



Road Map for Sustainable Transport Strategy for Colombo Metropolitan Region with Cleaner Air, through Experience

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Definition and Silent Features of Colombo Metropolitan Region

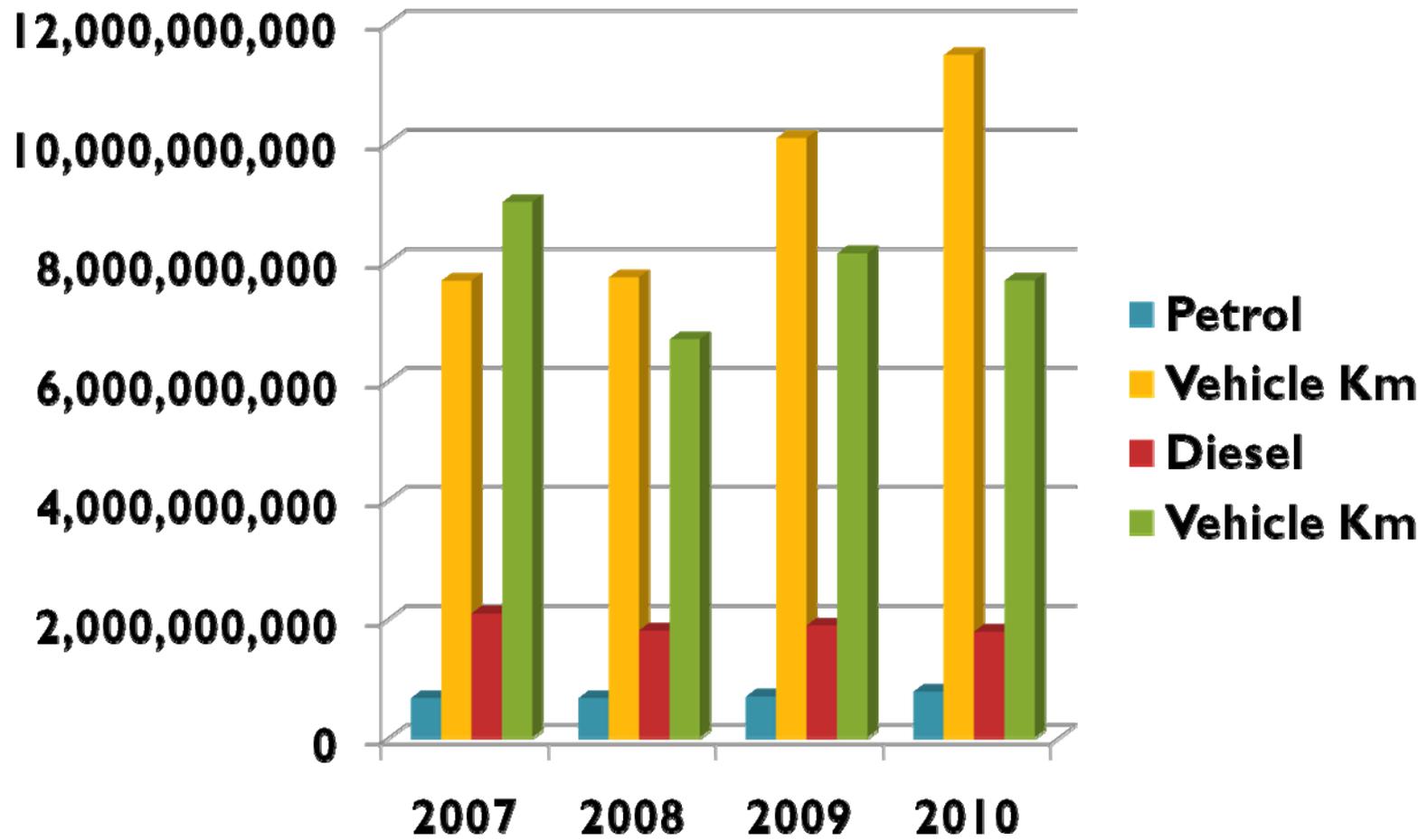
- **The Colombo Metropolitan Region is defined as 80% of the land area of the Western Province where total population is 5.8 million;**
- **The CMR Per Capita GDP is US \$ 3,986 in 2010;**
- **The average trip length of passengers in the CMR is around 16 to 25 kms. The commuter trip length of the floating population is around 45 to 72 km.**

