

# Public Transportation for Green Cities

Dr. Rosli Nekmat  
Urusbudi Transplan Sdn Bhd

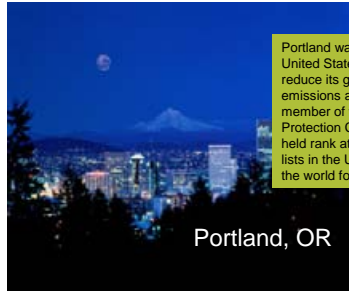
Prepared for Presentation at  
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Sri Siantan Conference Hall, Perbadanan Putrajaya  
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## Presentation Agenda

- Green Cities and the Role of Sustainable Transportation.
- What are Sustainable Transportation Strategies and Tactics
- Public Transport Systems and the role of Local Governments

## Green Cities, Now



Portland, OR

Portland was the first city in the United States to reduce its greenhouse gas emissions and was named member of the Climate Protection Campaign. It held rank at the top of the lists in the United States for several years.

Vancouver has an ambitious 100-year plan for clean and green living. The city already leads the world in hydroelectric energy, which currently makes up 90 percent of its power supply. It also plans to reduce its greenhouse gas emissions to levels 20 percent lower than reported in 1990 during the formation of the Kyoto Protocol. Fossil fuels will be reduced with city investments in wind, solar, wave and tidal energy systems.



Vancouver, BC



Copenhagen, Denmark

The 1.7 million people living in Copenhagen are known for eschewing cars for public transit, but their transportation is only one of the city's eco-friendly urban features. In 2006, Copenhagen was named European Environment City for its clean water and leadership in environmental planning.

Sweden is a leader in green electricity solutions -- most of the country's electricity comes from nuclear and hydropower. Cities such as Malmö are contributing to the greening of Sweden with plans to reduce its carbon dioxide emissions by 25 percent between 2008 and 2012, far exceeding the 5 percent goal set by the Kyoto Protocol.



Malmö, Sweden

## Archetypal Green City, Curitiba

- Perhaps the archetypal green city is Curitiba, Brazil.
- When architect and urban planner Jamie Lerner became mayor in 1972, he quickly closed six blocks of the city's central business district to cars, delighting residents and business owners alike.
- Today the pedestrian-free zone is three times larger and serves as the heart of the bustling metropolis.
- Lerner also put in place a high-tech bus system, greatly reducing traffic, energy usage and pollution; the move also encouraged density around transit hubs and thus preserved open space in other areas that would have likely turned into suburbia.
- Today the bus system still goes strong, and three-quarters of the city's 2.2 million residents rely on it every day.

### Curitiba: Buses and Roads

**Goal:**  
Make buses run faster.

**Problem:**  
Buses always get stuck in traffic.

**Solution:**  
Create bus-only "roads within roads," with traffic signal priority, both reducing running time and making the system more reliable.

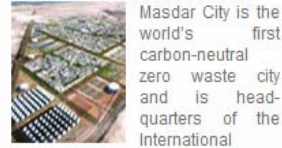


# Future Green City, Masdar, Abu Dhabi

Is a zero-carbon, zero-waste, zero-car city



Masdar City



Masdar City is the world's first carbon-neutral zero waste city and is headquarters of the International

Renewable Energy Agency (IRENA)

- the emirate of Abu Dhabi is spending \$15 billion to build an eco-friendly emerald city: Masdar City.
- Masdar will make use of progressive sustainable and renewable resources including solar, wind power and biofuels for energy and water purification, as well as underground light rail transportation.
- Construction on Masdar broke ground in early 2008, and it should be completed in the next decade.
- The city will be a 2-square-mile (5-square-kilometer) zero-emission community with about 40,000 to 50,000 residents.

# Green Cities Movement

- Best described as a loose association of cities focused on sustainability,
- the emerging “green cities movement” encompasses thousands of urban areas around the world all striving
  - to lessen their environmental impacts by reducing waste,
  - expanding recycling, lowering emissions, increasing housing density while expanding open space, and
  - encouraging the development of sustainable local businesses



# Green Cities Movement; Malaysia

On 24th July 2009, the Malaysian Government launched the National Green Technology Policy. The aim is to enhance the nation's environmental sustainability by reducing its carbon footprint through four primary pillars of energy, environment, economy and social perspective. The policy outlines five main objectives of which objective no.4 is to ensure sustainable development and conserving the environment for future generations.

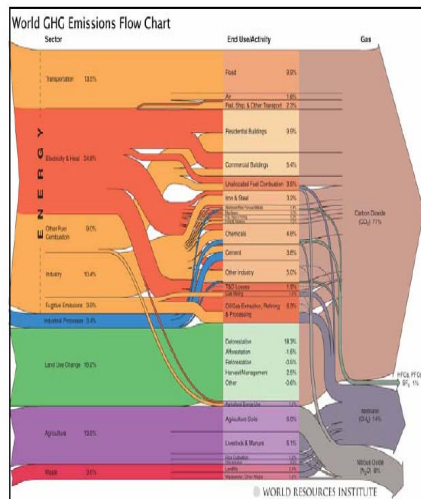
In the recently concluded UN Climate Change conference, the Copenhagen Accord has been adopted to replace the Kyoto Protocol which will end in 2012. Malaysia has committed a 40% carbon emission reduction by the year 2020 in comparison with the 2005 levels. This commitment means that Malaysia has to strengthen its policies and actions towards combating climate change and reassess all its steps to achieve the target. Thus, the emphasis on Green Cities is timely, given the role of cities as centres for human activities, and their potential impact on the environment.

In line with this policy, in the Budget 2010 the government has determined Putrajaya and Cyberjaya to be the pioneers of Green Technology City. The government acknowledges that cities and townships must be designed with consideration of environmental, social and economic impacts. The people inhabiting them must be dedicated to minimum use of resources (energy, water and material) and to reduce waste, air and water pollution.

