Preface

The National Urban Transport Policy of the Government of India, 2006 (NUTP), lays strong emphasis on building capabilities at the state and city level to address problems associated with urban transport and also lays down the guidelines for developing sustainable urban transport systems.

The Ministry of Urban Development, Government of India has taken two prominent steps to encourage cities to reform their city transport:

- Organizing an annual conference-cum-exhibition on 'Urban Mobility' at New Delhi every year (UMI) for dissemination of information and to facilitate exchange of ideas;
- According recognition to good urban transport initiatives by giving awards to selected good practice projects.

The Ministry of Urban Development (MOUD), Government of India; the United Nations Centre for Regional Development (UNCRD); the United Nations Department of Economic and Social Affairs (UNDESA); the World Health Organization Regional Office for South-East Asia (WHO/SEARO); and the Ministry of the Environment (MOE) of the Government of Japan co-organized the conference cum exhibition on "Sustainable Mobility" from 3rd to 6th December 2011 at New Delhi, India. The conference included the 4th Annual Urban Mobility India (UMI) Conference 2011 and the 6th Regional Environmentally Sustainable Transport (EST) Forum in Asia. It was attended by approximately 700 participants, comprising high-level government representatives from twenty-one countries, namely, Afghanistan, Bangladesh, Bhutan, Cambodia, People's Republic of China, Indonesia, India, Japan, Republic of Korea (hereinafter, Korea), Lao PDR, Malaysia, the Maldives, Mongolia, Myanmar, Nepal, the Philippines, Pakistan, Singapore, Sri Lanka, Thailand, and Viet Nam, Additionally, Experts of the Regional EST Forum, international resource persons, representatives from various UN and international organizations, Indian officials from the central and state governments, urban local bodies and para-statals as well as academics, students, nongovernmental organizations (NGOs), and representatives from the private sector also attended.

The integrated conference on 'Sustainable Mobility' was organized with the objectives of reviewing the progress made by Asian countries in achieving the goals under the Bangkok 2020 Declaration as well as addressing sustainability issues in urban transport. The conference aimed, as well to contribute towards enhanced regional input to Rio+20 by addressing sustainable transport in the context of moving towards a green economy.

Urban Mobility India 2011 was preceded by a research symposium on 3rdDecember at which some selected research work in the field of urban transport was disseminated.

The event was organized at the Manekshaw Centre, DhaulaKuan, New Delhi, India by the Institute of Urban Transport (India) New Delhi in association with Mirabilis Advisory, an economic development consultancy. The 3 day conference was chaired by Prof. Saugata Roy, the Union Minister of State for Urban Development, Government of India.

Executive Summary of Important Outcomes

1. Sustainable transport results in low carbon emissions which lead to improved public health and there upon, sustainable development.
2. 5 pillars of road safety are road safety management, safer roads & mobility, safer vehicle, safer road users and post-crash management.
3. Cyclists are road users to be serviced from door to door. Cycling & pedestrian inclusive approach in road design, traffic management, urban planning and management is required to make cycling practice successful & effective. Road widening should be avoided.
4. Concept of 'SPACE' is applicable for a good NMT facility in a city, which is safety, giving priority, accessibility, comfort and enjoyable experience.
5. Intelligent Transport System (ITS) deliver 5 key classes of benefits by - enhancing personal mobility and convenience; increasing driver and pedestrian safety; improving operational performance of transportation network; delivering environmental benefits and spurring broader economic & employment growth.
6. 3 Pillars of ITS success identified are - demonstration of national level commitment & vision, featuring strong government leadership at all levels and making substantial investments in ITS.
7. Innovative public transport agencies are improving operational efficiency with reduced environmental impact, reducing operating expenses, increasing safety & reliability of operations and reducing traffic congestion.
8. Road pricing helps to prioritize more important trips over less important ones. Paying congestion charge helps the people to realize the cost of driving. Road and fuel taxes have to be paid by all car owners irrespective of their decision to drive or not. Hence road pricing is a more direct measure to limit the number of trips made by car owners.
9. Battery intensive methods may be suitable for short travels; longer travel needs are better served by internal combustion technology.
10. Branding and modernization of bus operations is extremely crucial to tackle the challenge of negative and often derogatory social perceptions of public transport. Introduction of ITS and Passenger Information System (PIS) in bus operations, rational & integrated fare structure are significant reforms for securing efficient bus operations.
11. Accessible buses, convenience in connection and transfer, well-timed and punctual bus service, predictable arrival time, fast & convenient as metro, friendly & safe buses, approachable operation system, pleasant &environment-friendly buses, transparent & reliable bus management and secured public interest are keys for an attractive bus system in a city.
12. Strong political will and administrative efficiency along with reforms related to employee and labor satisfaction are necessary and desirable in making bus operations successful.
13. Traffic system management (TSM) involving ITS in car navigation, electronic toll collection,

driving safety, traffic management, road management, public transportation, commercial vehicle operation, pedestrian support and emergency vehicle operation are important elements in reducing travel time and reduction in CO2 emission.

14. Mass transit for a city should have benefits like extensive public outreach, safe mobility for senior citizens, women and children, and accessibility for all.
15. The major factors enabling framework for PPP in a mass transit option for a city are policy and regulations, financial viability, commercial viability, environment, timely clearances, security, public perception and stakeholders.
16. Designing a multimodal integration through design of interchanges to include consideration of the origin to destination trip, provision of alternative to the traveler, including the first and the last kilometers and the connection to be designed as seamlessly as possible.
17. Five basic principles in the designing of Feeder Bus Service are network economics, optimal route structure for public transport network, physical integration, using modern IT for fare collection and transfer payments, institutional integration through vertical integration or long - term contracting between bus and rail operators.
18. Smart card in public transport beneficial for government as it facilitates flexible and efficient control over integrated public transport and demand responsive routing and scheduling, based on concrete demand data.
19. There is a need of India specific Highway Capacity Manual and text books for urban transport.

Recommendations

1. Road users, vehicles, road network & environment should be addressed in integrated manner in policy development, through wide range of interventions and greater attention to speed management, vehicle and road design.
2. Parking policy should restrict parking &levy fees; this will incentivize less use of private vehicle and will enhance revenue for the city. The space can be used for transit & NMT investments.
3. Principles for transport in urban life should actively promote walking, prioritize cycle networks and support high quality public transit. For this urban planning involving neighborhood development and mixed land use with dense network of streets & paths, with parking regulation is considered essential. Transit capacity should be matched with population density and vice versa for efficient systems.
4. Footpaths should be consistent throughout the route, devoid of obstacles / encroachments, should be shaded where possible, adequately lit and properly linked to PT stations
5. Good cycle lanes should be direct - minimal interference with motorized traffic, properly demarcated lanes with well displayed signages, accorded priority at signals (at junctions) and adequately illuminated.
6. Public bike schemes to be adopted to provide opportunity to people without bicycle. These create social equity among users and are important for last mile connectivity. Public bike schemes

integrated with bus system with bicycles provided at public transport stations and single fare facility will facilitate a distinct image for the public transport system.