Modal Share (Change of Demand)

Operated Passenger Km

| Passenger Km's | 2008 | 2009 | 2010 |
|----------------|--------|--------|--------|
| Motor Cars | 7.2% | 7.8% | 8.8% |
| Vans | 11.8% | 11.4% | 11.6% |
| Buses | 64.1% | 61.4% | 56.9% |
| Three Wheelers | 5.9% | 7.4% | 9.3% |
| Trucks/Lorry | 1.7% | 1.6% | 1.7% |
| Motor Cycles | 4.6% | 5.7% | 7.1% |
| Railways | 4.7% | 4.5% | 4.6% |
| Total | 100.0% | 100.0% | 100.0% |

Fuel Consumption and Fuel Efficiency





Policy Intervention to reduce Emission from Transport Sector

- **Vehicle Emission Testing program commenced in September, 2008 covering CMR;**
- **Leaded petrol removed from the market in 2002;**
- **Low sulphur diesel introduce in 2003 (500 ppm super diesel, and 2500 ppm regular diesel);**
- **Regular diesel will be 500 ppm in 2012, and super diesel will be 50 ppm in 2012;**
- **Importation of two stroke ethnology was banned;**
- **Low tax regime for hybrid vehicles from 2011, January (within three months 3,000 hybrid vehicles has imported to the country);**
- **Review of policies introduce purely on financial reasons, assembling of vehicles using old parts (BOI law)**

Emission from the Transport Sector - 2010

Emission estimated for Road Transport sector

| Pollutant/Emission | 2008 | 2009 | 2010 |
|---------------------------|-------------------|------------------|------------------|
| CO | 36,268 | 2,397 | 2,631 |
| HC | 81,381,087 | 4,853,498 | 5,408,608 |
| Nox | 6,230,936 | 6,649,152 | 5,929,915 |
| PM | 12,654 | 1,401 | 1,372 |

Traffic Flow of CMR

Daily Average
Traffic

| Number of Vehicles | | | | | | | |
|---------------------------|---------------|--------------|----------------|---------------|----------------|----------------|--|
| CAR | LGV | BUS | MCL | LBUS | 3WH | Total | |
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| 190,629 | 60,913 | 7,006 | 103,816 | 32,691 | 101,568 | 496,623 | |
| 38% | 12% | 1% | 21% | 7% | 20% | 100% | |

Daily Vehicle Km's Operated for Passengers who travel by roads(CMR)

