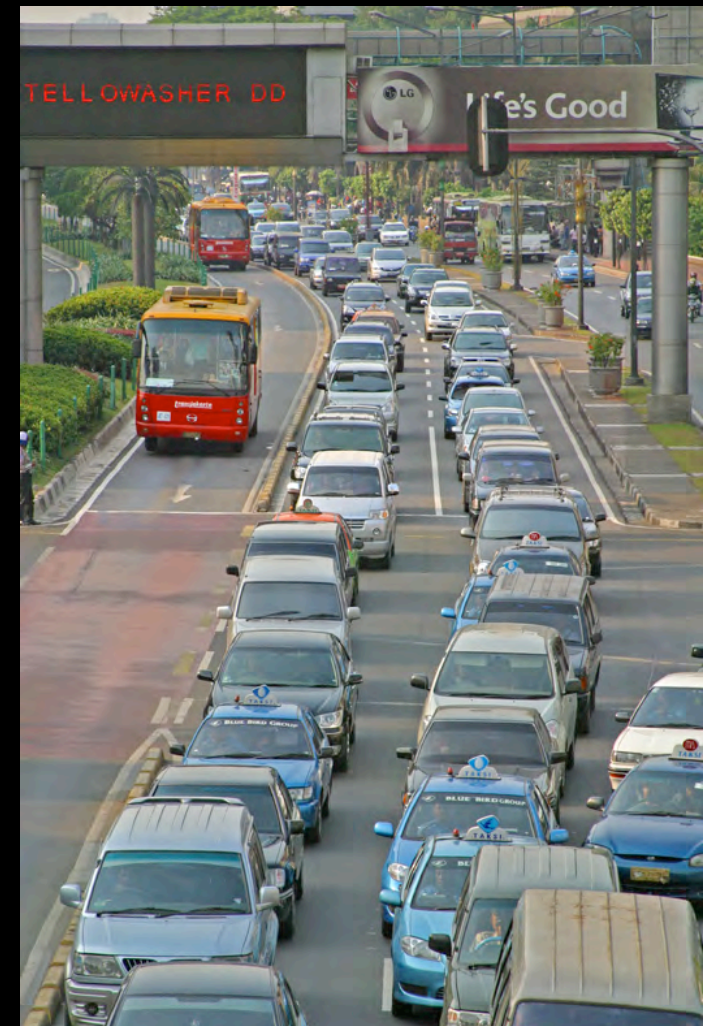
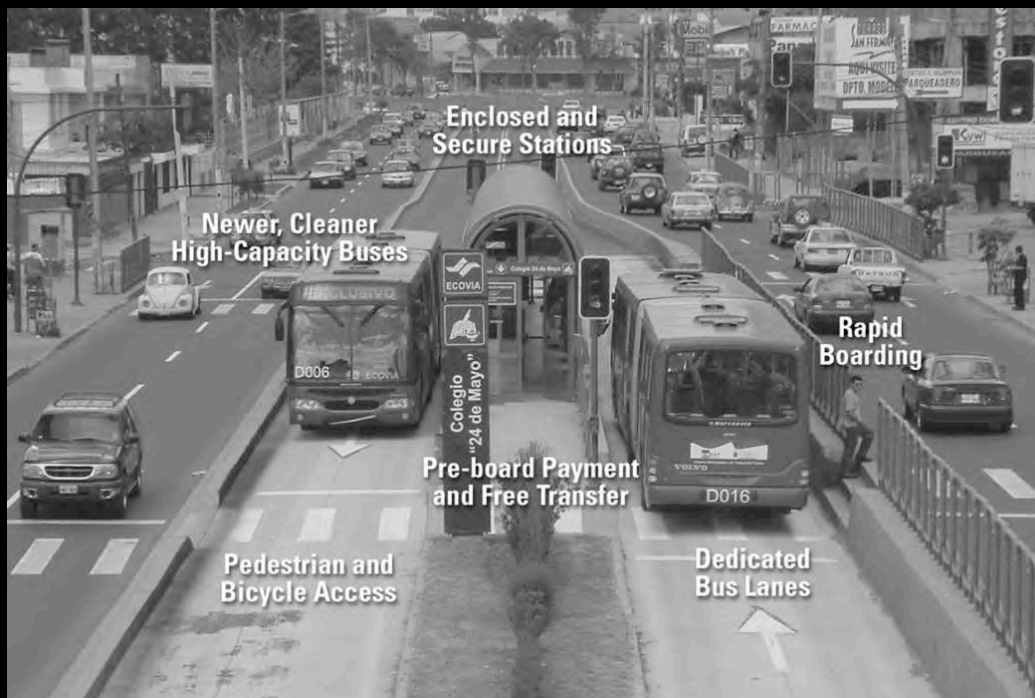
**Accra Mayor Darko**



**President Wade of Senegal**

# Fastest and cheapest solution: surface mass transit using buses

- 1 normal lane carries 500 private cars per hour, 600 people per hour
- TransJakarta Capacity 4500 - 6500 people per hour
- Optimized BRT 35,000 people per hour