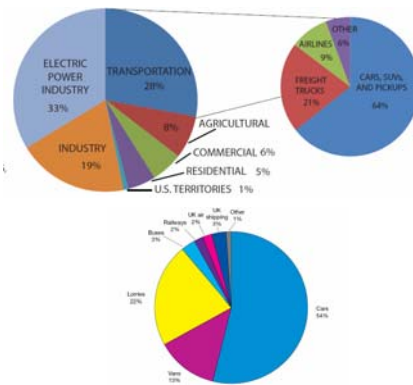
*Malaysia's commitment:  
40% reduction of carbon emission by 2020  
(Copenhagen Accord)*

*Cities consume 67% of global energy, and over 70% of GHG, the main contributor to climate change. The heating & lighting of residential & commercial buildings alone contribute to 25% of GHG whilst transport emits 13.5%, causing irreversible climate change.*

# Climate Change and Transportation



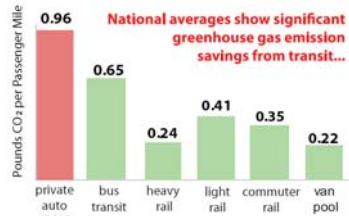
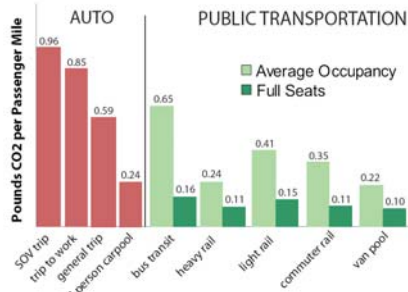
Transportation accounts for about 28% of Green House Gas (GHG) emission



Cars, SUVs, trucks accounts for more than 80% of GHG emission from transportation

# GHG impact > Auto vs Transit

...transit greenhouse gas emissions per passenger mile are still significantly lower than those from driving, even taking into account emissions from construction, manufacture, and maintenance.



# Transportation and Energy Consumption

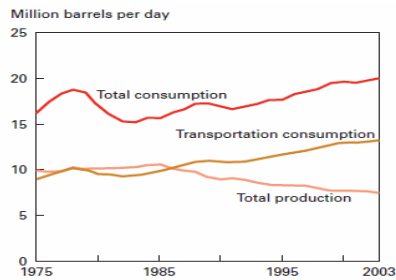
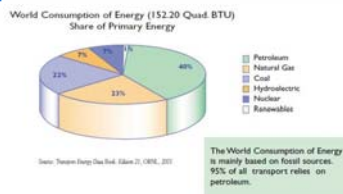


FIGURE 2: Total consumption, transportation consumption, and total domestic production of petroleum.



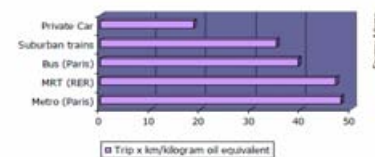
Transportation consume for about 70% of petroleum produced

Table 5.1: World transport energy use in 2002, by mode

| Mode                       | Energy use (EJ) | Share (%) |
|----------------------------|-----------------|-----------|
| Light-duty vehicles (LDVs) | 34.2            | 44.5      |
| 2-wheelers                 | 1.2             | 1.6       |
| Heavy freight trucks       | 12.48           | 16.2      |
| Medium freight trucks      | 6.77            | 8.6       |
| Buses                      | 4.76            | 6.2       |
| Rail                       | 1.19            | 1.5       |
| Air                        | 6.95            | 11.6      |
| Shipping                   | 7.32            | 9.5       |
| Total                      | 76.67           | 100       |

Source: WRI (2004b)

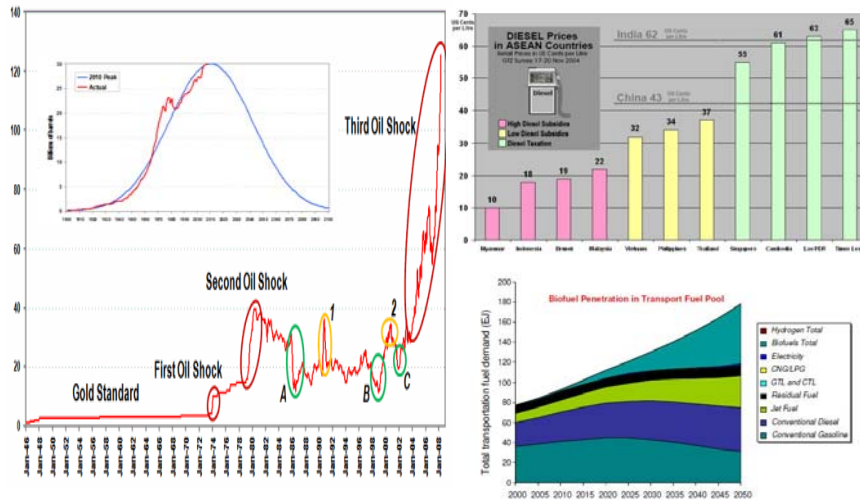
## Energy consumption per mode



Transit mode deliver more than double trip-km by cars on same amount of petroleum.



# Transportation Energy Supply



Green City International  
Conference 2010

Public Transportation for Green Cities



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# Sustainable Development = Green City ?



Green City International  
Conference 2010

Public Transportation for Green Cities



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## Sustainability Movement

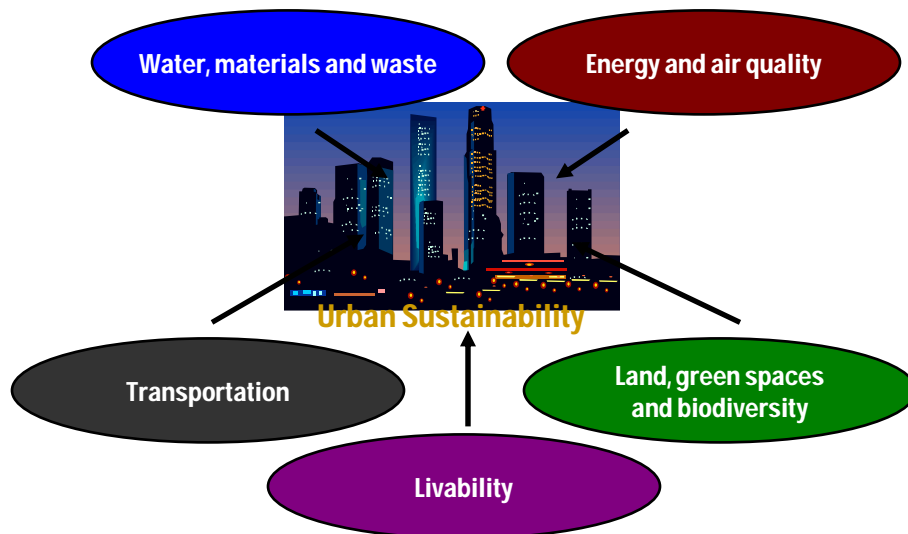
### ■ Global environmentalism

- Ideology grew out of the 1972 UN Conference on the Human Environment, known as the Stockholm Conference.
- Key event in the emergence of a global environmental movement.
- Environmental issues are at the global scale.
- Establish the linkage between poverty and environmental degradation.