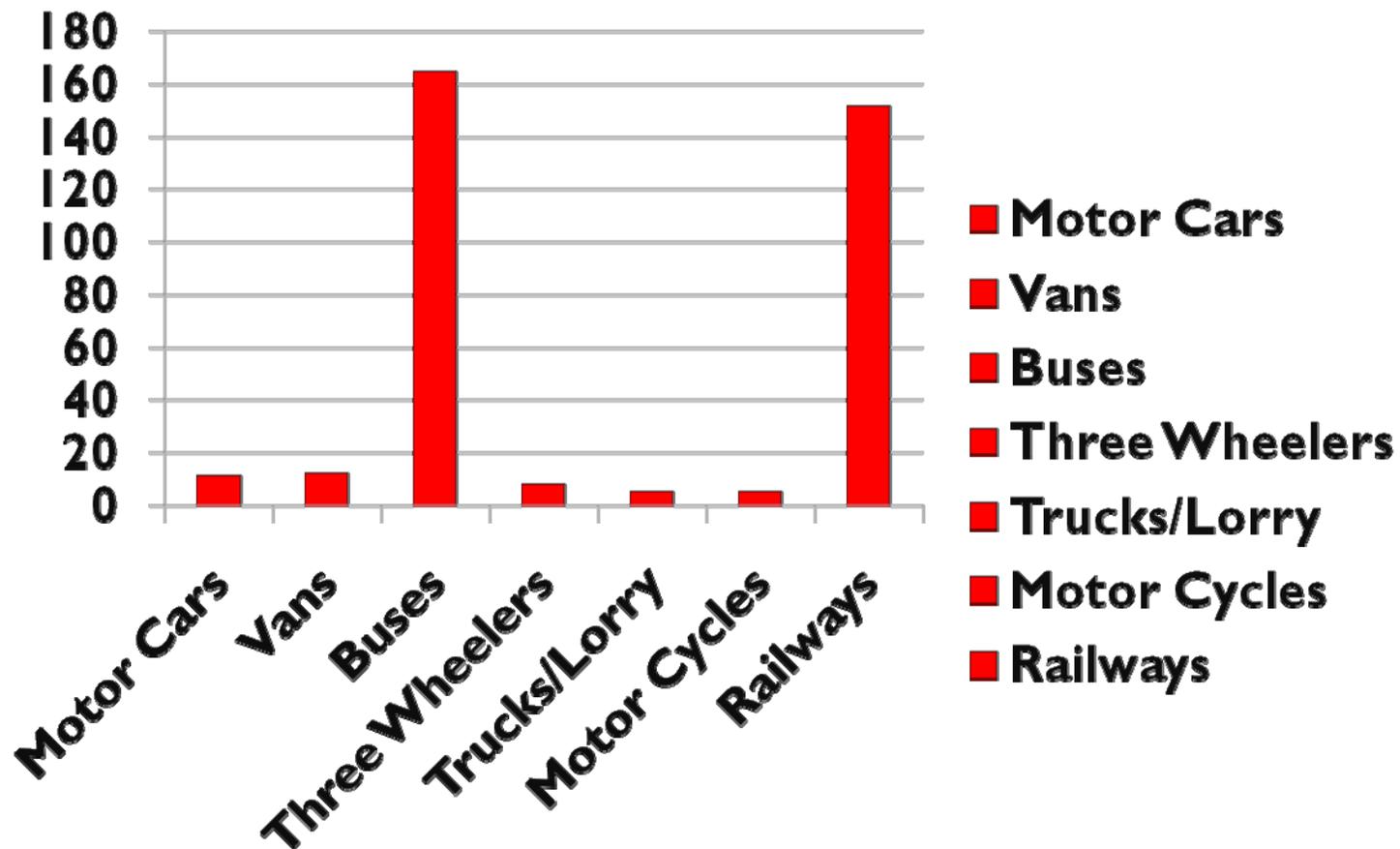
| Vehicle kilometers | | | | | | |
|--------------------|------------------|----------------|------------------|------------------|------------------|-------------------|
| CAR | LGV | BUS | MCL | LBUS | 3WH | Total |
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| 10,675,233 | 3,898,411 | 294,256 | 5,398,434 | 2,092,209 | 3,250,188 | 25,608,732 |
| 42% | 15% | 1% | 21% | 8% | 13% | 100% |