## ITDP's Bus Rapid Transit Projects Under the Livable Communities and Low Cost Mobility Initiatives

- Jakarta
- Delhi
- Ahmedabad (India)
- Johannesburg
- Dakar
- Accra



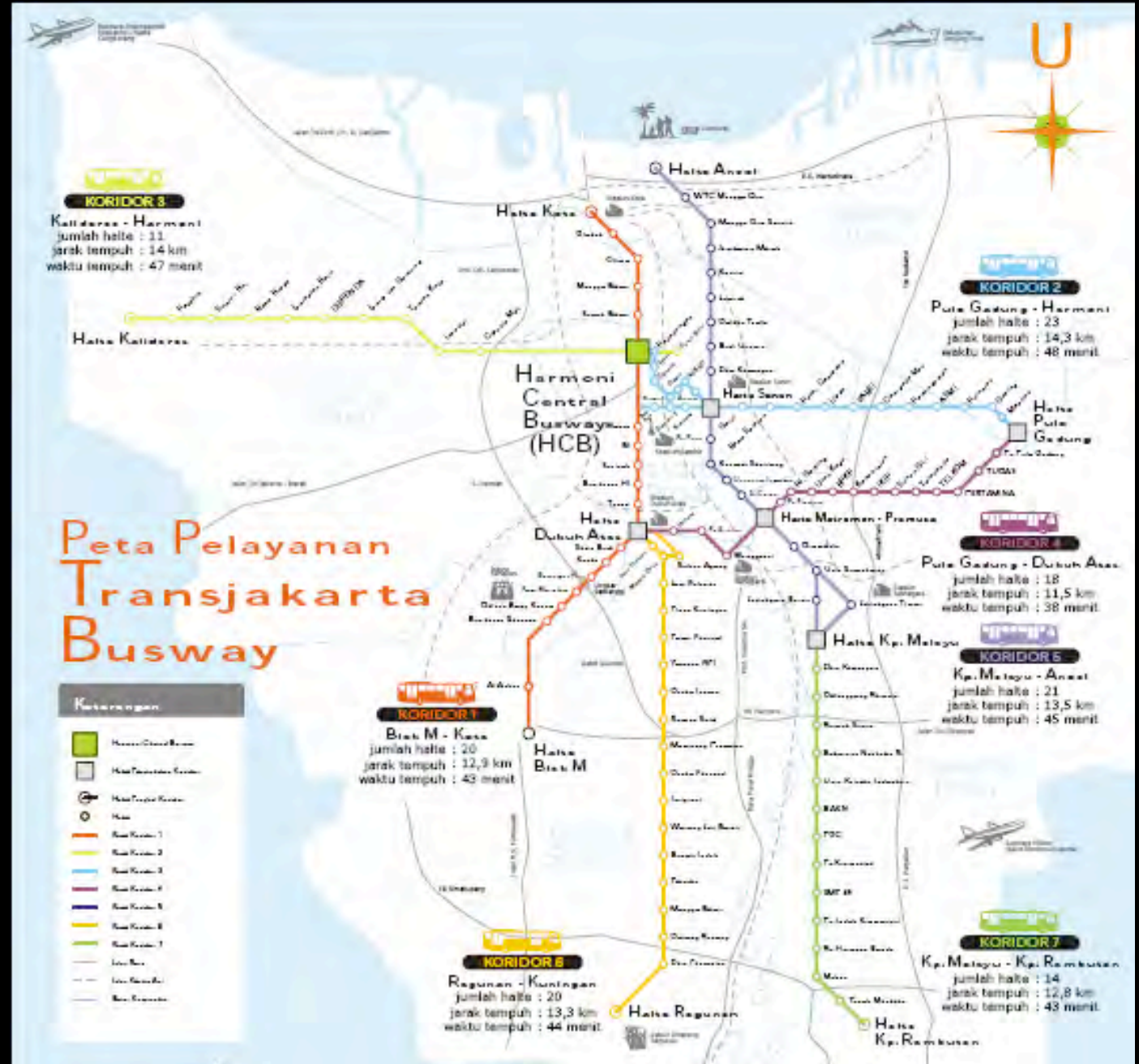
## TransJakarta, 2007 Route Map

## Routes I – III operational

## Routes IV – VII Open 2007

## Funds leveraged to date:

**\$190 million**





## Blok M Pre-Paid Boarding Terminal, Corridor I



## Pre-paid boarding stations create safe, metro like atmosphere, and hasten boarding and alighting

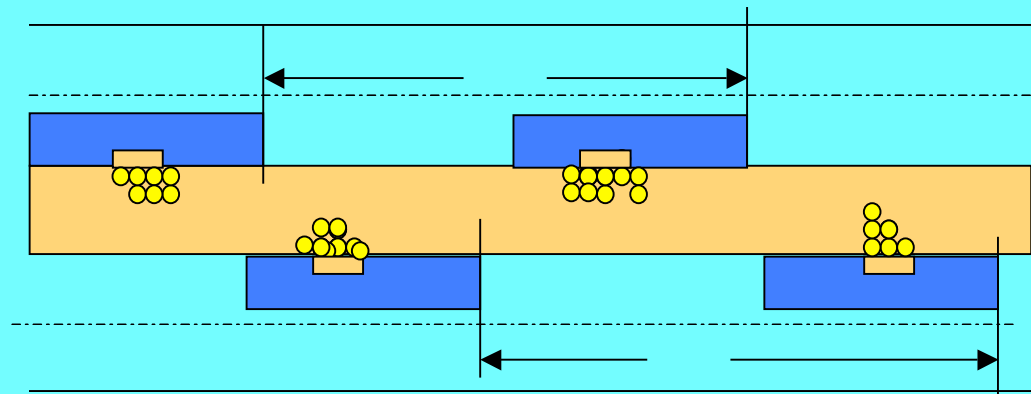




**At level boarding and alighting like a metro is much faster and easy for wheelchairs.  
More doors needed**



## ITDP Projected Serious Crowding at Harmony Transfer Terminal Proposed Redesign:





**Completed September, 2006.**



# Innauguration of new Harmony Transfer Terminal By Governor Sutyoso





## Meeting of ITDP President and Governor Sutiyoso before Opening Corridor II and III, 2006



## Phase I Road used asphalt, and rapidly deteriorated





**Corridors IV- VII are being constructed entirely in concrete.**



# **Corridor I Capacity Low because of Lack of Passing Lanes and single door.**

## **First use of Busway Passing Lane, Corridor III**



**Corridors IV – VII designed with 3 doors**



## Construction in Corridors IV – VII



**Anchol Terminal,  
Corridor V**



**Innovative "Floating"  
Terminal, Corridor 6**



**Rambutan Terminal,  
Corridor 7**



**Ragunan Terminal,  
Corridor 6**

# New bicycle taxi feeder service at Kota Terminal

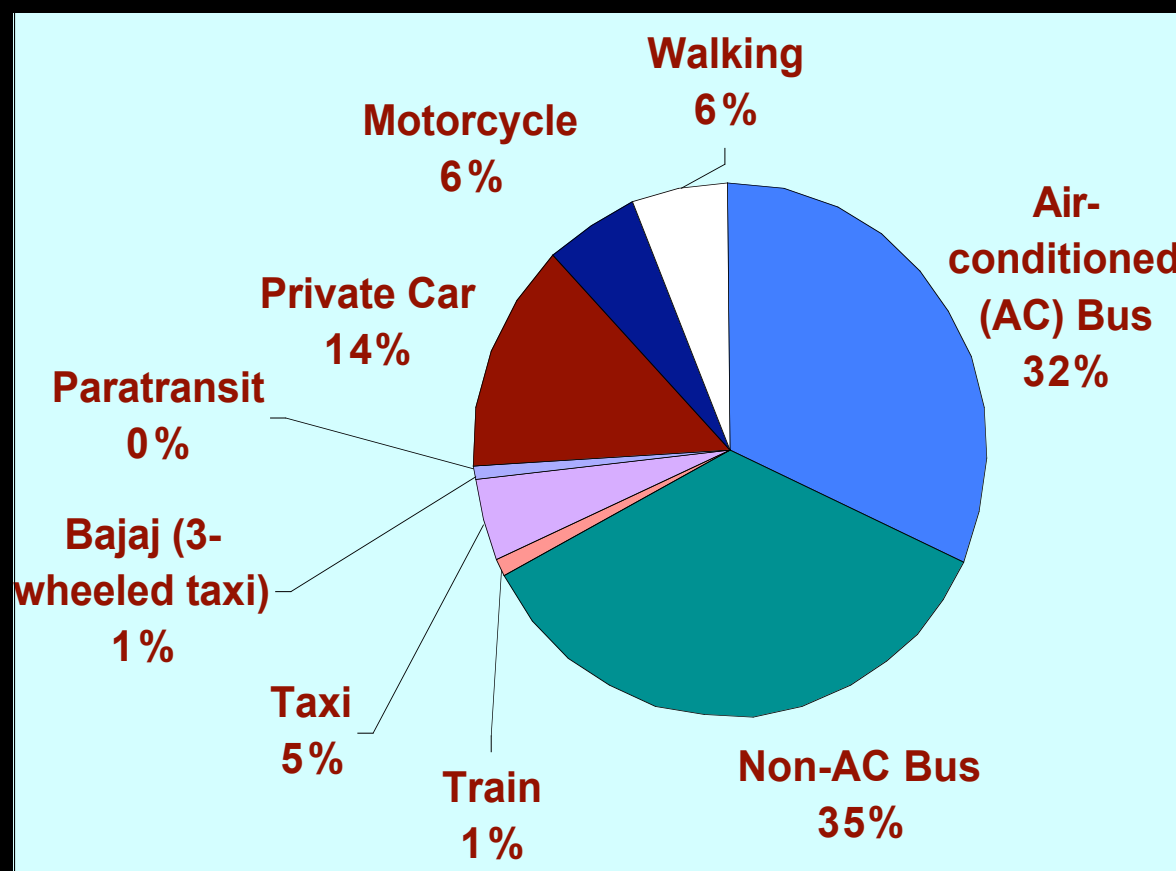




## THE JAKARTA BUSWAY TRAVEL TIME

BUSWAY ROUTE	Before TransJakarta Travel Time	After TransJakarta bus travel time	Improvement	
Blok M - Kota	00:97:00	00:45:00	53.61 %	1 <sup>st</sup> Corridor
Kota – Blok M	00:97:00	00:45:00	53.61 %	
Pulogadung - HCB	01:27:00	00:40:00	54.02 %	2 <sup>nd</sup> Corridor
HCB - Pulogadung	01:02:00	00:35:00	43.55 %	
Kalideres - HCB	01:41:00	00:55:00	45.54 %	3 <sup>rd</sup> Corridor
HCB - Kalideres	01:20:00	00:45:00	43.75 %	

## Where did the passengers come from?





## **Estimated Annual Emissions Reductions from Phase I and II**

- NOx – 155 MetricTonnes
- Particulates – 23 Metric Tonnes
- CO2 – 20,000 Metric Tonnes

## CNG Buses on Corridor II and III Emissions Bonus



- Total bus km on Corridors 2-3 = 5,000 km/day
- Particulates:
  - Diesel = 1.7g/km
  - CNG = 0.03 g/km
- Carbon Monoxide
  - Diesel = 3.5 g/km
  - CNG = 0.8 g/km
- CNG Busway buses further reduce emissions:
  - Particulates by 8 kg/day or 2.5 Tonnes/year
  - CO by 14 kg/day or 4 Tonnes/year



# First CNG Stations Introduced





# POOL AND CNG FILLING STATION FOR BUSWAY





## **TransJakarta (PT JET company) hires Jakarta's first four women bus drivers.**



# Getting cities to integrate sidewalk improvement with BRT Planning: Sidewalk Situation in TransJakarta Corridor Before recent improvements.





**Sidewalk Improvements in TransJakarta Corridor  
Alone have taken trips away from Taxis. It is now  
possible to walk short distances and cross streets.**



**TransJakarta Corridors all being reconstructed with wider, elegant sidewalks. Revitalization of pedestrian traffic on the whole corridor.**



**Governor just announced plans to pedestrianize major road in N. Jakarta**



## High grade shaded walkway connects TransJakarta to the Commuter rail line.



**Improved Sidewalks  
have increased  
walking trips at the  
expense of taxi trips.**

**Cab drivers are  
complaining, so we  
know it is successful  
(but no evaluation yet)**





# Phase I Pedestrianization: Yogyakarta



## **Delhi's High Capacity Bus System Its not just a busway, it also has bike lanes, and better sidewalks.**



- Funds leveraged to date:
- \$33 million
- 5 corridors approved
- 1 under construction