7. Cycling networks should be prioritized along with cycle parking facilities at prime locations.
8. User friendly facilities for public transport are easy-to-understand and attractive fare structure, off-board ticketing, passenger convenient and attractive bus station design, level boarding and smart route selection for easy interchanges. Public transportation system and urban development need to be integrated.
9. Modal shift to be promoted by creating disincentives for driving, such as parking regulation, congestion pricing etc.
10. In order to manage travel demand there should be reduction in fuel subsidies and the money to be invested in sustainable modes of transport.
11. There is a need for governments to promote the use of alternative energy to power public and private vehicles and at the same time improve city level infrastructure to complement such vehicles.
12. For PPP in bus operations, gross cost contract is considered more appropriate in expanding transit markets while net cost contract is useful in cities introducing transit for the first time. Innovation through sharing of revenue risks (similar to Bogota), is necessary and desirable.
13. PPP concessionaire authority for a mass transit system in city should either be empowered or a nodal committee formed to expedite approvals, Cap on VGF needs to be eased, minimum guaranteed fare revenue should be assured to the concessionaire and last but not the least the sooner the infrastructure project inputs get some sort of relief from taxes the better for successful implementation of an efficient mass transport system.
14. There should be central planning agency for giving policy directions which can emphasize on public mobility
15. There should be integrated planning approach for the region to improve regional and suburban connectivity. An institutional body to be responsible for all urban transport issues and at the same time to have a planning role for infrastructure. National / State Government participation should be committed to facilitate resolution in differences of opinions.
16. Rail Development to be considered an efficient mass transit option for Asia and for India in particular. Finance and commitment by government(s) during construction period is critical for the success of large-scale rail based projects. .
17. Build, operate or lease transfer arrangements can allow private investment to supplement public finance in the short term. Land development value capture around transit terminals is also an innovative means of financing transport system.
18. Fuel pricing needs to include the full production cost as well as pollution costs. Fuel tax, parking charges, and/or road use charges are needed to be included in the cost of roads for private vehicles in order to achieve a level playing field with public transit systems and the

more efficient modes of transport.

19. Sustainable transport as part of the green economy to include pro-poor strategies, to promote social equity in public transportation. Integrated land-use planning that takes into account the housing and mobility needs of the urban poor should be a key part of any strategy to promote a green economy that is socially inclusive for all sections of society.

20. For urban travel, metros (underground and elevated) can provide a "backbone" with rapid, high density service, but given their cost, these should be focused on high density, travel corridors. Light rail and bus systems to be used as feeder services, linking neighborhoods to the metro system.

21. Need to evolve and implement comprehensive institutional and regulatory framework for two- and three-wheelers that subsume and integrate related elements urban planning and transport demand management, emissions standards, vehicle technology, cleaner fuels, inspection and maintenance.

Contents

A. Inaugural Session

Mr. S. K. Lohia, OSD (Urban Transport) and Dr. Sudhir Krishna, Secreatary for Urban Development with other delegates

While welcoming participants and at the same time, introducing recent achievements under the NUTP and JNNURM, Mr. Sanjeev Kumar Lohia, Officer on Special Duty (Urban Transport) and ex-officio Joint Secretary, MOUD-India, stressed that the most challenging impact of urban growth and rising income levels in Asian developing cities is the mobility crisis, and that even though a significant number of initiatives have been taken up in this region, much is still required to be done in a collaborative endeavor to secure the rapidly urbanizing cities in Asia to be as livable in comfort, clean, energy-efficient, and sustainable as possible.

While addressing the importance of the forthcoming UNCSD 2012 (Rio+20) and one of its main themes, i.e the green economy, in the context of sustainable development and poverty eradication, Ms. Chikako Takase, Director of UNCRD, emphasized that the integrated strategy (Avoid-Shift-Improve) that governs the goals outlined in the Bangkok 2020 Declaration has set a clear roadmap for Asian countries and cities towards amore sustainable future. She also remarked that pre- and post-Rio+20 processes offer a significant opportunity not only to address the objectives and goals under the Bangkok 2020 Declaration, but also to address EST as an essential element in pursuing a green economy.

Drawing the attention those present to the UN Decade of Action for Road Safety 2011-2020, Dr. PoonamKhetrapal Singh, Deputy Regional Director of WHO/SEARO, shared that WHO and the UN regional commissions, in cooperation with the UN Road Safety Collaboration and other stakeholders, have

prepared a Plan of Action for the decade. She also underscored that the provision of safe, sustainable, and affordable transport should be a prime objective in the planning and designing of transport systems that will stop and reverse the trend that, without action, would lead to the loss of millions of lives on the roads each year.

Expressing his appreciation to the Government of India as well as other Asian countries for their support to his country following the great East Japan Earthquake in March 2011, Mr. OsamiSagisaka, Director General of MOE-Japan, not only encouraged participants to move forward towards the realization of people-friendly and environmentally sustainable transport, but also urged other bilateral and multilateral donor agencies to provide necessary and timely support in further strengthening and expanding the EST initiative in this region and other parts of the world.

Delivering the keynote address on the metro rail revolution in India, Dr. E. Sreedharan, Managing Director of Delhi Metro Rail Corporation (DMRC)firmly stated that urban rail transit has a definite role to play in addressing the issues of energy efficiency, air pollution, and greenhouse gas (GHG) reduction at the local and global levels. Indeed, the Delhi Metro is the only metro that is credited for emission reduction via the Clean Development Mechanism of the Kyoto Protocol. He further underlined the importance of multi-modal integration for a city-wide urban rail transport network, and especially, the fare integration envisaged by MOUD through a national Common Mobility Card, the need for setting up an exemplary public-private partnership (PPP) model for financing, and the support of the central government institutional framework for promoting urban rail transit.

In his keynote address, Mr. Robert O'Keefe, Vice President of the Health Effects Institute (HEI) and Chairman of CAI-Asia, underscored that the ambient levels of particulate matter (PM), in many Asian countries exceed current WHO air quality guidelines, resulting in around 795,000 premature deaths in Asian cities caused by air pollution. He also stated that excessive motorization and non-walkable environments have led to a series of negative chain effect, such as sedentary lifestyles, obesity, an increase in cardio vascular disease, and growing susceptibility to air pollution. He concluded that in both the developed and developing world, reducing air pollution will certainly extend lives, and sustainable transport policy is essential to achieving that goal.

Concluding the opening session, Dr. Sudhir Krishna, Secretary for Urban Development, MOUD-India, encouraged that a systematic approach needs to be applied to promote sustainable urban mobility with various policies and measures, including the improvement of public transport service, on parking and advertisement, transit-oriented development, land-use and transport integration, provision of alternative modes to motorized transport, establishment of a dedicated urban transport fund, implementation of various road pricing policies, and higher taxation on private cars to mention but a few.