Daily Operated Passenger Km's - CMA

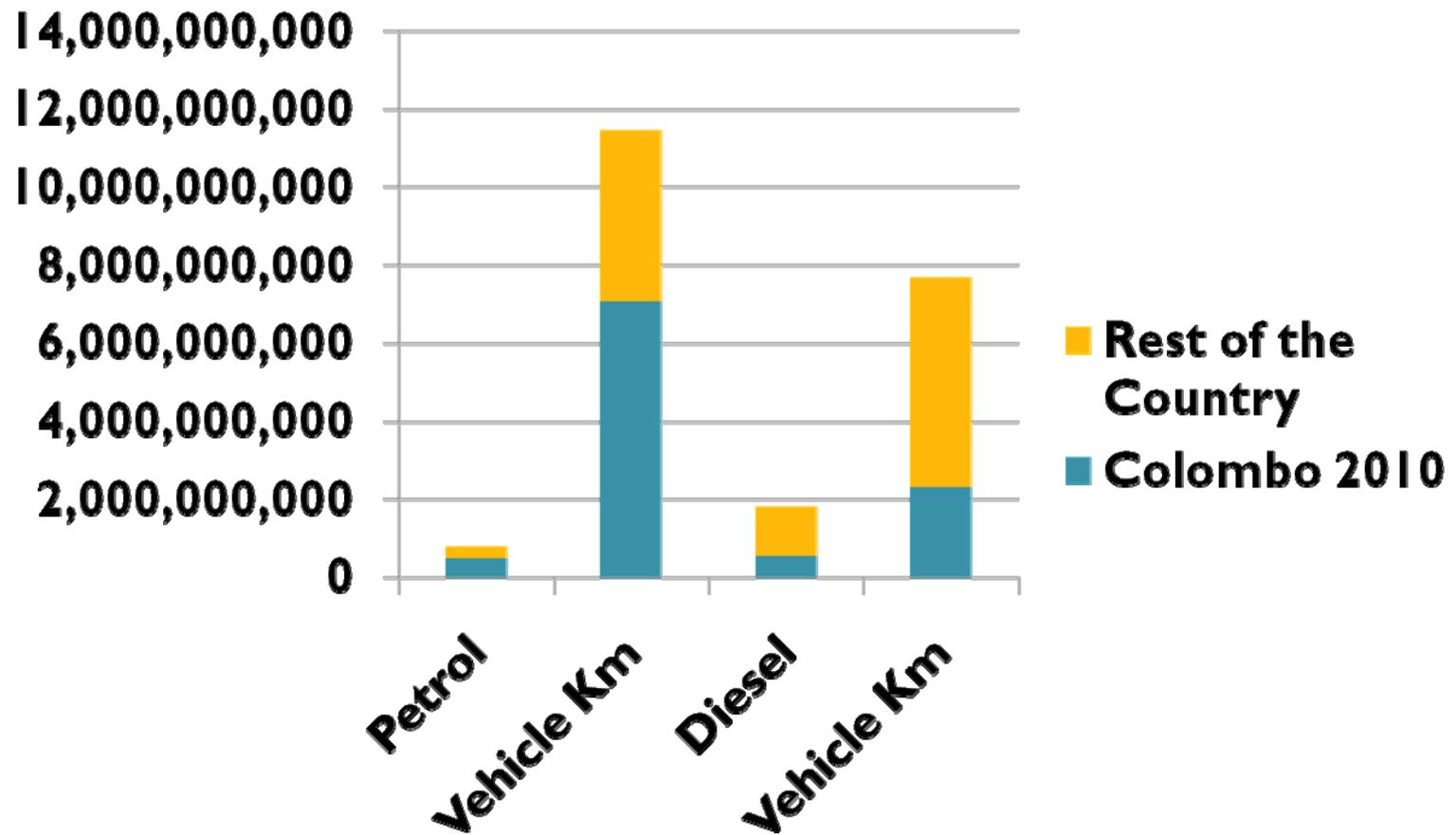
| Passenger Km | | | | | | |
|-------------------|-------------------|------------------|------------------|-------------------|------------------|--------------------|
| CAR | LGV | BUS | MCL | LBUS | 3WH | Total |
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| 26,688,083 | 21,441,259 | 5,885,128 | 9,177,338 | 87,872,795 | 6,825,394 | 157,889,996 |
| 17% | 14% | 4% | 6% | 56% | 4% | 100% |

Passenger km. per fuel one liter

Passenger Km/fuel liter (National)



Fuel Consumption and Operated Km's 2010 (CMR Vs. Country)