# First five approved HCBS Corridors, Delhi

## Corridor I



# Construction Begins, Delhi High Capacity Bus System, November 2006





## ITDP Co-Hosts Conference & Exhibition on Appropriate Technologies for Public Transit, Delhi, March 2006.



5 Indian Cities with  
Advanced BRT  
Plans:

- Delhi
- Pune
- Ahmedabad
- Indore
- Jaipur

Others under  
consideration

Bangalore, Hyderabad,  
Serat, other

**April, 2006, BRT declared eligible for Nehru Urban  
Development Mission**



## Pune Opens India's first "BRT" system, October 2006

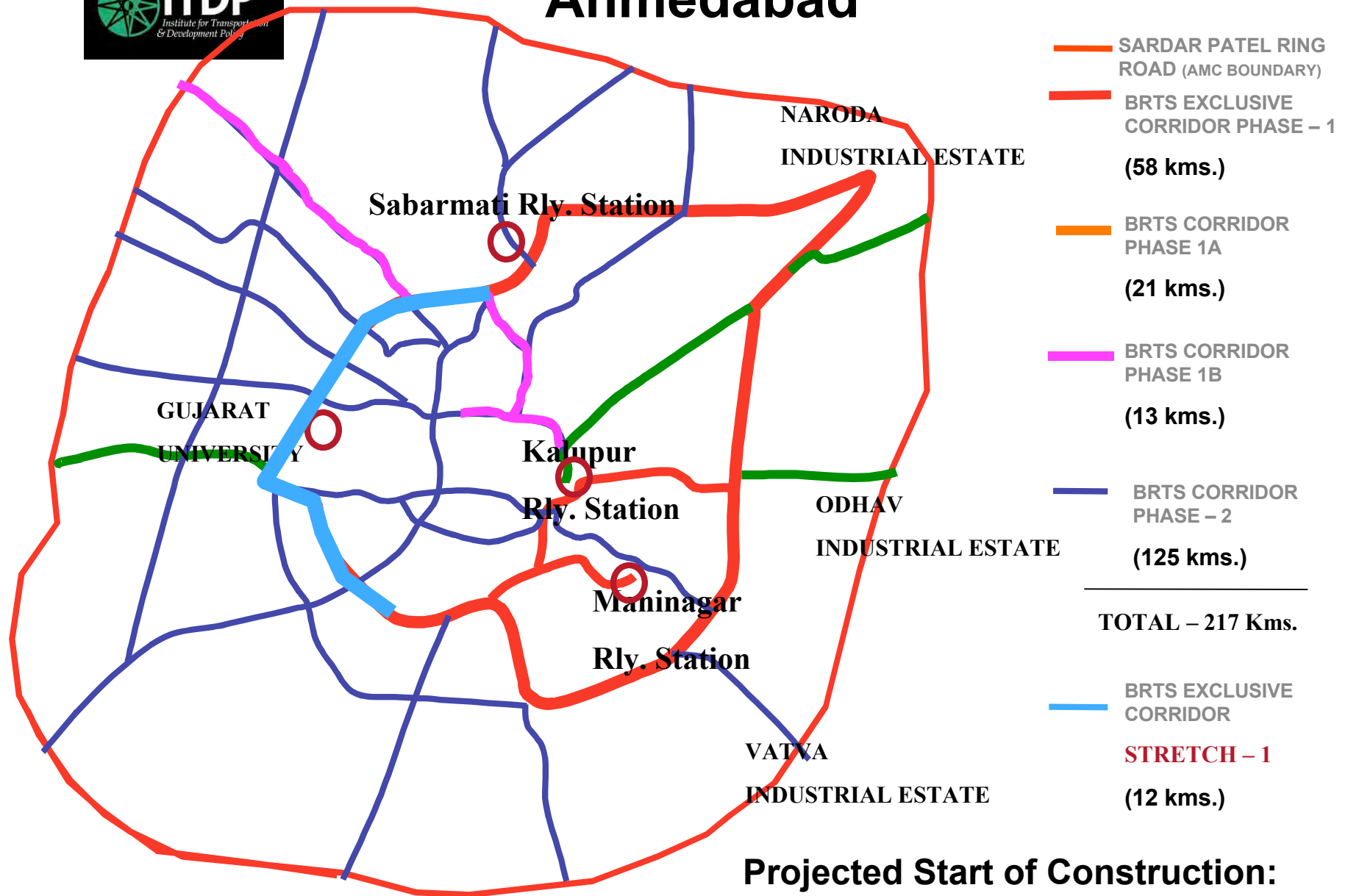


**No foreign help, very few buses, not well planned,  
draws some criticism**



# Ahmedabad

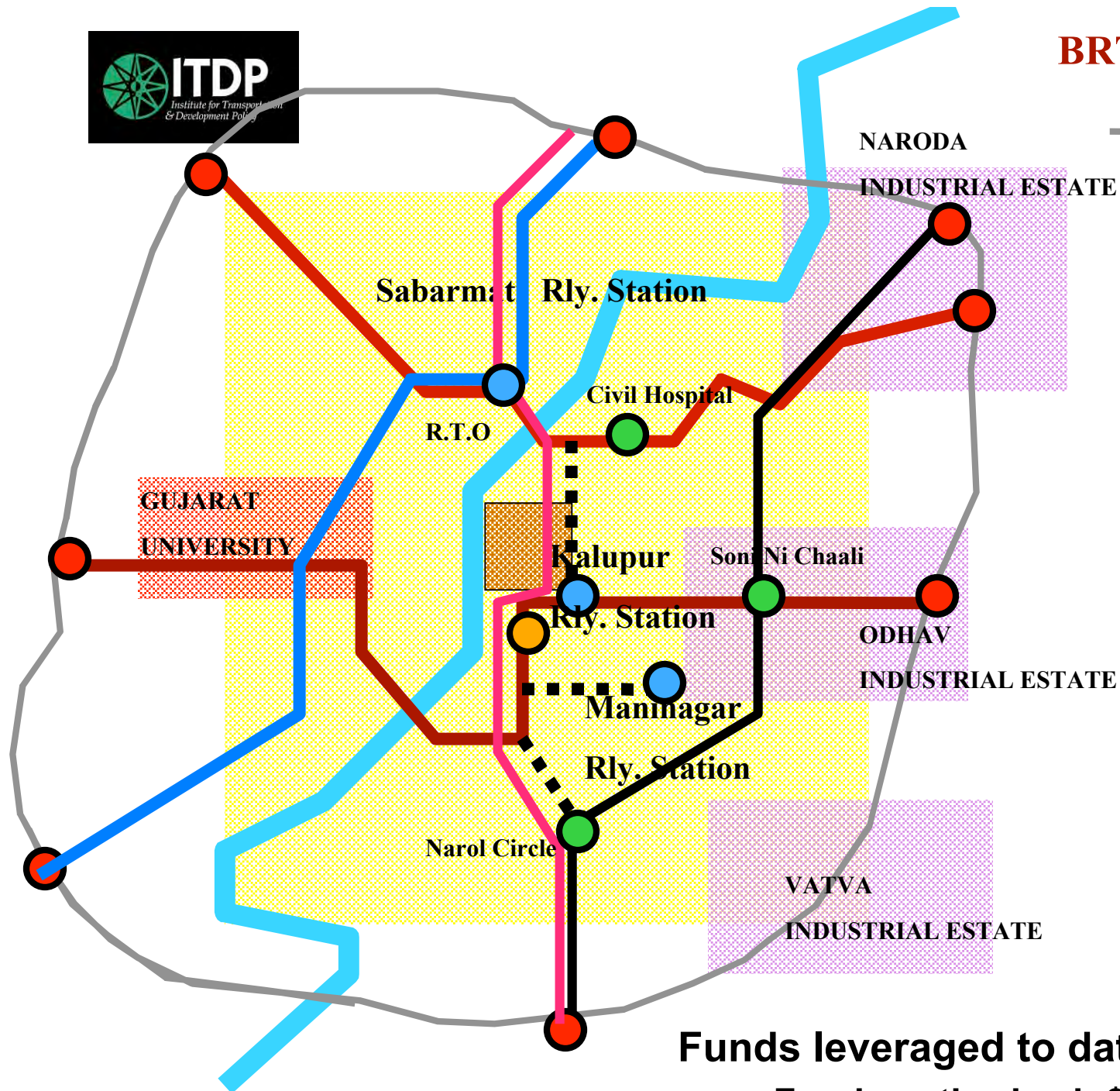