B. Joint Plenary Sessions

Joint Plenary Session 1: Public Health and Safety in Sustainable Urban Transport

Session Chair: ShriSudhir Krishna, Secretary (Urban Development), Ministry of Urban Development, India

Facilitator: Shri S.K. Lohia, OSD (UT) and EO Joint Secretary, Ministry of Urban Development, India

Rapporteur: Mr. Charles Martin Melhuish, Expert, EST

The speakers at this session included: -

Dr. ChamaiparnSantikarn, Regional Advisor - Injury and Violence Prevention (IVP), WHO/SEARO; 'Implementing a system approach in support of the decade of action for road safety 2011 – 2020'
Mr. Oleg Tonkonojenkov, Senior Transport Specialist - Asian Development Bank (ADB); 'Mainstreaming road safety in ADB transport operations'
Dr. MadhavPai, Director - EMBARQ India; 'Preventing traffic deaths and injuries through sustainable transport measures'

'Implementing asystemapproach In support of the decade of action for road safety 2011-2020' by Dr. ChamaiparnSantikarn, Regional Advisor - Injury and Violence Prevention (IVP), WHO/SEARO

Presentation of global death and injury statistics of nearly 1.3 million road deaths and 20-50 million injuries.

UNGA (United Nations General Assembly) resolution of 2010 that proclaimed 2011-2020 as the decade of action for road safety.

Preparation of World Health Organisation (WHO), United Nations (UN) regional commissions, United Nations Road Safety(UNRS) collaboration & stakeholders,of a Global Plan of Action for Decade as a guiding document.

Framework for the decade of action aimed to develop road system to accommodate human error & concern,goal being is to ensure crashes do not result in serious human injury.

Road users, vehicles, road network & environment addressed in integrated manner in the guiding principles, through wide range of interventions and greater attention to speed management, vehicle and

road design.

Major share of responsibility shifted from road users to road system designers, road managers, automotive industry, police, politicians and legislative bodies.

Individual road users are responsible to abide by laws & regulations

5 pillars in road safety are road safety management, safer roads & mobility, safer vehicle, safer road users and post-crash management.

'Mainstreaming road safety in ADB transport operations' by Mr. Oleg Tonkonojenkov, Senior Transport Specialist - ADB

ADB's initiative in sustainable transport & road safety, road safety initiatives by development bodies, examples of ongoing ADB-supported road safety activities in India and future activities in South and South East Asia.

ADB established sustainable transport initiative in 2010 and identified four emerging needs – regional cooperation & integration, urban transport, climate change & energy efficiency and road safety & social sustainability.

Key areas of ADB operations indicated were:

- Strengthen internal road safety capacity
- Develop & operationalize procedures, guidelines & related tools
- Identify opportunities for scaling up road safety
- Mainstream and strengthen road safety components
- Establish stand-alone road safety pipelines
- Participate with donors &United Nations (UN) agencies in delivering UN Decade of Action
- Mobilize international organizations as partners for road safety in Asia and Pacific region

'Preventing traffic deaths and injuries through sustainable transport measures' by Dr. MadhavPai, Director - EMBARQ India

Presentation of high statistics of road incidents – deaths and injuries in India and worldwide.

Main public health interventions identified as helmets, seat belts, alcohol, speed and visibility.

Impact of motorization on public health, e.g. more number of vehicles on road means more accidents, more vehicle miles means, more physical inactivity & obesity, as well as exposure to pollutants. To curb these, discernible and progressive shift to mass transport, walking & biking to be encouraged.

Accessibility & safety audits / inspections on few mass transport corridors in India, along with effects of exposure to criteria pollutants, evaluation of no physical activity case studies showcased.

Conclusion that sustainable transport leads to improved public health and sustainable development, which has low carbon emission.

Joint Plenary Session 2: NMT – An Integral Part of Urban Planning

Session Chair: Mr. Daniel M. Nicer, Assistant Secretary, Department of Environment and Natural Resources-Philippines

Facilitator: Dr. Marie Thynell, Expert, Göteborg University, EST

Rapporteur: Mr. SanthoshKodukula, Urban Transport Specialist, Gesellschaft fur

InternationaleZusammenarbeit – Sustainable Urban Transport Project (GIZ-SUTP)

Speakers at this session included: -

Mr. Michael Replogle, Global Policy Director and Founder – ITDP; 'Our cities ourselves: principles for transport in urban life'
Mr. RoelofWittink, Director - Dutch Cycling Embassy; 'Cycling for sustainable development: sharing Dutch expertise with the world'
Mr. Manfred Breithaupt, Senior Transport Advisor and the project director of the Sustainable Urban Transport Project (SUTP) – Gesellschaft fur InternationaleZusammenarbeit (GIZ); 'Innovative and pro-poor modal integration – integrating NMT into public transport system'

'Our Cities Ourselves: Principles for transport in urban life' by Mr. Michael Replogle, Global Policy Director and Founder - ITDP

Traditional modernistic planning approach puts people at last while for quality of life approach, people come first.

Principles for transport in urban life should be:

- walk (develop neighborhoods that promote walking),
- cycle (prioritize cycle networks),
- connect (create dense networks of street & paths),
- transit (support high quality transit),
- mix (plan for mixed land use),
- densify (match density & transit capacity),
- compact (create compact regions with short commutes, and
- shift (increase mobility by regulating parking & road use)

Poor network of streets results in – poor access to public transport, higher dependence on private vehicles, concentration of traffic on few main roads and poor mobility generally for citizens.

Parking policy should restrict parking &levy fees; this will lead to less private vehicle use and will add revenue for the city. The space so released can be used for transit & NMT investments

Streets should ideally be planned as green public open spaces and potentially vibrant community spaces can be planned under the flyovers.

'Cycling for sustainable development: sharing Dutch expertise with the world' by Mr. RoelofWittink, Director - Dutch Cycling Embassy

Dutch Cycling Embassy is a network of local governments, three national ministries, bicycle factories, producers of bike parking provisions, consultancy agencies, engineering companies, research institutes and civil society organizations. Together they have created and continue to sustain the Dutch cycling culture.

The Embassy is entrance to the Dutch for exchange, assistance, capacity building, transfer of knowledge & technology, partnerships.

The Dutch are very much into cycling, the Americans are in the process, while India has an interesting tradition.

Cyclists are road users to be served from door to door. Cycling & pedestrian inclusive approach in road design, traffic management, urban planning and management is required to make this successful& effective. Road widening to be avoided.

Road safety is about risk prevention by minimizing conflicts, and its outcomes, allowing interaction between road users.

OmniTRANS is a multi-traffic model between car, bike and transit in urban context, which calculates the impact of modal shifts on accessibility, safety and environment. It has appraised that if the present 36% share of cycling in Utrecht be replaced with no bicyclescenario; there would be 70% more CO_2

emission.

Cycling and public transportation have reduced transport related emissions in cities by more than 50%. 18 million Dutch still invest 700 million USD per year on cycling facilities on purpose.

'Innovative and pro-poor modal integration - integrating NMT into public transport system' by Mr. Manfred Breithaupt, Senior Transport Advisor and the project director of the Sustainable Urban Transport Project (SUTP) – Gesellschaft fur InternationaleZusammenarbeit(GIZ)

Developing cities still invest increasingly in automobile infrastructure, which in turn leads to traffic chaos and lack of proper NMT infrastructure. This resulting unsafe pedestrian & cyclists' environment and decision makers perceive no NMT activity.

Concept of 'SPACE'which is safety, priority, accessibility, comfort and enjoyable experience is inevitable for a good NMT facility in a city,

Most Indian cities still have high NMT and public transport modal shares; time to act is now when private vehicle numbers are still low.

For pedestrians, proper unobstructed footpaths, safe access & egress to stations, better bus shelters and street furniture to be integrated.