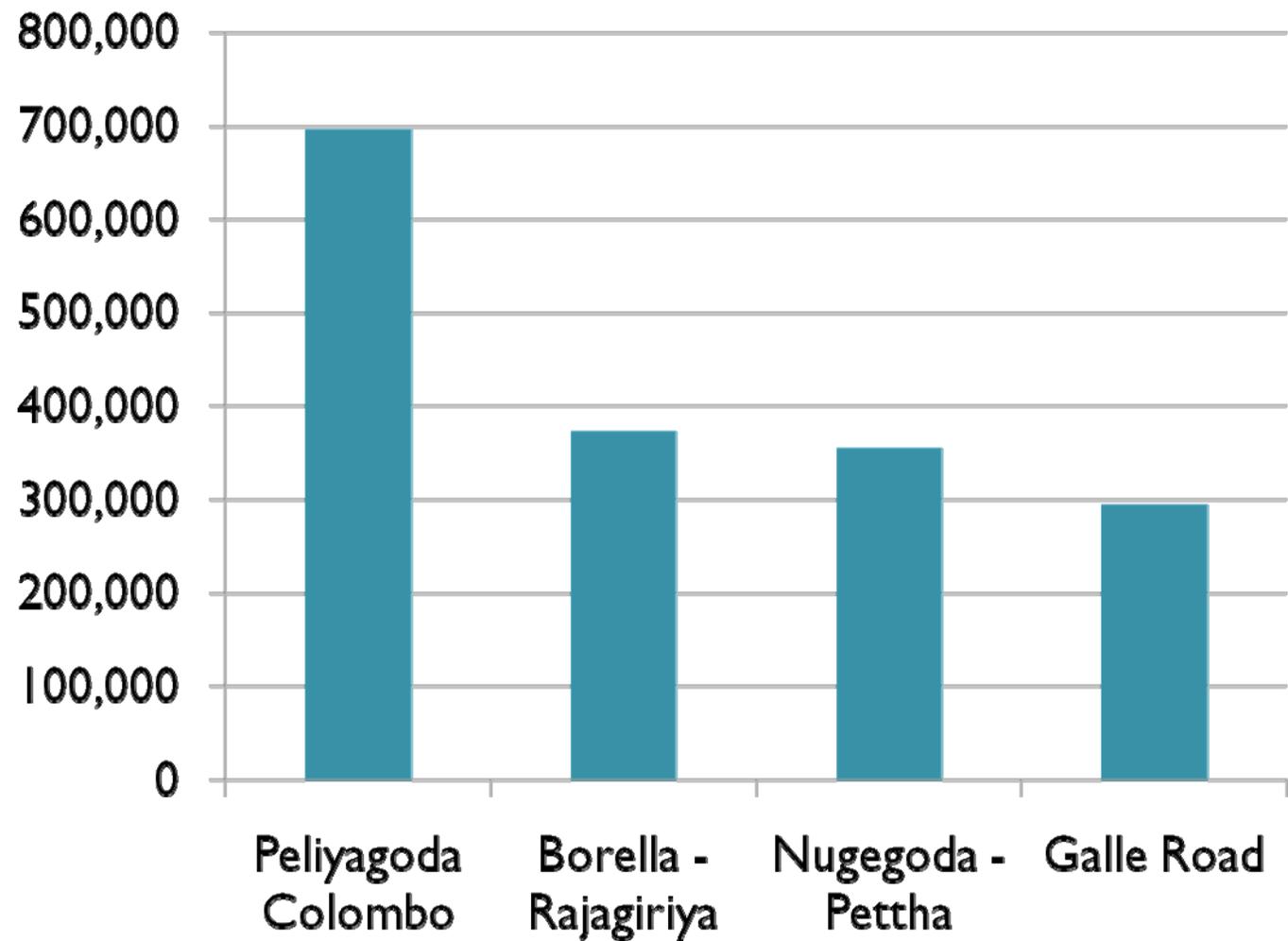
TRIP PROFILE OF NATIONAL AND CMR

| TRIP PURPOSE | NATIONAL | CMR |
|-----------------|----------|------|
| WORKS | 44% | 30% |
| SERVICES | 22% | 26% |
| SCHOOLS | 20% | 24% |
| BUSINESS | 10% | 14% |
| OTHER | 04% | 06% |
| TOTAL | 100% | 100% |

Modal Share of Daily Passenger Traffic in the City of Colombo

| MODE | PASSENGER TRIPS | MODAL SHARE |
|----------------|-----------------|-------------|
| RAILWAYS | 220,000 | 03% |
| CARS | 1,369,236 | 20% |
| VANS | 1,026,545 | 15% |
| MEDIUM BUSES | 228,958 | 03% |
| MOTO CYCLES | 606,074 | 09% |
| LARGE BUSES | 2,724,340 | 39% |
| THREE WHEELERS | 756,311 | 11% |
| TOTAL | 6,931,464 | 100% |

Daily Passenger Flow by Corridor -2010



Expenditure on Transport

- AVERAGE ANNUAL GDP PER CAPITA OF THE CMA WAS US \$ 3,986/= IN 2010. IT IS FORECASTED THAT THE ANNUAL GDP PER CAPITA INCOME OF THE CMR AS **US \$ 5,857/= IN 2015 (2013 US \$ 5021/=)**;
- THE EXPENDITURE ON TRANSPORT IN CMA IS 10% OF THE INCOME WHICH IS 398.6 US \$, EQUIVALENT OF RS. 44,643.20;
- THE DISTRICT OF COLOMBO DOES NOT HAVE SIMILAR EXPENDITURE AS THEY SPENT ON 06% OF INCOME ON THE TRANSPORT. THIS MEANS THAT THEY SPENT ONLY AVERAGE OF RS.83.71 ON TRANSPORT PER DAY