## BRTS- PHASING







## BRTS- NETWORK



**Funds leveraged to date: \$14 million**  
**Funds authorized: \$110 million**



# **Dar es Salaam: Phase I Planning Complete**

## **Projected Construction Start: September, 2007**

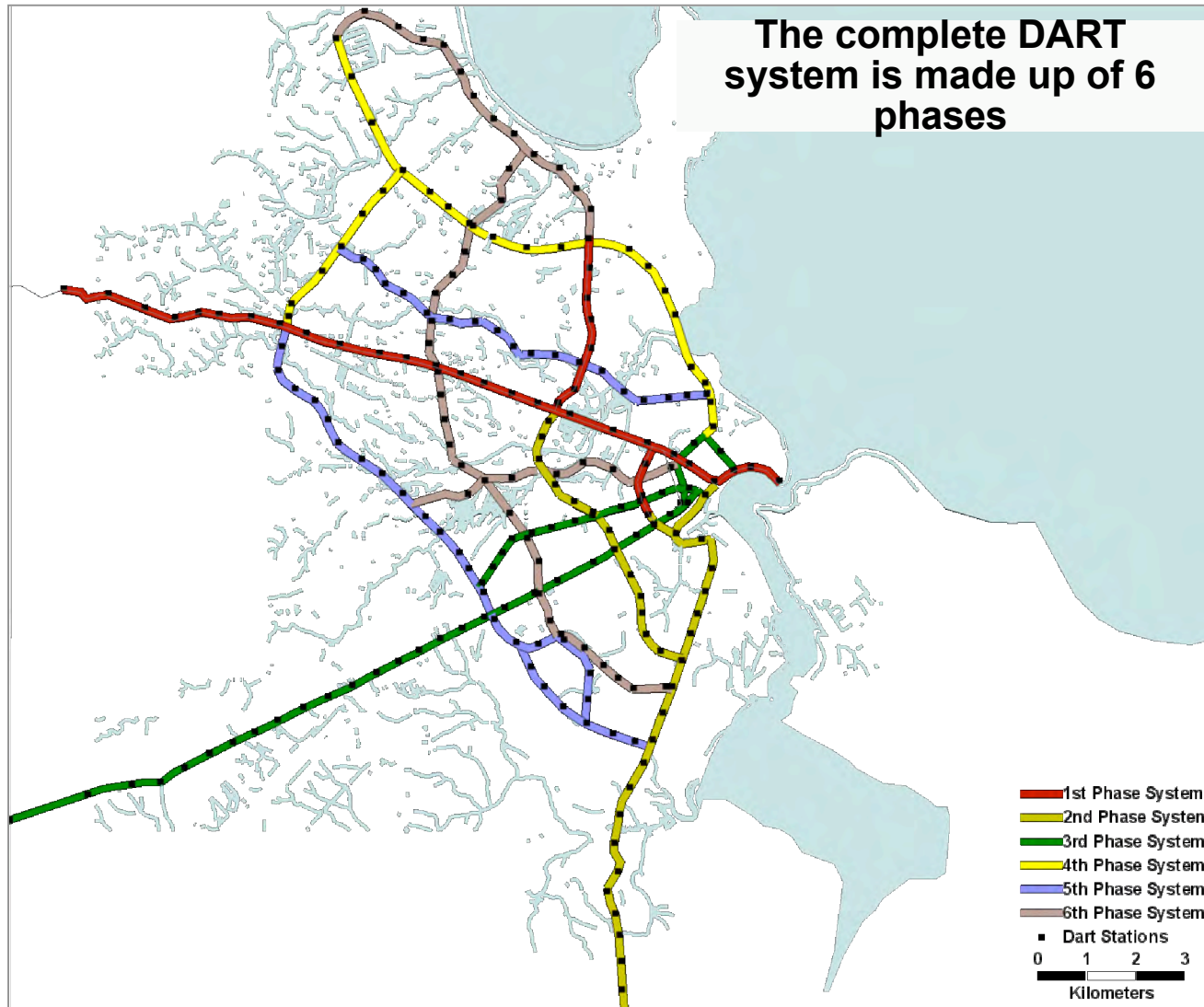
## **Opening Day: March 31, 2009**



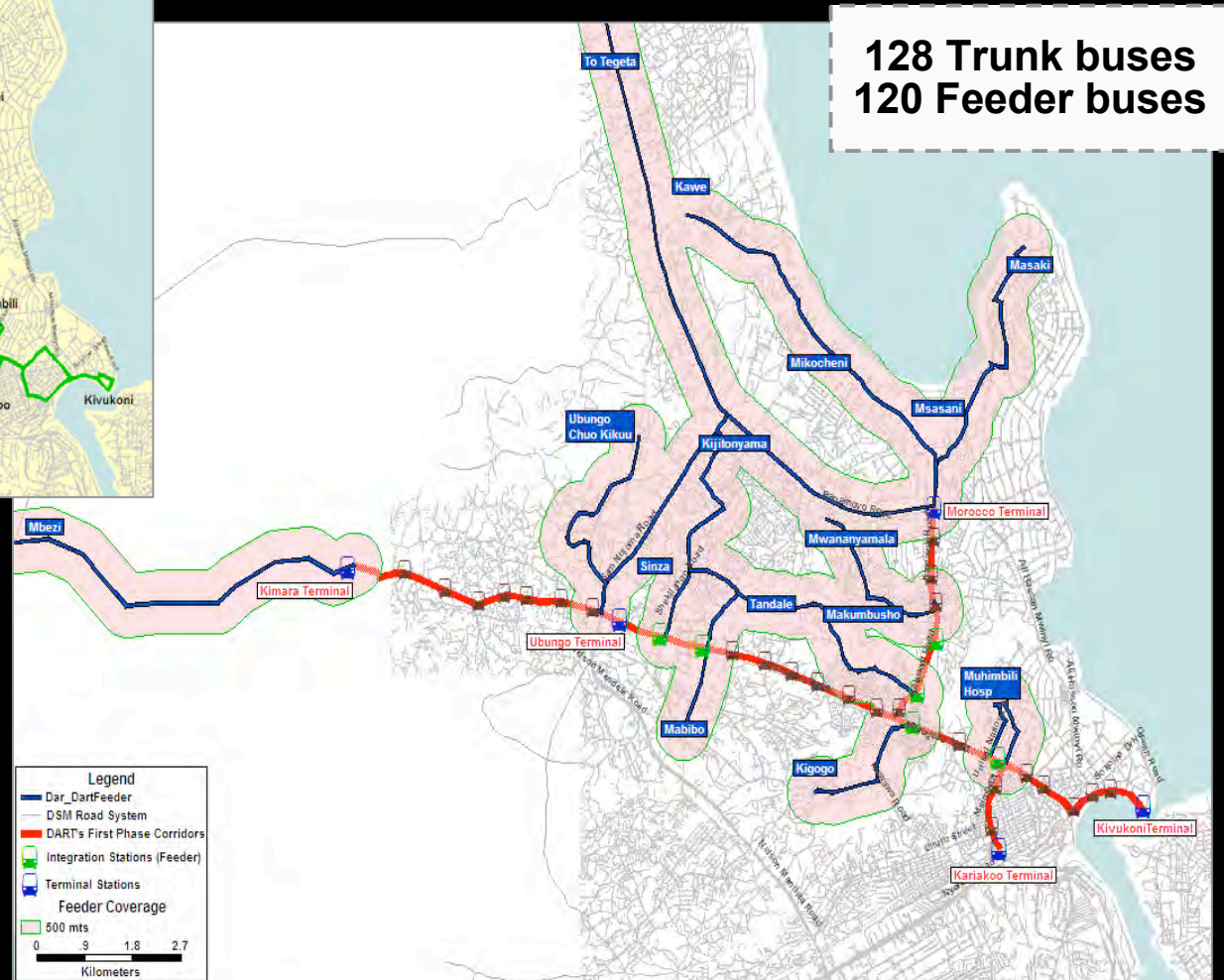
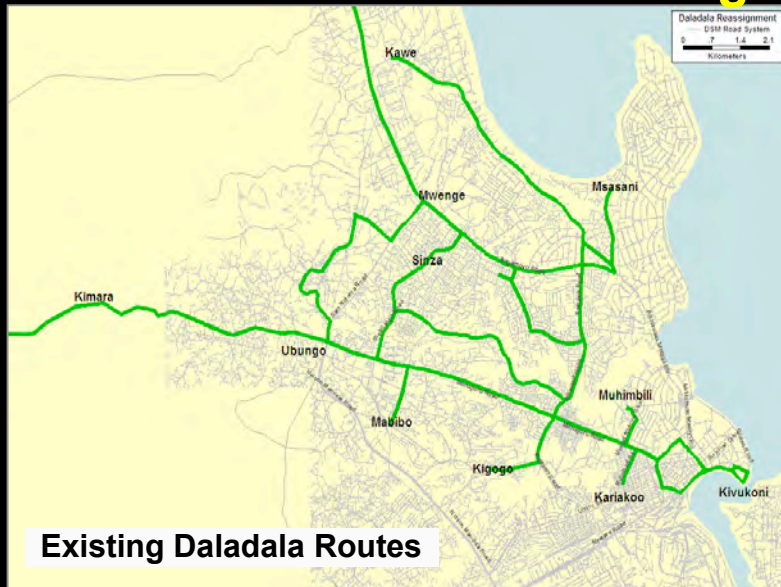
**Financing  
approved  
by Prime  
Minister,  
October  
2006**



# Longer Term system Plan Completed



# Phase 1, 20.9 km Trunk System. 1500 Daladalas and 48 routes will be replaced by DART Integrated Trunk and Feeder System



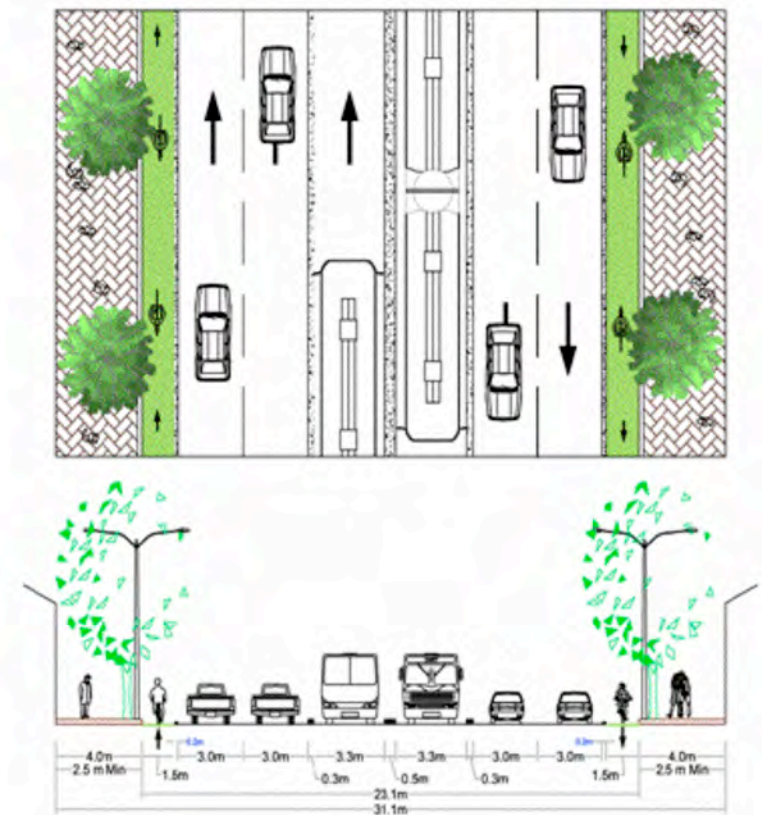
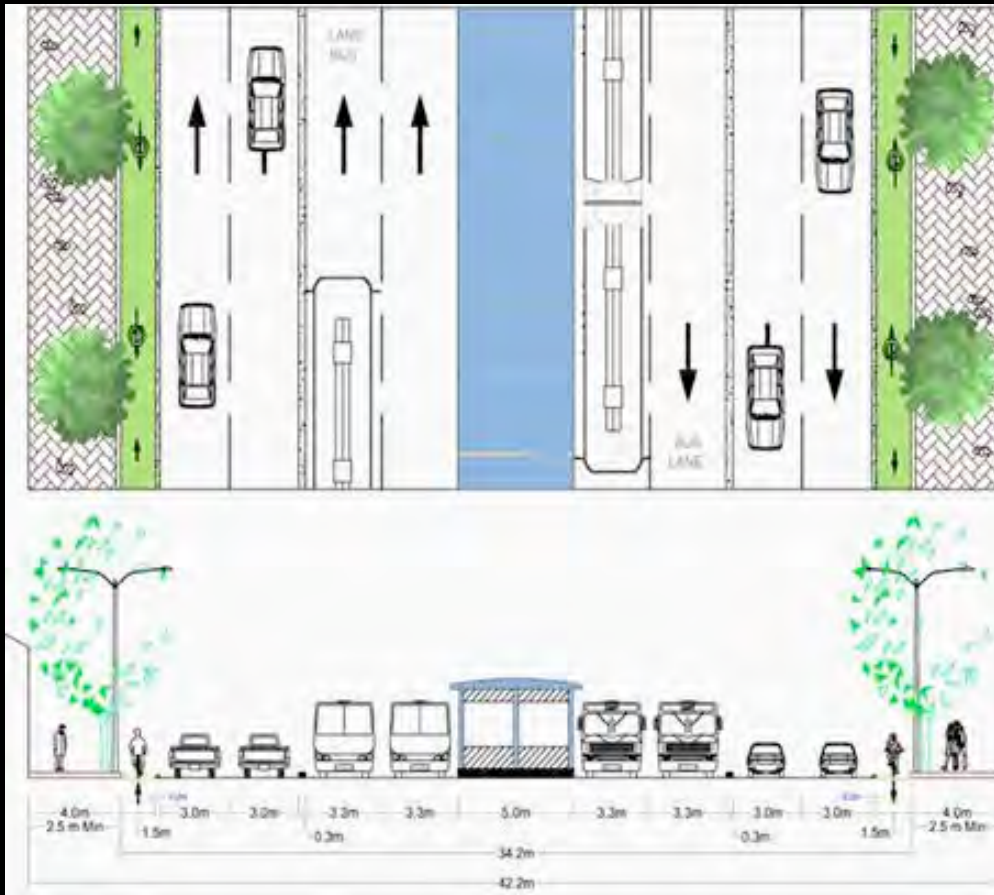
150,000 daily passengers