Footpaths should be consistent throughout the route, without obstacles / encroachments, should be shaded where possible, adequately lit and properly linked to PT stations

Good cycle lanes should be direct with no/least interference with motorized traffic, properly demarcated lanes with signages, accorded priority at signals (traffic junctions) and adequately illuminated.

Public bike schemes - to be adopted to provide an opportunity to people without bicycle, create social equity among users - is important for last mile connectivity.

Public bike schemes integrated with bus system would give a distinct image for PT system, with bicycles provided at public transport stations and single fare facility.

Public transport needs to be integrated at its end with easy-to-understand and attractive fare structure, off-board ticketing, proper bus station design, level boarding and smart route selection for easy interchanges.

There are challenges in integration and Indian cities have embarked on the journey, though there is much to achieve.

Joint Plenary Session 3: Intelligent Transport Systems for 'Better City, Better Life'

Session Chair: Dr. P.K. Sikdar, Vice President - IUT

Facilitator: Mr. SilvesterPrakasam, Director - Fare System Division, LTA; Singapore

Rapporteur: Dr. Jane Rovira Romero, Policy Researcher/Transport Specialist - Institute for Global Environmental Strategies (IGES)

Speakers at this session included: -

Mr. Stephen Ezell, Senior Analyst, Information Technology and Innovative Foundation (ITIF); 'Three pillars for ITS development: National vision, investment, strong government leadership'
MrTakahikoUchimura, Vice President – ITS, Japan; 'Moving towards the next generation Intelligent Transport Systems in Japan'
ShriHimanshu Bhatt, Global Program Director, Market Strategy - IBM Software Group; 'The IBM Smarter Cities Solutions: Opportunities for intelligent transportation'

'Three pillars for ITS development: National vision, investment, strong government leadership' by Mr. Stephen Ezell, Senior Analyst - Information Technology and Innovative Foundation (ITIF)

Categories of ITS applications are: –

- Advanced Traveler Information Systems (ATIS),
- Transportation Management Systems (TMS),

- ITS-Enabled Transportation Pricing Systems,
- Advanced Public Transportation Systems (APTS) and
- Vehicle-to-Infrastructure Integration (VII) and Vehicle-to-Vehicle Integration (V2V).

ITS is the 21st century digital equivalent of the highway system, which brings real-time, actionable intelligence to individuals and to assets in the transportation network

ITS delivers 5 key classes of benefits viz: -

- Enhances personal mobility and convenience
- Increases driver and pedestrian safety
- Improves operational performance of transportation network
- Deliverstangible environmental benefits
- Spurs broader economic & employment growth

Benefit-cost ratio of ITS-enabled systems-operations measures 9 to 1, far above addition of highway capacity with benefit-cost ratio 2.7 to 1.

Japan, South Korea and Singapore lead the world in ITS

3 Pillars of ITS success identified are – demonstration of national level commitment & vision, featuring strong government leadership at all levels and making substantial investments in ITS.

3-5% of transportation budget to go to ITS application and key area of investment is training & education for computer and electrical engineers.

'Moving towards the next generation Intelligent Transport Systems in Japan' by Mr. Takahiko Uchimura, Vice President – ITS, Japan

9 areas of ITS development identified (in 1996) – car navigation, Electronic Toll Collection, driving safety, traffic management, road management, public transportation, commercial vehicle operation, pedestrian support and emergency vehicle operation

Vehicle Information and Communication System (VICS) gives real time traffic information to each driver and avoids traffic congestion & reduces travel time

Private sector has started traffic information system services with probe data, which gives the fastest route guide reducing travel time by 20% and CO_2 emission 17%

ITS Spots has been deployed nationwide in 2011, consisting of 3 main services – dynamic route guidance, safety driving support and Electronic Toll Collection (ETC)

Other services of ITS Spots are free internet access from designated parking spots, local information of facilities, food, entertainment etc.

Future cooperative ITS includes traffic congestion reduction at Sag by vehicle to infrastructure communication and automated platoon by vehicle to vehicle distance maintenance through radar & lane marker recognition

'The IBM smarter cities solutions: Opportunities for intelligent transportation' by ShriHimanshu

Bhatt, Global Program Director, Market Strategy - IBM Software Group

IBM applying insights from 2500+ projects of all sizes, e.g. 99% of smarter trains in Taiwan run on time, in Stockholm downtown smart traffic systems help reduce gridlock by 20%

Smarter cities drive sustainable economic growth by leveraging information to make better decision, anticipating problems to resolve them proactively and coordinating resources to operate effectively

IBM has intelligent transportation solutions for all drivers of changes in the society e.g. population explosion, urbanization, inefficiencies in systems and reliability & security

Transportation issues are an increasing challenge throughout the world, but specific priorities and solutions vary by region, e.g there is funding challenge in North America for new infrastructure, and maintenance of existing ones, western Europe is seriously considering levying congestion charges and in Asia Pacific regional innovation like advanced traffic & bus management, integrated fare, traveler information are under active consideration

Innovative public transport agencies are improving operational efficiency with reduced environmental impact, reducing operating expenses, increasing safety & reliability of operations and reducing traffic congestion

IBM is leveraging upon technology and business innovations to build a sustainable delivery model and services in intelligent transportation.

A. Technical UMI Sessions

UMI 1A: Integrated Approach to Transport Planning

Session Chair: Prof. P.K. Sarkar, Professor, School of Planning and Architecture, New Delhi

Rapporteur: Ms. Taru Jain, Assistant Professor, School of Planning and Architecture, New Delhi

Speakers at this session included: -

Ms. ShreyaGadepalli, Regional Director – Institute for Transportation and Development Policy (ITDP); 'Facilities for transport sensitive groups'
Mr. Todd Litman, Executive Director – Victoria Transport Policy Institute (VTPI); 'Congestion charging: options and impacts'
Mr. HolgerDalkmann, Director – EMBARQ; 'Greening the transport for poverty alleviation'
Prof. Bruno Dalla Chiara, Polytechnic University of Turin – European Business & Technology Centre (EBTC);'Possible solutions for a transport system compliant with the energy supply and the environment: measurable analyses'

The session commenced by Prof. Sarkaroutlining the various factors that are integralto transport planning such as land use, safety, mobility, reliability, equity, accessibility, efficiency and transportnetwork performance. He also explained how since the last few years, the focus of transportation planning has been on mobility planning rather than planning for movement of vehicles.

'Facilities for Transport Sensitive Groups' by Ms. ShreyaGadepalli, Regional Director – Institute for Transportation and DevelopmentPolicy (ITDP)

The presentation concentrated on the travel needs of sensitive groups including economically, physically and socially challenged people.

Challenges identified are poor quality public transport with limited availability, with poor quality walking and cycling facilities that are often difficult and unsafe to use.

In big cities across the world percentage of bus users is more as these services have higher penetration and are easily accessible by walkers.

The efforts of Janmarg BRT in respecting the needs of the elderly and urban poorwere lauded. Studies suggest that Ahmedabad BRT is actively used by the elderly, particularly during off peak hours.

Stress was laid mobility and accessibility should be the pillars of an inclusive approach towards transport planning and as part of which, safe, comfortable and attractive walking facilities should be developed.