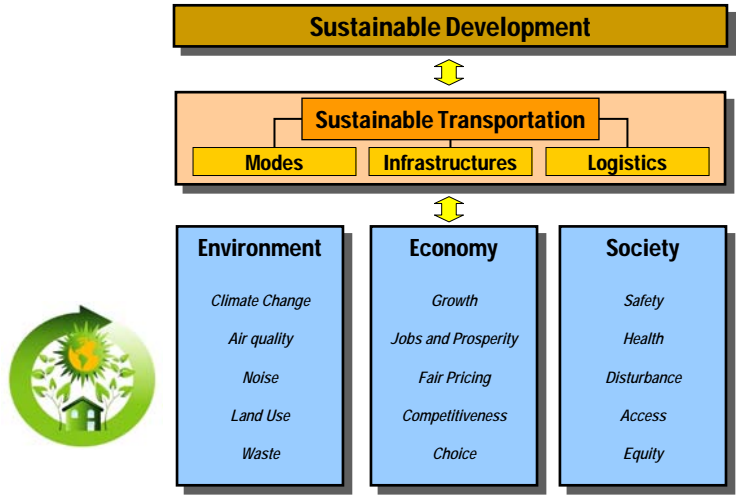
### ■ Definition

- Underlined by the Brundtland Commission in 1987:
  - “development which meets the needs of the present without compromising the ability of future generations to meet their own needs”.
  - Satisfy the needs of the population.

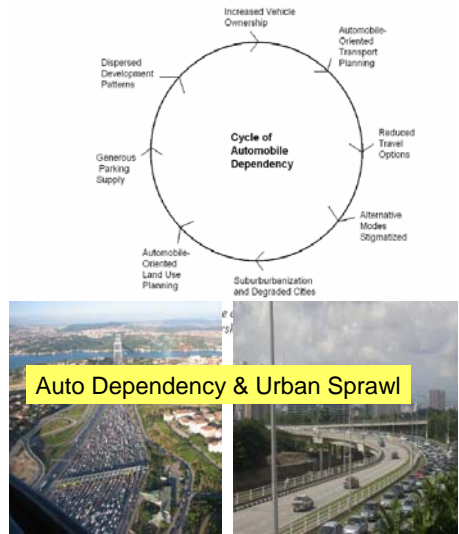
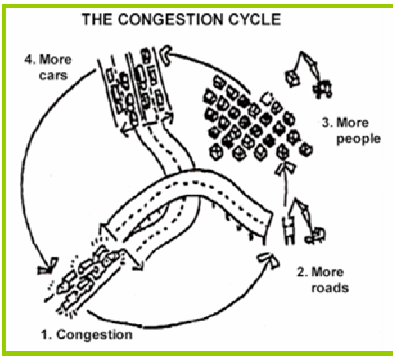
## General Indicators



# Sustainable Transportation



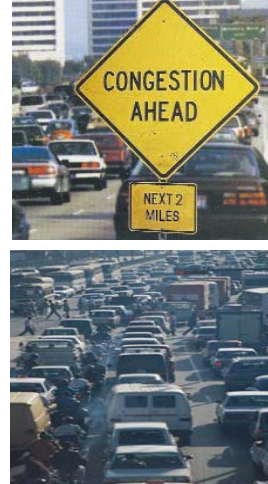
# Sustainable Transportation Problems



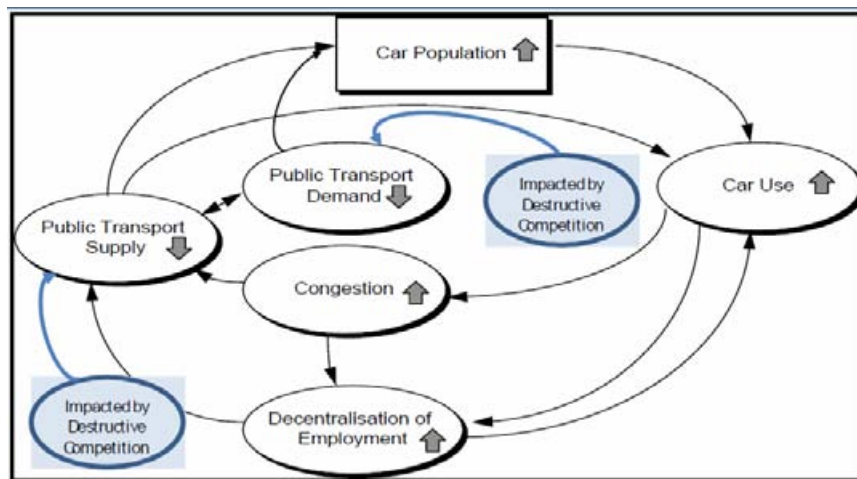


## Current Approach for Resolution

- Build more and more roads for more and more cars
- Build expensive rail based mass transit system, neglecting the buses (buses are less sexy)
- Retain “unhealthy competitive” transit environment, poor customer service
- Supplier/operator driven, less customer driven, people last.
- Ad-hoc solutions, if any, not implemented in an integrated manner
- Lack of continuous improvement, often as “stopgap” measures.