Emission Reductions:  
CO<sub>2</sub>: 112,795 MT  
TSP : 9.9 MT,  
CO<sub>2</sub> :1479 MT,  
NO<sub>x</sub>: 1788 MT.



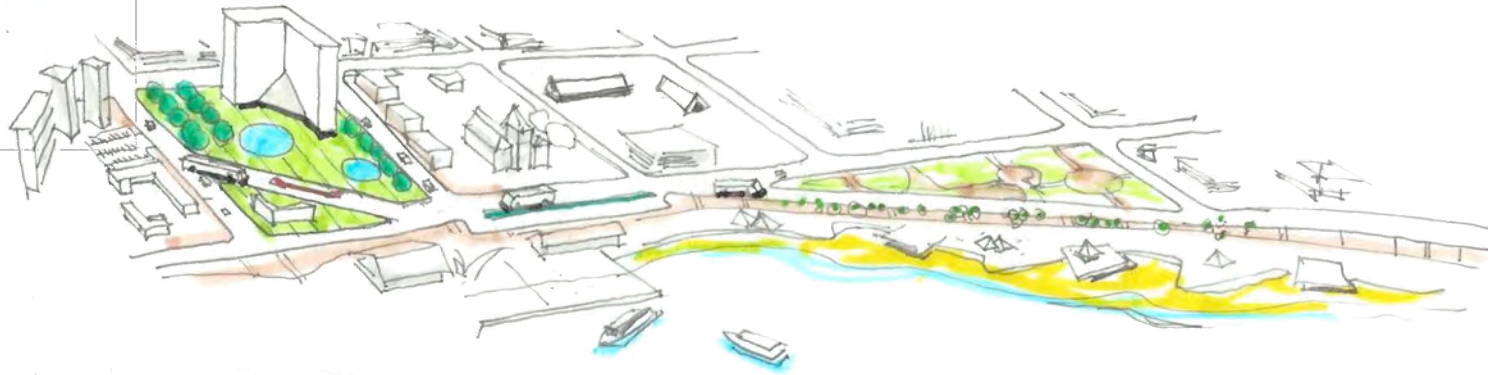
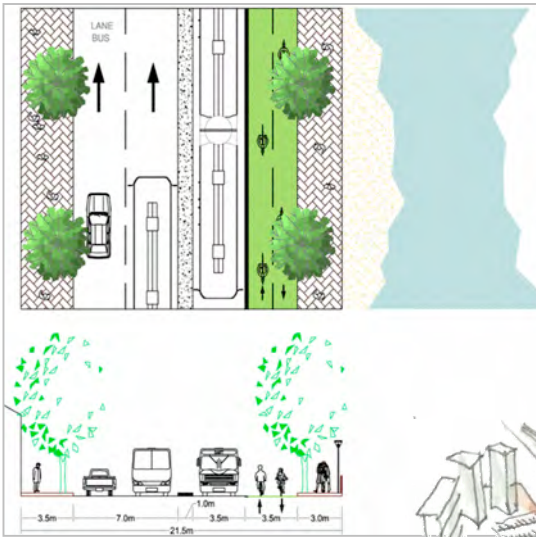
# Typical cross section

Example



Stretch 3 Cross Section off Station

# The Waterfront





## In the City Center

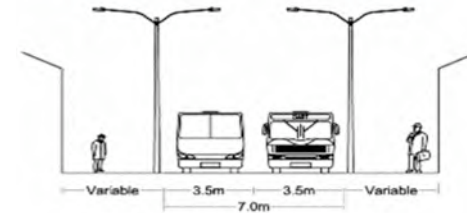
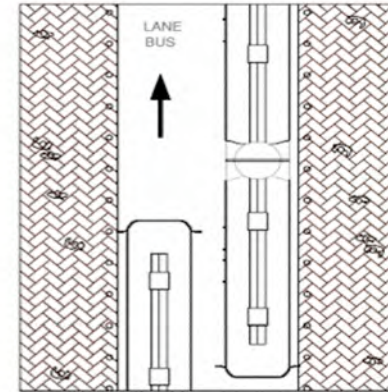
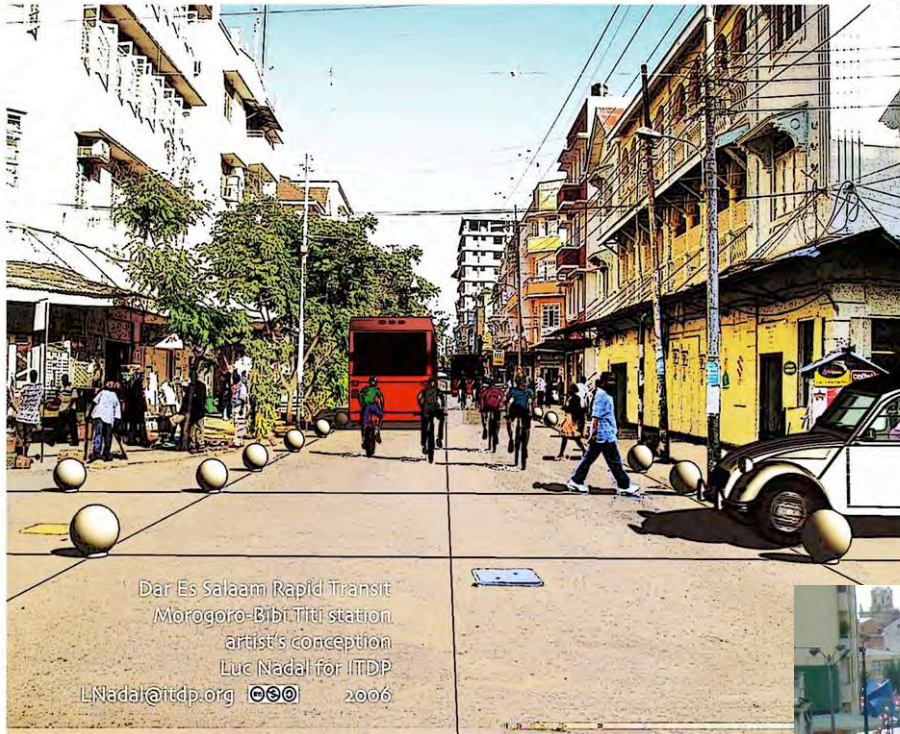
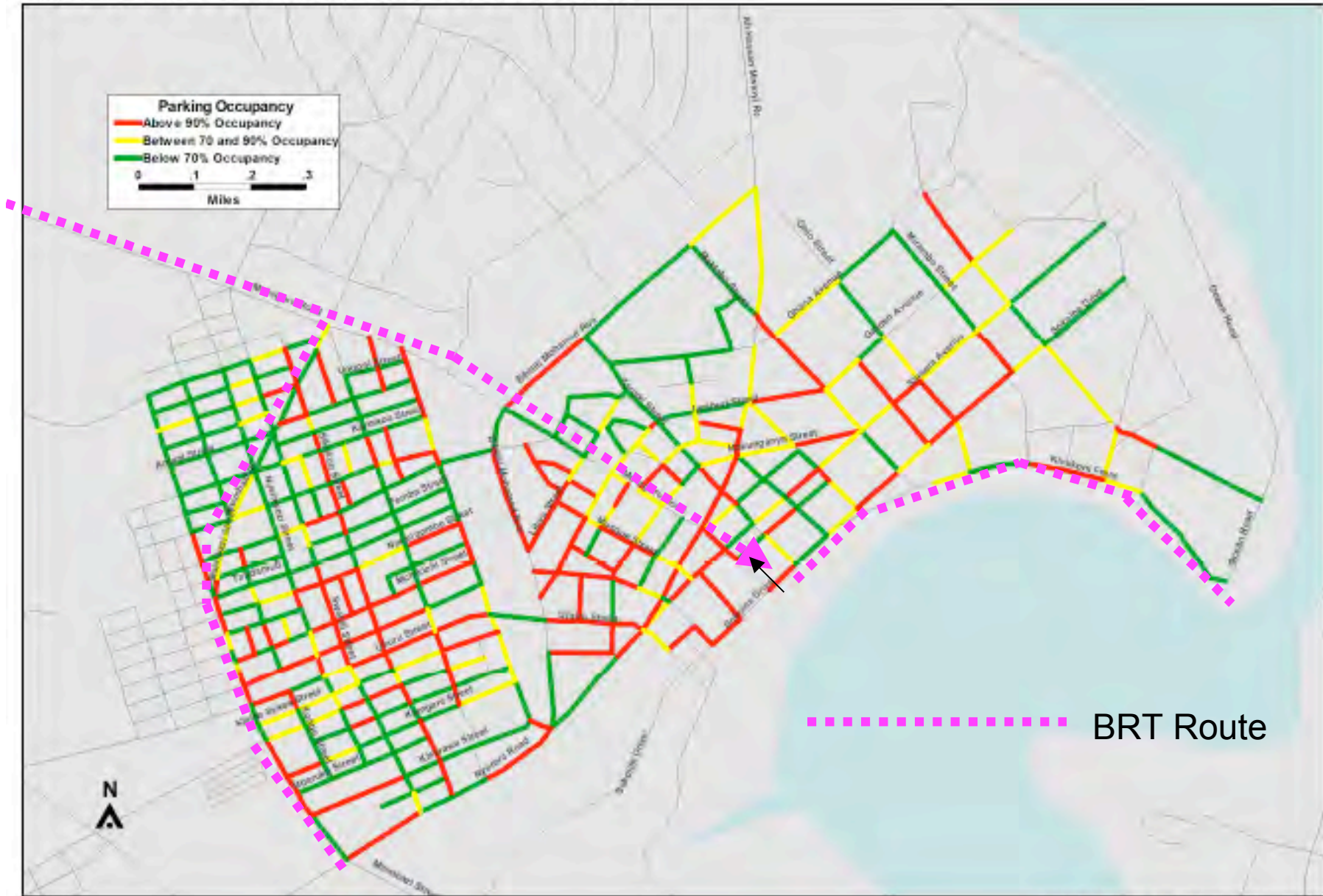