Cycling networks should be prioritized along with cycle parking facilities at prime locations.

Dense networks of streets and paths to be developed to minimize walking distance.

High quality public transport systems to be developed which cater to all income groups.

A mix of activities and people habitation to be ensured in land use plans so that travel demand is minimized and transit capacity should be matched with population density and vice versa for efficient systems.

Modal shift to be promoted by creating disincentives for driving, through parking regulation, congestion pricing etc.

'Congestion Charging: Options and Impacts' by Mr. Todd Litman, Executive Director-Victoria Transport Policy Institute(VTPI)

The speaker concentrated on congestion charging and talked about its applicability in Asian cities and drawing lessons from countries like UK, Norway and Singapore that have such systems in place.

Demand management is an integral part of an integrated transport policy and congestion pricing is one of the measures available to regulate the supply of private motor vehicles on public roads.

Excessive amount of land is taken up by roads and parking spaces. Such large spaces can no longer be afforded by even the most affluent cities in the long run. Congestion pricing is one of the tools for making the drivers of private motor vehicles offset the social and environmental costs of their own journey.

Toll roads may have been unsuccessful in some parts of the world, but they are bound to be successful in Asian cities because of the high demand for travel.

Road pricing helps to prioritize more important trips over less important ones. Paying congestion charge enables people to discern the cost of driving personal vehicles. Road and fuel taxes have to bepaid by all car owners irrespective of their decision to drive or not. Hence road pricing is a more direct measure to limit the number of trips made by car owners.

London and Singapore are good examples where the imposition of congestion charge has helped in solving minimizing local congestion to a large extent.

There is however a need to levy congestion pricing as part of a package of measures, along with public transport, walking and cycling improvements so that people have options available to make their trips. This improves the acceptability of such schemes and induces better modal shift as well.

Congestion pricing is better suited for solving localized congestion issues while more widespread issues related to ownership and use of cars are better solved by levy of road tax and fuel tax.

'Greening the Transport for Poverty Alleviation' by Mr. HolgerDalkmann, Director - EMBARQ

Concentrated on transportation issues specially pertaining to the urban poor.

The main challenges lie in the areas of safety, accessibility and vehicular pollution. More than 90% of road accidents of the world occur in low to medium income cities.

The urban poor deal with not only a lack of food and shelter but also with a lack of access to civic infrastructure.

There have been efforts across the world to create public transport systems thatcan be used by the poor. Studies suggest that in Latin America such efforts have created benefits for the economicallychallenged. However, those who are at the bottom of the economic spectrum have not yet reaped any significant benefits. Cities like Rio are setting a good example by laying out an investment of US $1.2 Billion for improving safety and accessibility.

The case of Brazil was mentioned, where recently it had been suggested that institutional reforms are required to make Transport and Accessibility as constitutional rights of every citizen.

To manage travel demand there should be a cut in fuel subsidies and the money so available should be invested in sustainable modes of transport.

'Possible solutions for a transport system compliant with the energy supply and the environment: measurable analyses' by Prof. Bruno Dalla Chiara, Polytechnic University of Turin – European Business & Technology Centre (EBTC)

This presentation of the session was on energy efficient and environment friendly transport systems.

It emphasized on the key challenges of today's transportation systems. These include the increasing number of vehicles on road and associated increase in vehicle kilometers and pollution. Though European countries have achieved some of the aims relating to diffused motorization, the same is not true for developing countries such as India as they are still growing.

Public and private vehicles create emissions and there is a need to minimize these. The main challenges to providing alternate technology are the provision of recharge areas and the availability of cost efficient alternative vehicle technology.

The presentation was made on the Well to Tank, Tank to Wheels and finally Well to Wheels evaluation of alternative energy options. Emerging European Union (EU) policy and its emphasis on alternative sources of energy were also briefly spoken on.

The latest technology in electric vehicle recharging systems using contactless methods was introduced to the participants. His research indicated that while battery intensive methods might be suitable for short travels, longer travel needs are better served by internal combustion technology.

A specific mention was made to the effect that there is need for governments to promote the use of alternative energy to power public and private vehicles and at the same time improve city level infrastructure to complement such vehicles.

UMI 1B: Bus Operations

Session Chair: Dr. P.S. Rana, Former CMD, HUDCO, India

Rapporteur: Ms. Chidambara, Professor, SPA – New Delhi

Speakers at the session included: -

Dr. JoonhoKo, Research Fellow, Seoul Development Institute; 'Successful reform in bus operation - case of Seoul'
Shri. K. N. Ingalagi, Chief Manager (MIS) - Bangalore Metropolitan Transport Corporation (BMTC); 'Improving financial viability of city bus operations - case study of Bangalore'
Prof. ShivanandSwamy, Executive Director, Centre of Excellence in Urban Transport - CEPT University; 'Paradigm shift in PPP for bus operations in India'
ShriGaurav Gupta, Managing Director (MD) - Karnataka State Road Transport Corporation (KSRTC); 'Evolving sustainable city service for medium size cities'

The theme of the session being "bus operations", presentations focused on public transport services in various cities. The major challenges discussed in the session were how to bring about a modal shift in favor of public transport and how to make bus operations a financially viable proposition.

Other concerns discussed were: -

- The challenge is to design fare structure that has some flexibility for short and long distance commuters and also accommodated modal transfers.
- Enhancing commuters and employees satisfaction
- Branding and modernization of bus operations is extremely crucial to tackle the challenge of negative and often derogatory social perceptions of public transport unanimous view
- Advanced Passenger Information System (PIS), route rationalization, and good frequency.

In case of public private partnerships, the key challenges identified were change in input costs, how and when fare would be reviewed, what would be the revised premium/authorization fee on modifying/ extending the route and how new operators could be included.

Introduction of ITS and PIS in bus operations considered a crucial reform for enabling efficient bus operations.

Key recommendations emerging from the session, for bus operations to be sustainable and financially viablewere:

- Modernization and branding with a state-of-the-art infrastructure and PIS.
- A rational and integrated fare structure
- Careful outlining of tasks, responsibilities and risk sharing in PPP options
- For PPP in bus operations, gross cost contract considered more appropriate in expanding transit markets while net cost contract may be useful in cities introducing transit for the first time.
- Innovation through sharing of revenue risks (similar to Bogota), however was desirable and necessary.

'Successful reform in bus operation – case of Seoul' by Dr. JoonhoKo, Research Fellow - Seoul Development Institute

Various reforms in bus operations carried out in the city of Seoulpresented.

Renovated Seoul Bus System became operational from 2004,characterized by friendly, safe, environment friendly and accessible buses, with convenience in connection and transfer, providing timed bus services, with predictable arrival times,with approachable operation system, andtransparent & reliable bus management and secured public interest.

Reforms in Seoul bus operations was structured with respect to a new operational system, publicity and monitoring.

Bus industry was reorganized to PPP model and the revenue of the new system is based on service distance (Veh-Km)

4-types of buses introduced in the reformed system – trunk lines, feeder lines, circular lines and wide area lines.

New integrated fare structure was designed that allowed a maximum of 5 transfers on the same as well as different modes.

There was an increase in ridership by 40% after the reforms and 60% increase in citizens' satisfaction levels.