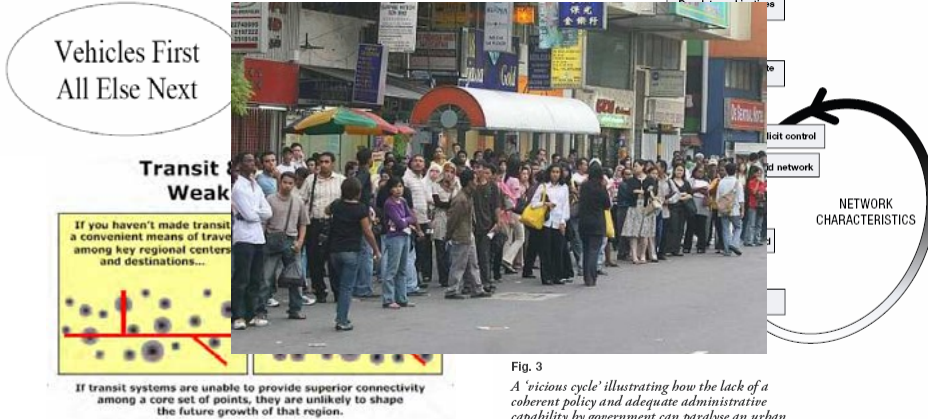


## Sustainable Transportation Problems: Public Transport



# Sustainable Transportation Problems: Root Causes

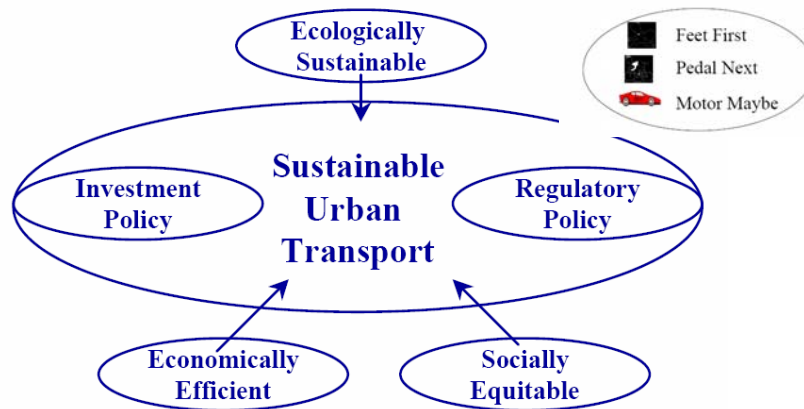
Figure 8. Transportation Planning Now



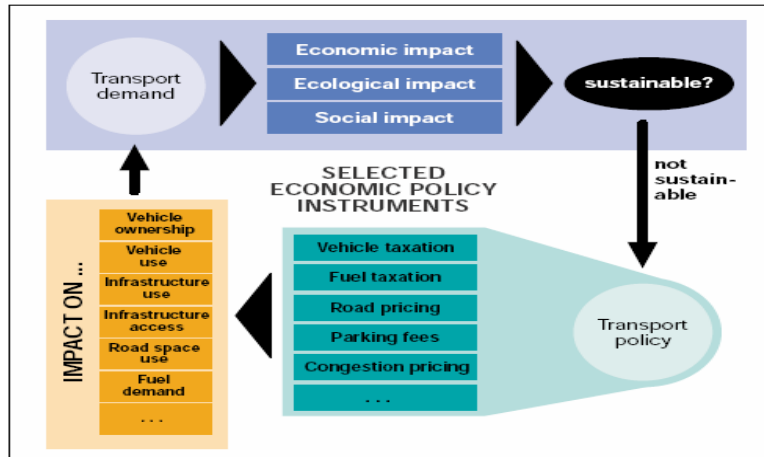
# Urban Transport Policy Spectrum

## Urban Transport Policy Spectrum

Figure 14. Sustainable Transportation Policy



# Sustainable Transportation Decision Making Process



# Sustainable Transportation Strategies

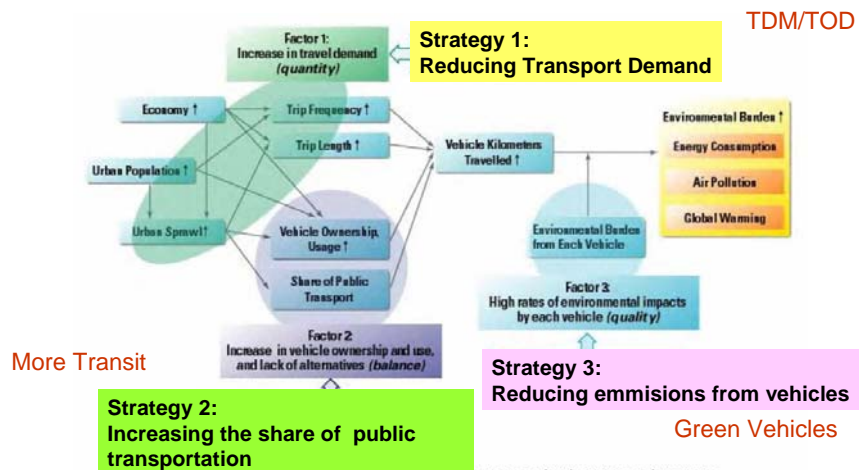


Figure 3.3-6. Factors of environmental burden due to transport related activities and strategies

# Sustainable Transportation Tactics

- **Improving Fleet Efficiency**
  - Use smaller, more efficient vehicles
  - Optimize vehicle use, maximize efficiency
  - More non-motorised mode (bike/walk)
  - Consider alternative fuel
- **Targeting the Commuter**
  - Provide transit and vanpool subsidies
  - Use carpools and vanpools
  - Use parking as a lever
  - Promote telecommuting and flexible scheduling
  - Offer parking cash-out
  - Guarantee a ride home
- **Emphasizing transit**
  - Provide ample transit funding
  - Make fares low; keep them low
  - Make transit system comprehensive and convenient
  - Target prime transit users
  - Provide dedicated transit right of way
  - Encourage non-traditional transit
- **Support Bicycling**
  - Integrate bicycles seamlessly with transit
  - Provide incentives for bicycle use
  - Build and maintain bicycle routes
  - Provide share bike program in downtown areas
  - Bicycle use in Municipal operations.
- **Creating pedestrian friendly community**
  - Make street safe for pedestrians
  - landscaped streets, more welcoming for pedestrians
  - Slow traffic to give priority to pedestrians.
- **Growing the community sustainably**
  - Discourage sprawl
  - Streamline permitting
  - Promote mixed use zoning
  - Use incentives to channel development sustainably
  - Promote Transit Oriented Development (TOD)
  - Promote infill and urban redevelopment
- **Planning facilities wisely**
  - Relax restrictions to support sustainable development
  - Encourage on-site facilities
  - Modify parking requirements
  - Equip facilities to support alternative commuting
  - Provide alternative refueling and recharging facilities
  - Offer preferential parking
- **Managing roads for improved efficiency**
  - Reduce tolls for carpools and vanpools
  - Give preferences to transit modes
  - Use area tolls to limit traffic
  - Use congestion pricing
  - Time signals to smooth traffic flow
  - Provide exclusive lanes for transit modes
- **Engaging the entire community**
  - Educate the whole community
  - Encourage community trips reduction program
  - Open a commuter information clearinghouse

# “Carrot and Stick” Approach

- Provide travel options (More transit, less auto use) → “Carrots” = Transit
- Impose physical and/or fiscal restraints → “Sticks” = TDM
- Which one come first → “the chicken or the egg”
  - Transit come first
  - TDM follows

**Measures with push-effects:**  
Area-wide parking management, parking space restrictions in zoning ordinances, car limited zones, permanent or time-of-day car bans, congestion management, speed reductions, road pricing.