Figure 10: Dar Es Salaam City Centre On-Street Parking





# DART Station Design: 31 Stations



6 stations - TYPE A



7 stations - TYPE B



4 stations - TYPE C





## DART Phase 1 Public Cost: \$110 million

### Total Public Costs

Item	Costs (TZS Billions)
20.9 km road infrastructure	46
31 Stations	16
5 Terminals	16
2 Depots	11
Resettlement (Utility relocation, upcountry bus terminal, expropriation, etc)	31
DART Operating Budget (prior to opening)	2
<b>Total</b>	<b>122</b>

### Financing

**Government Budget (2007):      \$30 million**

**World Bank/other:                      \$80 million**





## **DART Phase 1 Needs to Attract \$39 million in Private Investment: ITDP/Deloitte did the business plan and financial model**

Item	Total Investment (TZS BN)
Ubungo Depot Bus Operator: 77 trunk buses, 72 feeders	25
Morocco Depot Bus Operator: 51 trunk buses, 48 feeders	16
Fare Collection Company	2
<b>Total</b>	<b>43</b>

### **Financing**

**Equity Financing: TZS 13 BN**

**Total Loan  
Financing: TZS 30 BN**

**Credit: IFC, FMO, BNDES, other export credit agencies**



Currently, Dar es Salaam Commuter Bus Owners Association (Darcoboa) with 150 members is participating in project design

## Employment Impact

### Daladala measures

- Each operating company will operate both trunk lines and feeder lines
- Bidding will give advantage to consortiums which include former Daladala owners and operators
- They must form into consortium and bid to win one of the two Phase I operating contracts

### Government measures

- Government needs to ban the registration of used Daladalas in January of 2007 and announce which Daladala routes will be cut
  - By 2009 the same number of buses that will be cut from service will have failed anyway
- Government will only allow registration of new buses that comply with the technical specification of the feeder bus
  - Owners of these new buses can use these buses as capital to enter new consortiums

### DART system incurs no net job loss

Current jobs lost	<b>(3000)</b>
(+) Jobs created by DART operations	<b>1500</b>
(+) Jobs created by construction	<b>500</b>
(+) Jobs created from new Daladala routes in underserved areas	<b>1000</b>
<b>(=) Net jobs loss by DART</b>	<b>0</b>



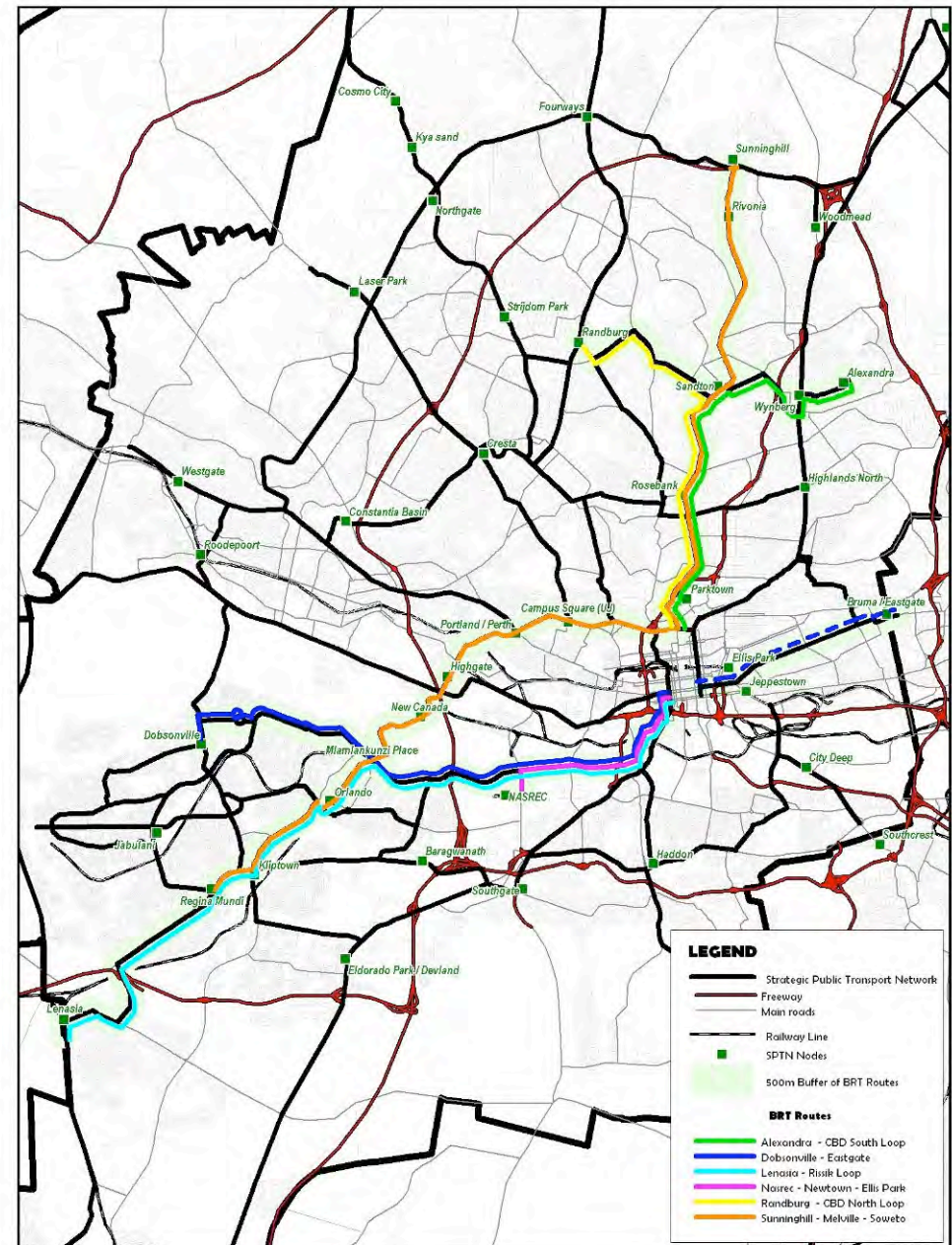


# Project Timeline

Project milestones	Activities
January 2007	DART Agency fully operational
	All tender documents ready (for system construction, operation, management)
February 2007	Resettlement Action Plan finalized and disclosed to public
	Formal budget request included in budget submission
July 2007	World Bank approval for financing of infrastructure
September 2007	Complete all relocation activities
	Award contracts for Phase I construction
	Pre-qualified bus operating companies formed
November 2007	Competitive Tender for Bus Operators Issued
March 2008	Bus operating contracts and ticketing system contract signed
May 2008	Bus financing secured
By February 2009	Complete Phase I construction,
	Ticketing system operational
	Buses operational
	Driver training begins
March 30, 2009	System operation commences: "D-day"

# Johannesburg BRT (Rea Vaya)

- In preparation for the 2010 World Cup
- Mayor and City Council Endorsement November 2006
- \$200 million in Municipal and National funds allocated.