'Improving financial viability of city bus operations – case study of Bangalore' by ShriK. N. Ingalalgi, Chief Manager (MIS) - Bangalore Metropolitan Transport Corporation (BMTC)

How the Bangalore Metropolitan Transport Corporation (BMTC), once a part of KSRTC, has made its city transport service financially viable.

The introduction of ITS and PIS in bus operations was identified as a very crucial reform for efficient bus operations.

BMTC demonstrated the significance of strong political will and administrative efficiency in making bus operations successful. Reforms related to employee and labor satisfaction have been initiated.

Positive transformation of BMTC included strengthening of infrastructure, fleet modernization, service augmentation, revenue mobilization measures, systems & process improvements, extensive use of IT, cost minimization measures, transparency in HR policies and outsourcing of activities.

The Third Citizen's Report Card on Bangalore's Public Service brought out by Public Affairs Centre, rated BMTC on the top with 96% overall citizen's satisfaction.

'Paradigm shift in PPP for bus operations in India' by Prof. ShivanandSwamy, Executive Director, Centre of Excellence in Urban Transport - CEPT

The role of PPP in bus operations, taking the case of Ahmedabad BRT examined

The average rating of Ahmedabad Janmarg BRTS has hovered around 9 on a scale of 1 to 10.

Gross cost contract is more appropriate in expanding transit markets. Innovation through sharing of revenue risks (similar to Bogota) is necessary.

Net cost contract may be useful in cities introducing transit for the first time.

'Evolving sustainable cityservice for medium size cities' by ShriGaurav Gupta, Managing Director (MD) - Karnataka State Road Transport Corporation (KSRTC)

Salient features of city transport services provided by Karnataka State Road Transport Corporation (KSRTC) for small and medium sized cities such as Tumkur, Mysore and Hasan were presented.

The case studies of KSRTC demonstrate that sustainable city bus operations were possible in small and medium sized towns with population ranging between 3 – 10 lakhs.

The introduction of ITS and PIS in bus operations was identified as a very crucial reform for efficient bus operations.

KSRTC demonstrated the significance of strong political will and administrative efficiency in making bus operations successful. Further, reforms related to employee and labor satisfaction initiated. Different market segments targeted through introduction of different types of bus services.

Dr. P. S. Rana, in the chair, concluded the session with the observation that public transport though not always financially viable, was quite definitely, economically and socially viable.

UMI 2A: Transportation Systems Management

Session Chair: Shri Anil Baijal, Former Secretary, MOUD

Rapporteur: ShriShanbhagSandeep, Transport Planner, CRAFTS

Speakers at this session included: -

Mr. Mahesh Thakur, Executive Engineer – Municipal Corporation of Greater Mumbai; 'Traffic engineering measures for improving the flow of traffic'
Mr. Takahiko Uchimura, Vice President – ITS, Japan; 'Use of ITS for efficient and effective traffic management'.

Transport System Management (TSM) is vital to urban mobility. It eliminates the need to continuously build new infrastructure by maximizing the utilization of existing infrastructure. TSM solutions can be classified into three categories:

1. Operational improvement of existing infrastructure:these include striping, channelization, adding turn road and auxiliary lanes, on-street parking removal, and prompt removal of disabled vehicles.
2. Exploration of alternative means:promotion of non-motorized transport, park and ride facility, car-pooling.
3. Use of new technology:examples include use of vehicle to road-side, vehicle to users and vehicle to vehicle communication.

'Traffic engineering measures for improving the flow of traffic' by Mr. Mahesh Thakur, Executive Engineer - Municipal Corporation of Greater Mumbai

The presentation is the first category of TSM solutions defined by the chair person dealt with

engineering measures to improve traffic flow in Mumbaithe population being 2 crores and there being 19 lakh vehicles plying on its roads. The project titled Urban Transport Project was initially funded by the WorldBank was later taken over by the Maharashtra Government.

The project objective was to institute a centralized control for traffic signals that were to be fully adaptive and coordinated. It used a leased line network.

The project started on June 1, 2007 and cost 72.8 crores. The project was divided into two milestones. The control room currently controls only 250 of the city's traffic signals though it has a capacity of 500 intersections. The staff in the control room was trained in Spain.

Some of the new area traffic control methodologies implemented in the project are:

- Controllers: capable of red lamp monitoring
- Traffic detectors: overhead detectors instead of loop detectors.
- Signal poles: capable of swinging to allow passage of tall objects during processions.
- Push button for pedestrian crossing.
- Fully ducted system for cable laying.

The challenges encountered in the implementation were:

- Work had to be done at night
- Disruptions encountered due to VVIP movement
- Work had to be stopped if it was too noisy
- Coordination with multiple agencies
- Extremely dense utilities

TSM implementation has resulted in reduction of average cycle time generally from 180 sec to 120 sec (although in some congested roads it is still 180 sec) and journey time from 5% to 10%.

'Use of ITS for efficient and effective traffic management' by Mr. Takahiko Uchimara, Vice President - ITS Japan

Nine areas of ITS development outlined - these include among others car navigational systems, electronic toll collection (ETC), real-time information to drivers, safety improvements and traffic management.

With ETC almost all congestion at the toll gate is eliminated.

The system that provides real-time information to each driver is called the vehicle information and communication system (VICS). VICS uses infrared and radio beacons to disseminate information to drivers.

An even more advanced system involves the use of private probe data to collect real-time road status information. It requires setting up an agreement with each driver to use their cell phone information.

Using probe dataprovide information on the fastest route not the shortest. This resulted in 20%

shortertravel times on the average. Traditionally, information on the shorter routes was provided to drivers.

Another example of the benefit from using probe data is the identification of passable or impassable roads during natural disasters. Probe data was used in 2004 to trace impassable roads.

The experience of the impact of the magnitude 9.0 earthquake in Japan that occurred in March this year was shared, namely.

Passable road information critical for rescue teams.

Regular traffic systems were all damaged and were not useful to identify impassable roads. These were identified using probe data. It was also realized that using probe data from multiple companies helped to get more complete coverage

Further improvement in the future for TMS was envisaged and the need for integration of public and privately held data was also emphasized.

UMI 2B: Last Mile Connectivity

Session Chair: Shri S.K. Manglik, Vice-President, IUT (India)

Rapporteur: Ms. AmmuGopala Krishnan, Transport Planner, CES

The speakers at the session included: -

Shri. N. V. S. Reddy, Managing Director (MD) - 'Hyderabad Metro Rail – Planning for seamless travel

&last mile connectivity’
Mr. JulienAllaire, Technical Director - Cooperation for urban mobility in the developing world (CODATU); ‘Planning for safe and effective pedestrian and bicycle facilities’
Shri. NavdeepAsija, Research Scholar - IIT Delhi & Founder Ecocabs - Graduate Welfare Association Fazilka (GWAF); 'Transforming cycle rickshaw –FazilkaEcocabs: World's First Dial-a-Rickshaw Service'

ShriS. K. Mangalikstarted the session by speaking on ‘Last and First mile connectivity’ and the need of equally comfortable and good connectivity.This was followed by the presentations.

‘Hyderabad Metro Rail – Planning for seamless travel &last mile connectivity’by Shri.N.V.S Reddy, Managing Director - Hyderabad Metro Rail Ltd.