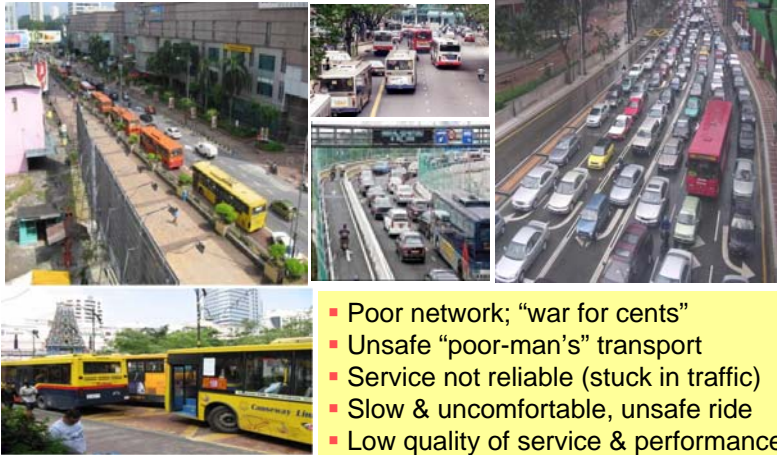
**Measures with pull-effects:**  
Priority for buses and trams, high service frequency, passenger friendly stops and surroundings, more comfort, push-and-ride, bike-and-ride... area-wide cycle networks, attractive pedestrian connections.

**Measures with push- and pull-effects:**  
Redistribution of congested space to provide cycle lanes, broader sidewalks, planting strips, bus lanes... redistribution of time-cycles at traffic lights in favour of public transport and non-motorized modes, public-awareness-concepts, citizens' participation and monitoring, enforcement and penalties.

Source: Müller, P., Schleich-Jester, F., Schmidt, M.-P. & Topp, H.H. (1992): Konzepte für den öffentlichen Verkehrsbetrieb in 16 Städten. Online Heft des Fachvereins Verkehrsingenieur der Universität Karlsruhe Nr. 24.

## Poor Public Transport System

“unsafe”, “unreliable” and “poor” Branding



- Poor network; “war for cents”
- Unsafe “poor-man’s” transport
- Service not reliable (stuck in traffic)
- Slow & uncomfortable, unsafe ride
- Low quality of service & performance

## Public Transport “vicious cycle”

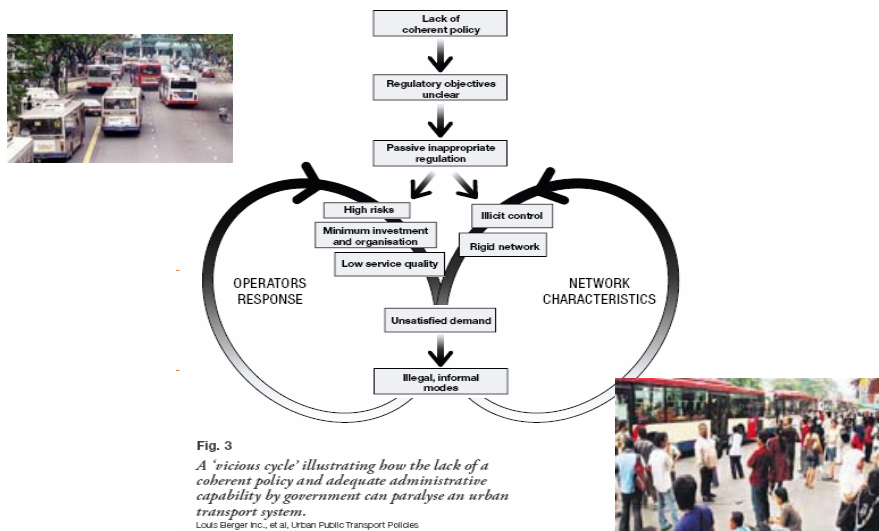


Fig. 3  
A ‘vicious cycle’ illustrating how the lack of a coherent policy and adequate administrative capability by government can paralyse an urban transport system.  
Louis Berger Inc., et al, Urban Public Transport Policies in Bandung, Final Report, March 2002



# Public Transport “best practices”



Width of line represents distance of 1,000 metres  
Putting 85% of Bogota's 7 million inhabitants within 500 metres of a TransMilenio line



Seoul, Korea



Jakarta



Singapore

# Political Will

World's best systems were developed with high levels of political support

With strong political will, anything is possible

*“Datuk Seri Najib Tun Razak entered office confronted with challenges that no other incoming prime ministers had to face but has made a good start and shown political will for change” Joceline Tan, FOCUS Sunday STAR 5 July 2009*