Metro and Commuter Rail

- **Metro** is the most common international term for subway, heavy rail transit, though it is also commonly applied to elevated heavy rail systems. In this module we use “metro” to refer to urban grade separated heavy rail systems. They are the most expensive form of MRT per square kilometer but have highest theoretical capacity.
- **Commuter rail** or suburban rail is a the portion of passenger rail road operations that carries passengers within urban areas or between urban areas and their suburbs but different from Metros and LRT in that the passenger cars generally are heavier, the average trip lengths are usually longer and the operations are carried out over tracks that are part of the rail road system.



Bus Rapid Transit

- **Bus Rapid Transit typically involves bus way corridors on segregated lanes-either at – grade or grade separated and modernized bus technology**
- **However, segregated bus way systems BRT systems commonly includes;**
 - **Rapid boarding and lightning;**
 - **Efficient fare collection;**
 - **Comfortable shelters and stations;**
 - **Clean Bus Technologies;**
 - **Modal Integration;**
 - **Sophisticated marketing identity; and**
 - **Excellence in customer service**



Comparative Analysis

- A bus way station in Quito, Ecuador costs only about US\$35,000 while a rail station in Porto Alger that serves a similar number of persons but costs US\$150 million per kilometer;
- The capital costs of US LRT systems are **on average US\$ 21.6 million per kilometer;**
- **Metro systems in developing countries were much more expensive for example Delhi Metro**



Options Available for Colombo Metropolitan Area on Mass Transit Systems

- The current ridership market within the Colombo Metropolitan Area land use development has generated only one main corridor which can be considered for MRT; namely, Peliyagoda to Pettah via Dematagoda. The traffic forecast passengers per one hour per one direction threshold of 35,000 exceeds only in the Peliyagoda to Pettah link;
- Other link now requires attention of MRT system which may be Bus Rapid Transit Systems. The passenger traffic forecast consider the average economic growth of 8% which is in higher side.



Basic prerequisites of successful rail based MRT

- Corridors with outstanding trip volume (more than 700,000 trips per day)
- **More than 5 Million inhabitants or linear spatial development**
- **At least US\$1,800/= per capita annual income at the city level**
- A city management with positive experience with traffic regulation
- Integration of other modes/fares
- Competitive fares
- A strong institutional framework
- Steady population growth combined with economic prosperity
- City center growth



Bus Lanes and Priority Bus Lanes

- A bus lane is highway or street reserved primarily for buses, either all day or specific time period, it may be used by other traffic under certain circumstances, such as while making a turn, or by taxis, bicycles, or high occupancy vehicles;
- Bus way is special road way designed exclusive use by buses, It may be constructed at, above, or below grade and may be located in separate right-of- way or within highway corridors. **Some form of bus way system is a future of many bus rapid transit systems**



Issues Related to High Fuel consumption and Productivity

- High density land use corridor has not been developed with an appropriate overall land use;
- Clear vision for the land use development with the integration of transport systems has created a high expenditure on transport with in-efficient systems;
- Imagination of in-appropriate multi modal transport in the core area of Colombo

CONCLUSION

- **Considering present travel demand, in general we can conclude that there are few reasons for Colombo to favor rail-based systems where passenger capacities would be higher than than 25,000 passengers per hour per direction. Unless specific circumstances apply – such as when visual image of the system is quite important and a city is sufficiently wealthy to handle the higher capital and operational costs – this kind of rail-based transit for core area of Colombo compares un-favorably with BRT systems on most terms, and especially for key parameters such as cost, flexibility, time frame, and institutional demands.**
- **There is however no single “right” transit solution. The best system for a city will depend on local conditions and preferences and will involve a combination of technologies. When passenger flows are extremely high and space for bus ways is limited, other options may be better, such as rail-based public transit;**
- **It must however be recalled that city investments in Mass Rapid Transit systems come at a high opportunity cost.**



Thank You