Mission of HMRL is “To create an efficient, safe, reliable, economic & world class public transportation system in Hyderabad which will facilitate the city’s transformation as a competitive global city with high quality of life”. Hyderabad Municipal Corporation (HMC)is expecting to cater to 2.5 million people by 2025 with passenger friendly facilities, dedicated feeder systems, and high quality commuting experience so transform Hyderabad into a people friendly green city.

Due importance given to integration of metro rail station, bus stations and rail terminal for a seamless travel.

Provision of Merry Go Round dedicated feeder bus systems in influence areas (direct access up to 0.5 km and feeder connectivity to upto 3 kms) has been made, encouragement of TOD, mixed land-use, development around 300mts of belt on both sides of metro corridors, provide housing, employment, shopping, entertainment within walking distance of Metro corridors.

Access facilities to stations have been provided including adequate facilities for pedestrians, NMV, interchange facilities for MV and NMV, provision for parking at important stations etc.

The various steps in the planning process which included developing indicators for accessibility, demand estimation, land use and activity mapping, infrastructure planning and design, effect of infrastructure on accessibility and consultations with stakeholders were highlighted.

The effect on the city due to the implementation of HMR and last mile connectivity including continuous walkway, easier access, seamless travel, safety, benefits of people, increase in ridership, lesser pollution and urban rejuvenation and redesign of the city.

‘Planning for safe and effective pedestrian and bicycle facilities’ by Mr. JulienAllaire, Technical Director, Cooperation for urban mobility in the developing world (CODATU) Paris

Key issues for sustainable mobility system were detailed – statistical depiction of fatal and non-fatal injuries. Half of the fatality rate included vulnerable users. A car user cares less about a bike rider and a bike rider cares less about a pedestrian while cycling - manifestation of human nature while driving.

More bicycle use ensures more safety. For the safety of pedestrians and cyclist, planning and

provision of infrastructure need to be considerately evolved along with adequate provision of prominentsignages.

For sustainable mobility system three factors are of prime importance. (1) Inter-modality (using different modes for the same trip), (2) Multi-modality (using different modes in different situations), (3) Street.

The speaker explained with the case studies of Netherlands, Denmark and Germany that irrespective of gender, age limit, income class, cycling is considered safe, convenient and pleasant and is promoted.

For promoting the cycling habit, good infrastructure facilities are to be provided,detours should be minimum, safety should be ensured, proper and prominent signages need to be in place and the cyclist should be allowed to have a quicker and comfortable ride and enjoy the experience.

More cyclists mean less fatality. Separate speed limits to be mandated for cycle tracks to increase the efficiency of cyclists and to enforce priority of cyclists over private motor vehicle users.

By giving priority to pedestrians and cyclists, eco-friendly city with less pollution and traffic congestion can be created and sustained.

Adequate provision of pedestrian sidewalks, traffic signals for street crossing, parking spaces, parking policy implementation, educating drivers are a few examples of the varied and multi-faceted traffic management strategies that are required to be planned and implemented with a view to facilitating smooth commuting experience.

In conclusion, the need for a Local Transport Authority which has all the competencies related to urban planning, transport and mobility and which benefits from a specific financial resources to develop an integrated approach to urban transport management and to different stakeholders under a single unit was underscored.

There was need to change the mindset of people through education and public awareness to the effect that speed is not equal to modernity, pedestrians and cyclists are not equal to poor and car drivers are not equal to rich and that motorists can also walk.

An invitation to attend CODATU XV, Addis Ababa, Ethiopia, 22 – 26 October 2012 was also extended.

'Transforming cycle rickshaw – FazilkaEcocabs: World's first dial-a-rickshaw service' by ShriNavdeepAsija, Research Scholar, IIT Delhi & Founder of Ecocabs, Graduate Welfare Association Fazilka(GWAF)

Dissemination of information of the problems related to present rickshaw operators. The Main aim of Ecocab is to provide accessibility and good quality service – both these to be implemented as phase 1 and phase 2 of the program.

The three stakeholders in 'Ecocabs' mentioned are the traction men, society and environment, Real time technology is used to call a rickshaw as is the case at present while calling for a radio taxi. The call centre for the rickshaws will be near to tea stall or shop where generally the rickshaw drivers park their rickshaws.

Under this program many benefits are provided to the rickshaw drivers and their family such as health care, education to children, annual scholarship, legal help, provision of clothes etc. to induce larger numbers of rickshaw operators to operate on this platform and more come under this system.

In comparison with car mobility, rickshaw system is safe, congestion free, helps in noise reduction and secures better air quality enhancement and is eco-friendly as well. Separate call center numbers for rickshaw operators are publicized so the people can call, book a rickshaw and save time.

Research and developments are facilitating the implementing of new technologies that increase the efficiency of a rickshaw.

The salient features and the working of Dial-a-Rickshaw along with GIS application and the new policy that lead to the enactment of the "Punjab Eco-cab Act" and amendment in "Punjab Cycle Rickshaw Act – 1976" were explained.

Ecocabs provides a socially equitable and sustainable environment, can save carbon footprints, while additional revenue can be earned through advertisement in and on the rickshaw.

The way forward effectively canvassed by the session chairperson was to propagatethe objective to reduce pollution by reducing the use of cars. The task to create and enhance awareness was onerous. Car users are more comfortable in cars than any other public transport modes. Only way to shift the private motor car users into public transport is to make the latter as comfortable and convenient as the private modes and to provide efficient first to last mile connectivity.

UMI 3A: Mass Transit Options

Session Chair: Dr. M. Ramachandran, Former Secretary, MOUD

Rapporteur: ShriAmit Singh Baghel

Speakers at the session included: -

Shri I.P. Gautam, IAS, Principal Secretary (UD) – Gujrat; 'State of Art, Planning, Design and Operation of BRT – Case of Gujrat'
Shri Anil Gupta, President & Head (Infrastructure) - Reliance Infrastructure; 'Challenges faced by private parties in planning, design and operation of rail/guided transit'
Dr. Dario Hidalgo, Senior Transport Engineer – EMBARQ; 'Multimodal integration through design of interchanges'
Mr. NenadZdravkovic, Doppelmayr;'DCC automated people movers'
Shri K.D. Lala, City Engineer - Thane Municipal Corporation; 'Hybrid transit systems - Case study of Thane'

'State of Art, Planning, Design and Operation of BRT – Case of Gujarat' by Shri I.P. Gautam, IAS, Principal Secretary (UD) - Gujarat

The approach to BRT design in a city with examples of BRT corridors in Gujarat was introduced

The focus of the presentation was on the design issues while proposing a BRT systemsuch as use of ITS for integrated ticketing system, automatic vehicle tracking system, electronic fare collection and so on

Measures taken by the state government to track performance after a surprise visit by the Chief Minister of Gujarat and by taking customer feedback from commuters was explained in detail.

BRT system should have benefits like extensive public outreach, safe mobility for women and children,and accessibility for all.