YAB Datuk Seri Najib Tun Razak  
Prime Minister of Malaysia



Enrique Penalosa  
Former mayor of Bogota



Lee Myung-bak  
Mayor of Seoul

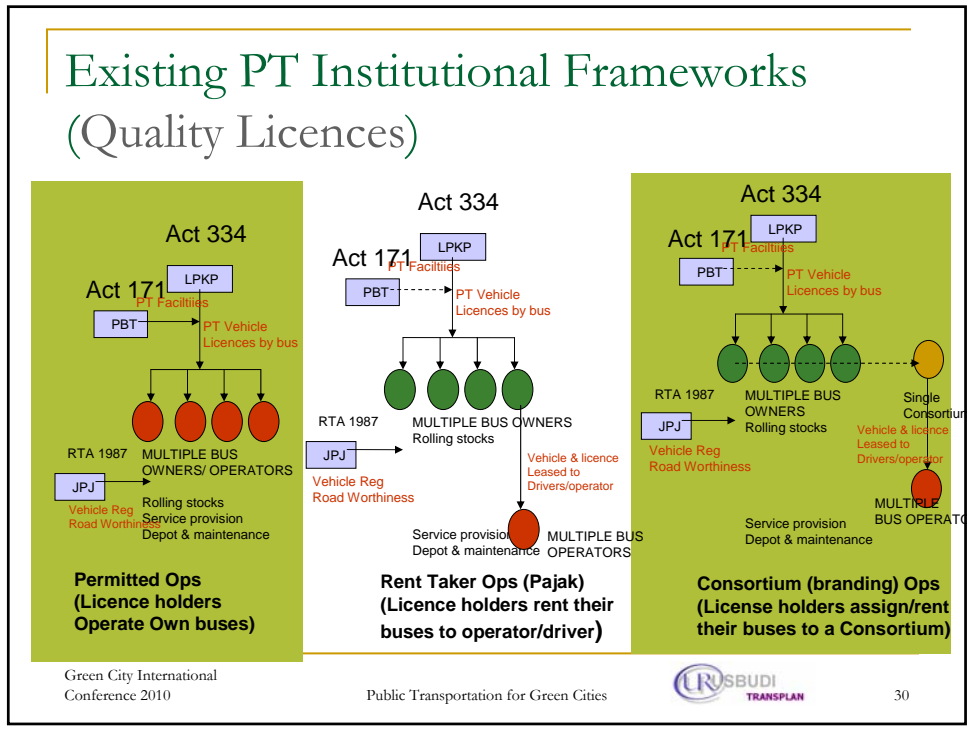
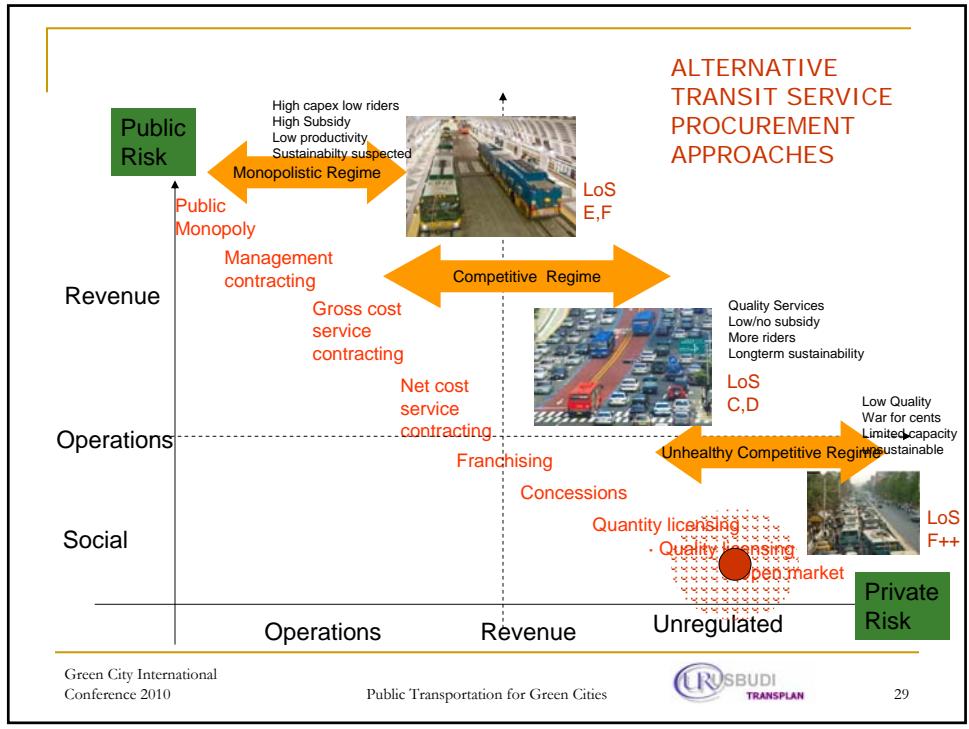