Drawn by:	S. Schutte
Date:	October 2006
Project:	Phase 1
File:	JHB BRT.doc
Project:	LL WUSHA
Scale:	1:100,000

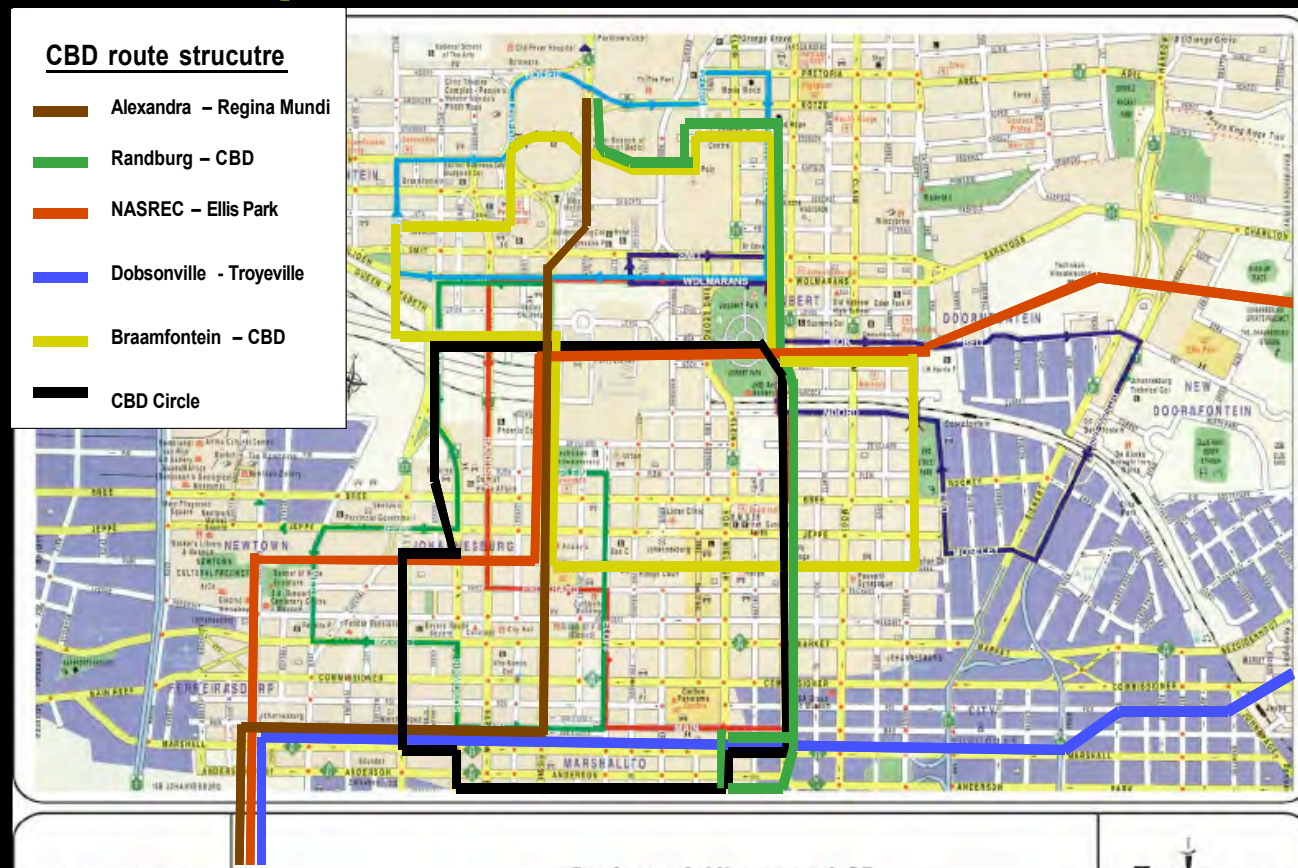
Joburg BRT Routes - Phase 1

Joburg





# ITDP convinced them to extend the BRT system through the city center rather than to have a separate downtown connector



# Dakar BRT Proposal

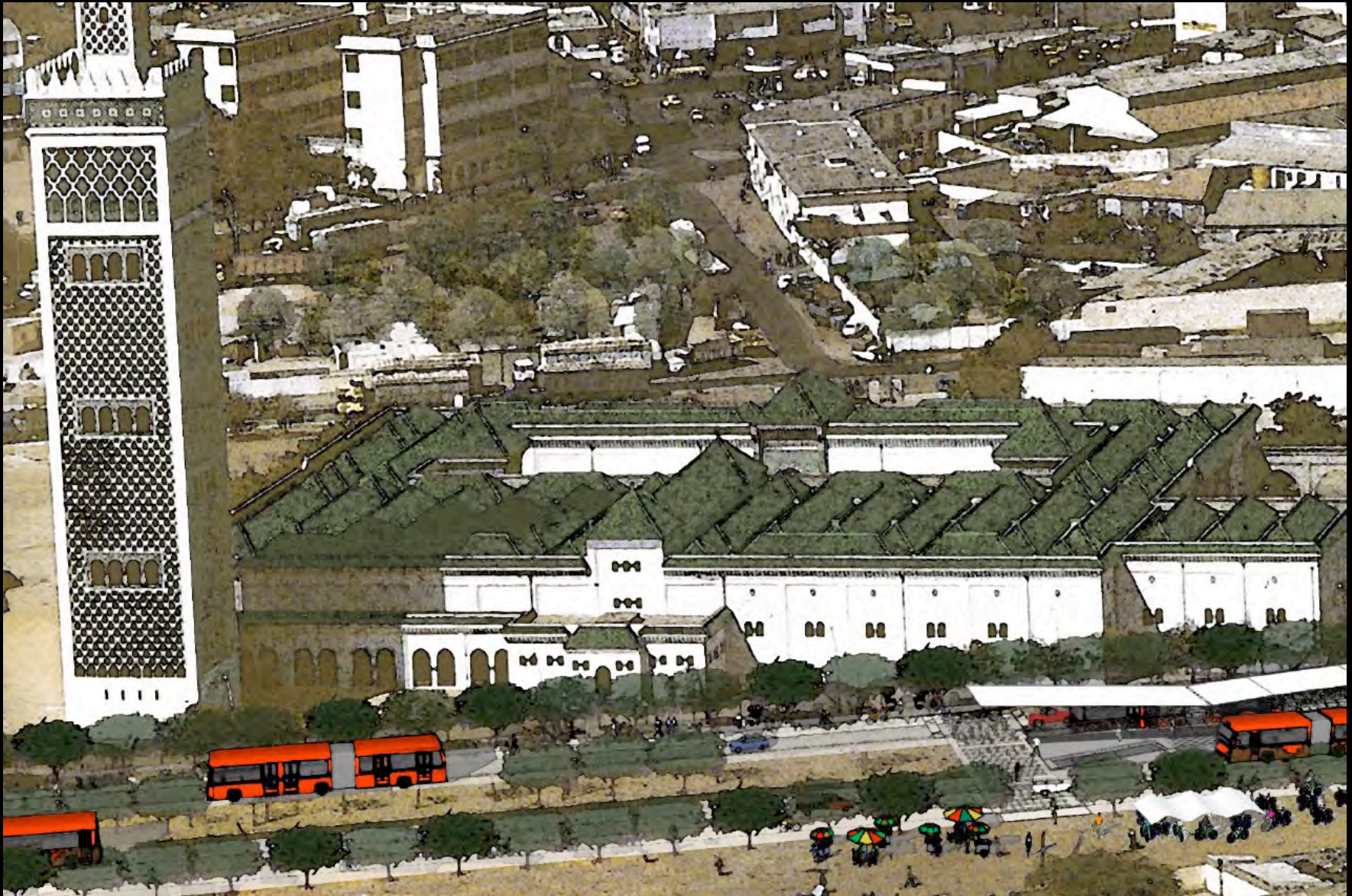


**Pre-Feasibility Study Complete 2004**

**41 km system included in Master Plan and Approved by Transport Minister, Fall 2006**



## **\$1 million UNDP GEF Planning Grant Pending under GEF 4**



## Accra BRT

- Taken over by the World Bank
- \$7.35 million World Bank GEF Grant Approved
- \$29 Million World Bank IDA Loan authorized



# CaliforniaBIKE

Los Angeles



- 1 Strong steel mudguards
- 2 Smooth shifting using a rapid rise derailleur
- 3 Strong load carrying rack
- 4 Clean high quality precision welds
- 5 Durable graphics beneath clearcoat finish
- 6 Strong aluminum brake lever  
Crisp grip gear shifting
- 7 Modern composite V-Brake System
- 8 High quality rust-resistant aluminum JoyTech hubs
- 9 Aluminum 36-spoke rim

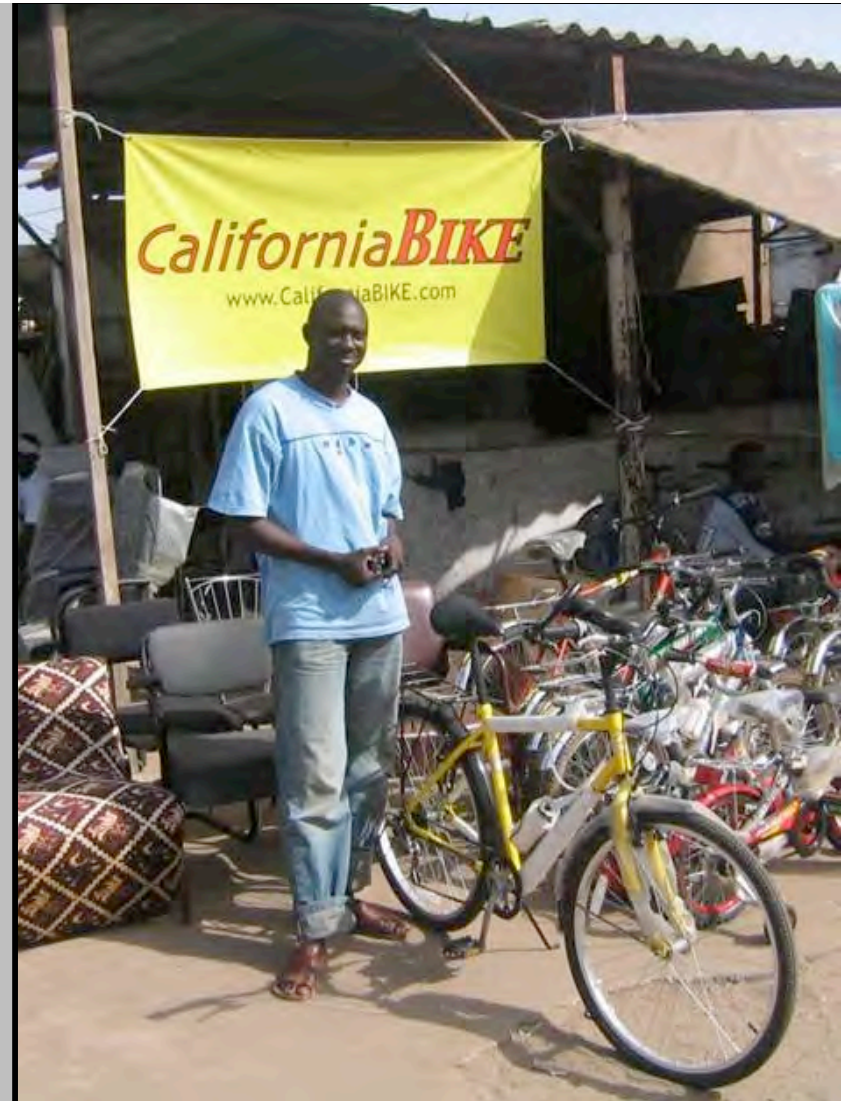




Percent of trips replacing  
minibus: 35%  
Average minibus trip distance  
displaced: 7km.  
Minibuses average age: 15  
Minibus capacity: 15  
Minibus Grams of CO<sub>2</sub>/pax km:  
140