Jaime Lerner  
Former mayor of Curitiba

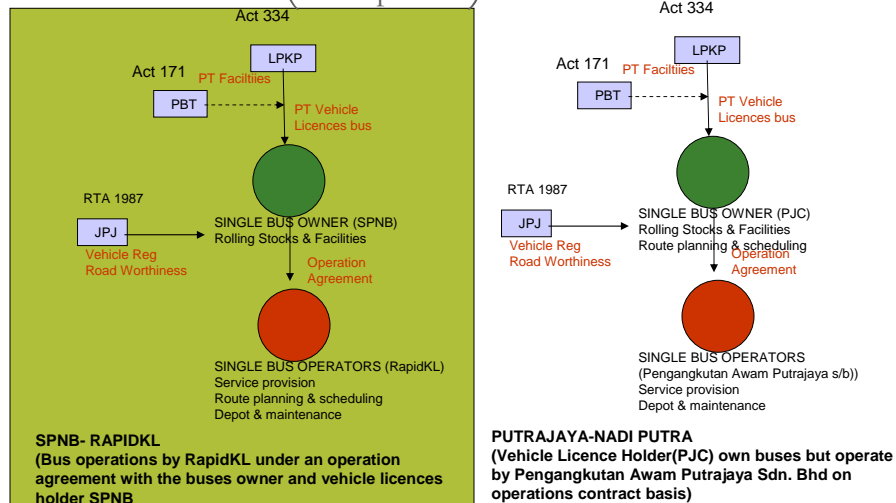


YAB Tun Dr Mahathir Mohammad  
X Prime Minister of Malaysia



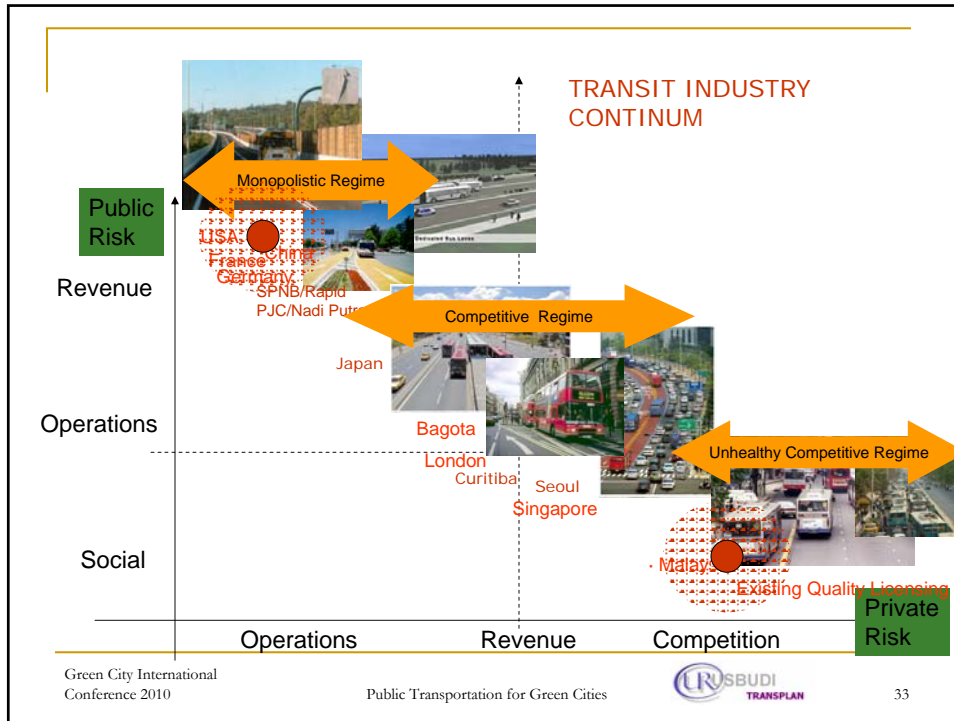


## Recently Introduced PT Institutional Framework (Monopolistic)



## COMMERCIAL VEHICLES LICENSING BOARD ACT 1987 (Act 334)

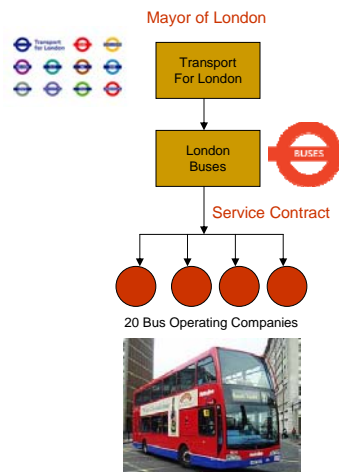
- Act 334 is for PT “vehicles licensing” not regulating PT “service”
  - 19 (3) The holder of the licence or any person using, causing or permitting **the use of a vehicle in respect of which a licence has been issued under this Act** who fails to comply with any of the conditions attached to the licence under this section shall be guilty of an offence and shall on conviction be liable to a fine not exceeding five thousand ringgit or to imprisonment for a term not exceeding one year or to both.
- Act 334 do not specify that “Licence Holder” must be the “vehicle owner” but is implied under definition”.
  - “authorised vehicle”, in relation to any licence issued under this Act, **means a vehicle specified in such licence and authorised to be used there under**
  - “registered owner” means the person registered as the owner of a motor vehicle under the Road Transport Act 1987;
- Act 334 allow CVLB to issue vehicle licenses without consultation of PBT (or existing operators) but implied do so in CVLB Circulars
  - 16. (1) Subject to this Act, **the Board on an application for a licence under this Act shall have full power in its discretion (a)** to grant the application in full or in part ...
- Act 334 allow CVLB to issue vehicle licenses without any details of route, schedule and fares structure.
  - 19. (1) Subject to this Act, **the Board may attach to any licence granted under this Act such conditions as it may think fit** and in Particular (a) in relation to a specified class of public service vehicles licence (i) that specified fares shall be charged; (ii) that where desirable in the public interest, the fares shall be so fixed as to prevent wasteful competition ...; (iii) that the service shall be operated within the specified areas or routes and in accordance with a specified time-table or in accordance with specified hours of operation and specified frequency;



## Institutional Framework Benchmark

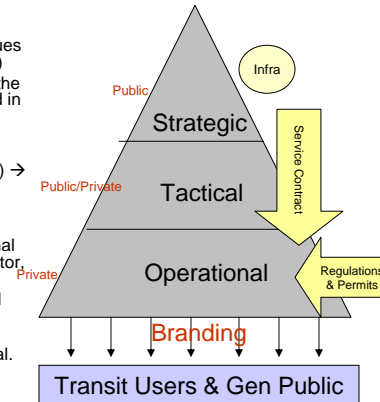
### London Buses, Greater London, England

- London Buses** (*London Bus Services Limited (LBSL)*), is the subsidiary of [Transport for London \(TfL\)](#) that manages bus services within [Greater London, UK](#).
- Transport for London (TfL)** is the local government body created by the Greater London Authority Act 1999, responsible for most aspects of the [transport system](#) in [Greater London](#) in [England](#). Its role is to implement the transport strategy and to manage transport services across London. Buses are required to carry similar red colour schemes and conform to the same fare scheme
- Transport for London's key areas of direct responsibility through London Buses are:
  - planning bus routes
  - specifying service levels
  - monitoring service quality
  - management of [bus stations](#) and [bus stops](#) and other support services
  - providing information for passengers
  - Common ticketing system
- The actual bus services are operated by 20 bus operating companies which work under contract to London Buses.



## Institutional Framework Benchmark: Lesson Learned from “best practices”

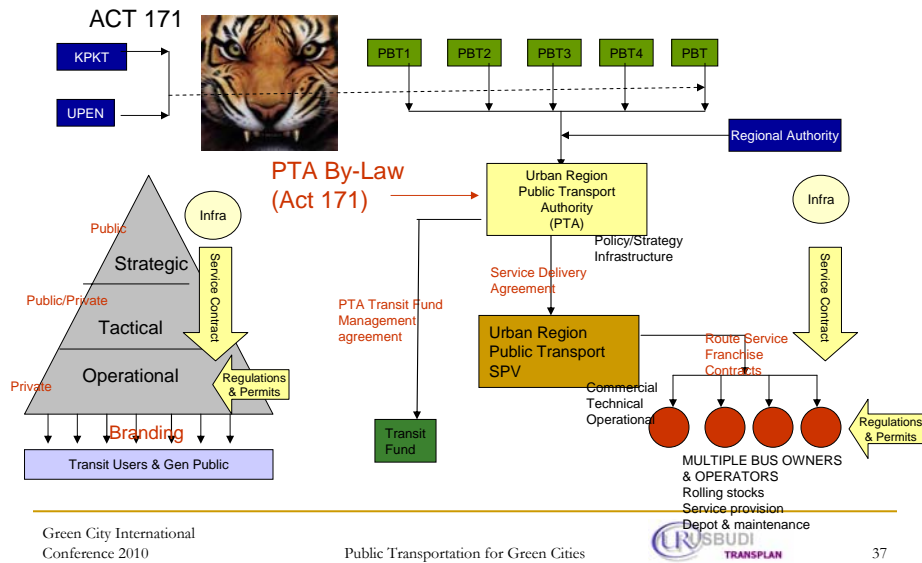
- Public Transport problem is a “local” issue of “services” not so much a “nationwide” issue of “vehicle licences”
- Strategic leadership by a Local Government body (PTA) focus on PT and its infrastructure (eg. TfL, City Mayor, Regional Administrator, Metropolitan Government, etc)
- “Special Purpose Vehicle” (SPV) to undertake tactical issues (eg. London buses, Transmelineo, HK Transport Dept, etc)
- Private bus operating companies perform the services at the “operational” level based on a local “service contract” and in compliance to “national” regulations under a common “branding”
- Sequence of decisions is “Appropriate” Institutional framework → “Best” strategy → “Right” tactics (HW & SW) → “Quality” operations.
- Institutional framework should be able to cater for multi-modalism and transit coverage area (multi PBT).
- PTA through SPV provide infrastructure (eg. busway, signal priority) and the use of technology (eg. BMS, ITS) to monitor, control and manage the services.
- Off vehicle fare collection and common ticketing managed through SPV not by respective operators. Revenue distribution to operators as per contract based on km-run
- Ultimate test, user acceptance and general public approval.



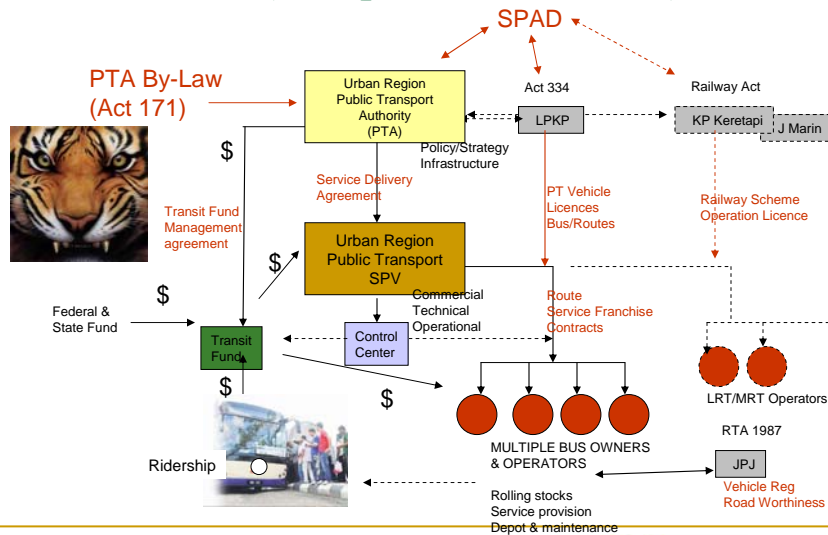
## Local Government Act 1976 (Act 171): Legislative Framework

- Part XII Further powers of local authority**
  - 101 In addition to any other powers conferred upon it by this Act or by any other written law a local authority shall have power to all or any of the following things, namely ---
    - (o) subject to the provisions of any law relating to road traffic, **to establish, acquire, maintain and carry on** within or without the local authority area **public transport services**.
    - (dd) **to enter into any contract** with any other local authority or with any person **to secure or further the carrying on** without the local authority area **of any work or undertaking which the local authority is authorised to carry on**;
- Part XIII By-Laws**
  - 102 In addition to the powers of making by-laws expressly or implied conferred upon it by any other provisions of this Act every local authority may from time to time make, amend and revoke by-laws in respect of all such matters as are necessary or desirable for the maintenance of the health, safety and well-being of the inhabitants or for the good order and government of the local authority area and in particular in respect of all or any of the following purposes ---
    - (l) **to provide for the establishment, maintenance, regulation and control of public transport services and to prescribe fares to be charged**;
    - (n) (i) to regulate, supervise and license trishaws and carts and to prescribe the rates or fares ...
    - (o) to provide for the licensing of bicycles and tricycles;
- 103 By-laws to be confirmed by State Authority**
  - Every by-law, rule or regulation made shall not have effect until it is confirmed by the State Authority and published in the Gazette.**

## Local Government Act 1976 (Act 171): PBT-Based Public Transport Authority By Law



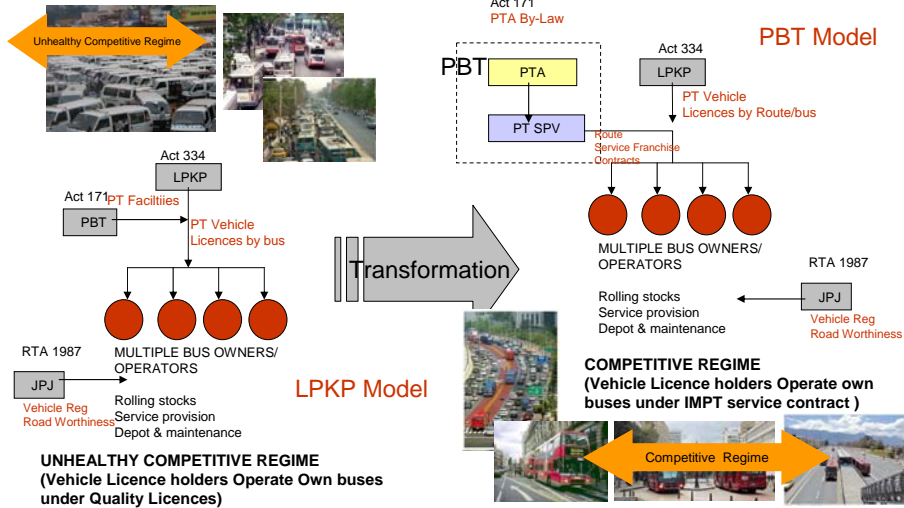
## Proposed PBT-based PT Institutional Framework (Competitive Franchise)



# Proposed Transformation

Existing Regime → Proposed Regime

"... transformation of the Country in a holistic, wholesome and comprehensive manner, not merely superficially." Datuk Seri Najib Tun Razak, Prime Minister of Malaysia, 7 July 2009



Green City International Conference 2010

Public Transportation for Green Cities



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## Terima Kasih



Dr Rosli Nekmat  
 Urusbudi Transplan Sdn Bhd  
 drrosli@ur-group.com.my