Annual CO<sub>2</sub> emission  
reductions to date:

456 Metric Tons



	Total Bicycles Distributed as of September 30, 2006
Ghana	2,410
Senegal	615
South Africa	1,308
Total	4,333



## The California Bike Coalition: Support local bicycle dealers



Ally Salum Spares & Merchandise, Tanzania



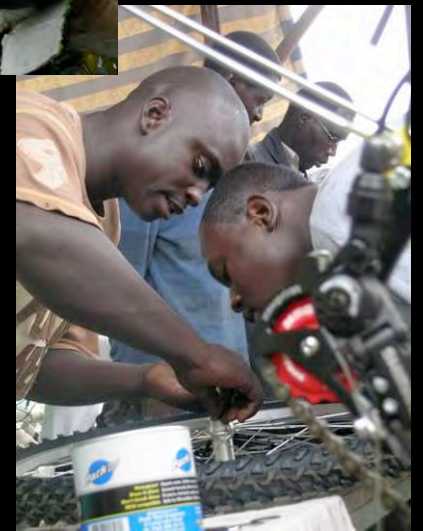
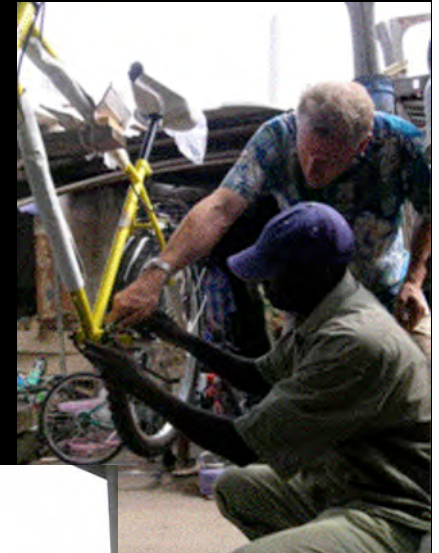
Mamadou Oule Diallo, Dakar, Senegal

California Bike is carried by 30 independent bicycle retailers in four countries.

Together they have sold over 4,200

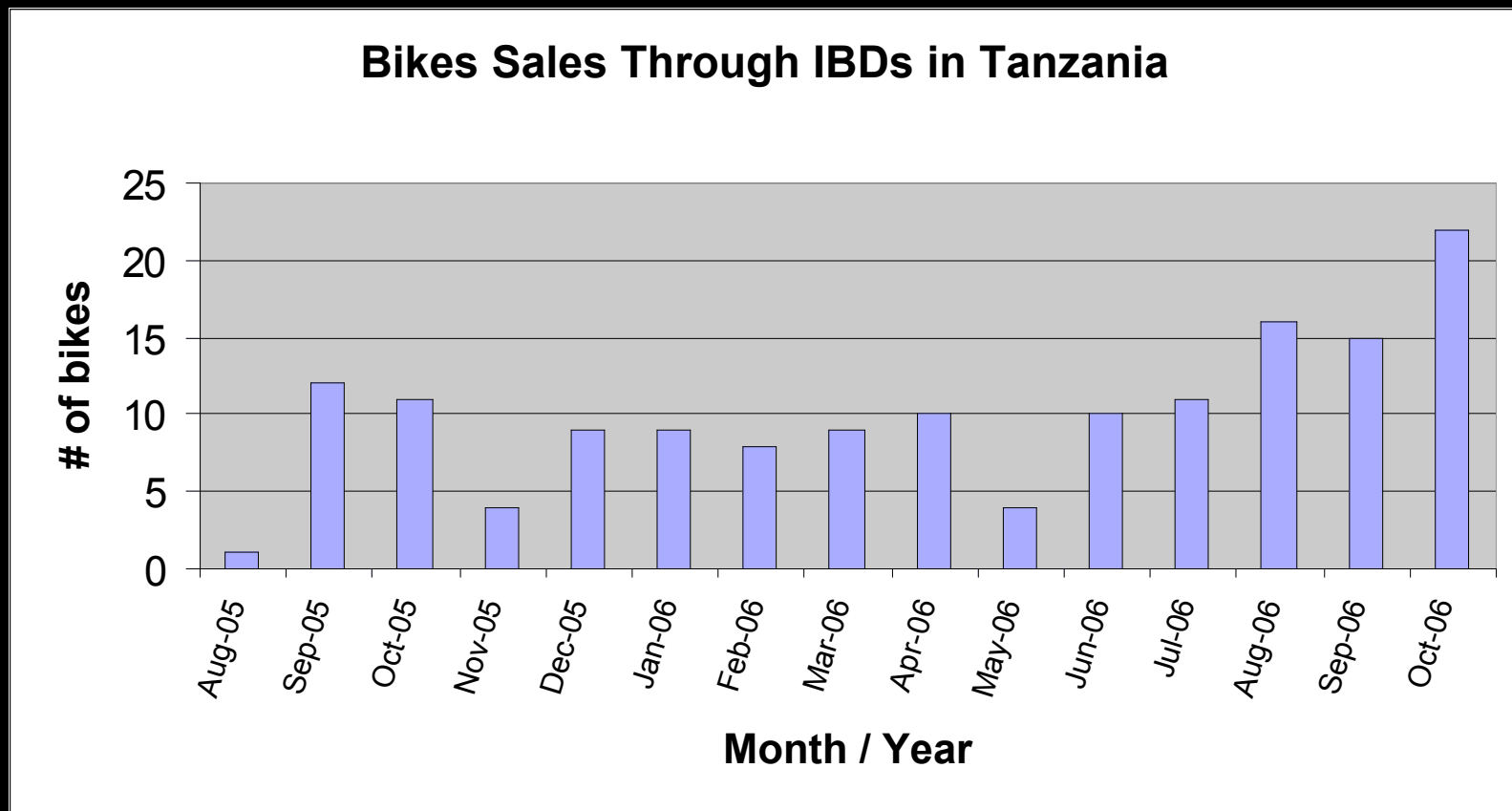


## Training for IBDs led to a doubling of sales





**Training was held June 06. Monthly sales doubled.  
Customers did not initially understand why this bike  
was better than the others.**



- **Technical Support for the ISENCY bicycle factory in Senegal**







## 9 Independent Bike Dealers in South Africa Created: 7 still exist





# Creative Credit Schemes

## Employee Payroll Deductions





## 11.5 km of New bike lanes in Cape Town (photo just prior to opening)



## Promoting Cycling



The first ever Car Free Day in  
West Africa  
Dakar, Senegal  
December 2004





## Over 6 Bike Caravans Held in Accra



Over 4,300 cyclists attended

# Promoting Cycling

Bicycle workshops with over 600  
children in 8 cities





## Establishing Partnerships between US Bike Companies and Local Retailers

- Trek Bicycle Corporation Signed Dealer Agreement with Bompthi Sport, Dakar, Senegal. Sold One Container (350 units) in 2006
- Trek Bicycle Corporation Signed Dealer Agreement with Firefox, India. Trek already sold 300, and project conservatively 1000 in 2007.



## Modern Indian Cycle Rickshaw

Extension of ITDP India  
Cycle Rickshaw  
Modernization Project

When Project Began:  
2000 in Delhi, Agra,  
Mathura, and  
Vrindavan

Today: 300,000 in 9  
cities



- **30 kilograms lighter weight**
- **Wide, comfortable woven nylon seat**
- **Permanent canopy for sun and rain protection**
- **Integral (one-piece) frame two speed gear system**



## **The First Trial Fleet Was Sold to the Wallahs at the Sheraton near the Taj Mahal.**

A marketing firm was  
hired to sell the vehicles.

There were bonuses for  
each sale.



## The Wallahs at the East and West Gates of the Taj Mahal were the second sale





## 100 Modern Rickshaws Launched in 3 events in Jaipur, 2004



**Selling the traditional financiers and fleet owners in the city of Vrindavan led to the rapid replacement of the entire fleet (1000 vehicles).**





**The Agra Frame manufacturer opened in Delhi, and began selling 400 modern vehicles a month.**



**This forced the Maleks in Delhi to switch.**

# Today...

- **Over 300,000 modern cycle rickshaws are operating on Indian Streets**
  - **They operate in 9 Indian cities**
  - **There are over 20 maleks in Delhi and another 10 assemblers and manufacturers of the modern rickshaws around India.**
- 
- **None of the gear systems were commercially accepted.**
  - **Certain elements of the traditional vehicle were reintroduced, increasing the weight, so total weight reduction was only about 10kg-15kg.**



# Yogya Becak Modernization



# Launch with Ministry of Tourism, Yogyakarta, 2004





**30kg lighter**  
**Much Safer Handling**



**New**



**Old**



## Over 120 Modern Becaks are on the Road in Yogyakarta



**New**



**Traditional**



**Becak and bicycle ride from Mercure to Sultan's Palace. 130 passengers rode 100 Becaks, several hundred cyclists participated despite the rain**



## 100 Fuji bicycles donated to Earthquake Victims in Yogyakarta





## Donation of Fuji Bikes to Earthquake Victims and relief organizations



**Thank You!**

[www.itdp.org](http://www.itdp.org)