'Challenges faced by private parties in planning design and operation of rail/guided transit' by Shri Anil Gupta, President & Head Infrastructure - Reliance Infrastructure

The presentation comprised of overview of Reliance Infrastructure, framework of implementation/ operation and enabling of frameworks

Highlighted the various challenges faced during the implementation / operation stages in planning, design, execution and operation

Various challenges faced in execution of big projects across India and the manner in which these were handled/mitigated at each level was detailed at length

The major factors enabling frameworks highlighted were policy and regulations, financial viability, commercial viability, environment, timely clearance, security, public perception and stakeholders.

Quicker decision by government agencies is important to facilitate and expedite the project.

The concessionaire authority should be empowered or a nodal committee formed to expedite approvals, cap on VGF needs to be eased, minimum guaranteed fare revenue should be assured to the concessionaire and last but not the least the infrastructure project inputs should get some relief from taxes.

'Multimodal integration through design of interchanges' by Dr. Dario Hidalgo, Senior Transport Engineer - EMBARQ

Connectivity provided across service and modes was described

Showcased examples around the world such as Atocha, Madrid, in Spain (Interchange between Regional Rail – Metro-Regional Bus –Local Buses), Moncloa, Madrid in Spain(Interchange between regional Rail – Metro-Regional Bus –Local Buses), PlazadeCastilla, Madrid, Spain(Interchange between Metro-Local Bus).

Among critical elements required for designing a terminal are level of services for persons, occupancy, and ease of walking.

Designing multimodal integration through design of interchanges should consider the origin to destination trip, Provision of alternative to the traveler, including the first and the last kilometers and the connection should be designed as seamlessly as possible.

'DCC automated people movers: Doppelmayr's Cable Liner Systems In urban environment' by Mr. NenadZdravkovic, Doppelmayr

The example of the DCC Doppelmayr Cable Car was illustrated: - how these move, features of the cable cars like drive machinery being isolated from the environment, noise levels along the track and at the station platforms very low, no emissions, not getting stuck in traffic, and easy to maintain.

The cable car has been implemented at the following cities: -

- 1999: completion of the Mandalay Bay Tram in Las Vegas, Nevada, USA
- 2002: completion of Air-Rail Link at Birmingham International Airport, UK

- 2006: award of contract for MGM Mirage City Center in Las Vegas, Nevada, USA
- 2007: completion of the Cable Liner Shuttle at Mexico City International Airport

Challenges in India highlighted - current traffic situation is poor, that just 25 percent of India´s 85 largest cities (over 500,000 populations) have formal public transport systems.

Most public transport is running at low maintenance level. Most have buses in mixed traffic whichleads to low level of service.

His vision for a public transportation system in India is one that is space saving, environmentally friendly (no emissions), reliable, easy to integrate as well as cost and energy efficient.

'Hybrid transit systems – case study of Thane' by Shri K.D. Lalla, City Engineer - Thane Municipal Corporation

The traffic condition in the city of Thane (Mumbai) described. As increased population growth lead to increase employment growth, the resultant traffic dispersal has become difficult to handle.

An overview of the Integrated Mobility Plan for Thane city presented that comprised of: -

Immediate Improvement Proposals: 2008-2011

Short-term Proposals: 2012-2016

Medium Term Proposals: 2017-2021

Long Term Proposals: 2022-2031

UMI 3B: People and Environment Friendly Urban Transport Infrastructure Planning

Session Chair: Shri O.P. Agarwal, Advisor - World Bank

Rapporteur: ShriProbhat Kumar Paul, RITES

Speakers at the session included: -

ShriSandeep Gandhi, IIT- Delhi; 'Urban street design guidelines'
Ms. Anumita Roy Choudhury, Executive Director – Centre for Science and Environment (CSE); 'Parking policy as a tool to enable modal shift'
Mr. BinyamReja, Sector Manager– World Bank; 'Designing feeder services for System Integration'

The session dealt on the feeder system of mass transit system; urban road design and parking policies near mass transit hub.

'Urban Street Design Guidelines' by ShriSandeep Gandhi, IIT - Delhi

Emphasis to be given to allocate different space of ROW for different users

A brief about the National Urban Transport Policy (NUTP) of moving people instead of moving vehicles.

Current standards are very old and do not match with current requirements. Brief procedure for preparing Geometric Design Standards based on experiences and studies done was presented.

Presentation categorized the procedure in three different ways i.e. Review Process, Stakeholder Participation and Finalization and Launch.

Further it described the structure of the code with detailed dimensions and cross-section drawings having information on maximum utilization of ROW according to its hierarchy.

Parking policy as a tool to enable modal shift' by Ms. Anumita Roy Choudhury, CSE

Various parking issues in Delhi highlighted such as - Demand more than supply of parking areas, loopholes in building byelaws which promote parking areas, high percentage of land under parking.

Examples where shopkeepers are not keen to charge public for parking areas (e.g. Khan Market) which in turn makes it difficult for policy makers to draft parking policy, were cited.

The presentation showed case where construction cost of multi-level parking cannot be recovered from the car owners due to lenient parking charges and where expenditure was covered by other means like advertisements.

A few international examples where implementation of parking policy leads to drastic change in environment, public transport share as well as reduction in congestion were shown.

'Designing feeder services for system integration' by Mr. BinyamReja, World Bank

Five basic principles in the designing of feeder bus service. i.e. network economics, optimal route structure for public transport network, physical integration, using modern IT for fare collection and transfer payments, institutional integration through vertical integration or long – term contracting between bus and rail operators were introduced.

Importance of feeder systems and its applicability where ever possible adequately emphasized.

A few designs suggested on how to implant such projects in the Indian context by taking international examples as well as some national examples like Mizoram.

Public transportation, the need and manner to increase the public transport modal share by various means discussed.

UMI 4A: Livable Cities and Bench Marking

Session Chair: Shri S. Sunder, Distinguished Fellow - TERI

Rapporteur: Ms. VishakhaVarshney, RITES

Speakers at the session included: -

Dr. Prof. Keiko Nakamura, Managing Director (MD) – Head of Secretariat of the Alliance for Healthy Cities (AFHC); 'The Alliance for Healthy Cities: A network of cities for comprehensive quality of life centered urban development'
Dr. Prof. Keiko Nakamura, Managing Director (MD) – Head of Secretariat of the Alliance for Healthy

Cities (AFHC)& Mr. Sadashi Toyoda, AFHC; 'ESHUT towards a livable city – A case of Owariasahi city, Japan on integrated land use planning'
Mr. Todd Litman, Executive Director – Victoria Transport Policy Institute (VTPI); 'Multi-modal performance evaluation'
Mr. Arnaud Dauphin, Urban Development Specialist (Transport) – Asian Development Bank; 'Tbilisi sustainable urban transport project: improved project design to better measure longterm impacts'

The session initiated by Prof. Sewaram, HOD, Transport Department, School of Planning and Architecture, Delhi,who introduced the panel members.Thereafter the Chairpersontook over with the quote "God created paradise, people created cities" and gave a brief glimpse into the various issues and challenges faced in day to day life. Those concerns and issues considered important points were:

CNG system and electric vehicle should be introduced in the near future to reduce pollution emission. Reduce import of old cars and conduct fuel emission tests on these vehicles if imported.

Measurement of performance indicator and retention of database and record is important. It is seen that fine particulate which causes major flaw generally gets skipped in tests conducted and hence proper statics needs to be maintained like rather than measuring vehicle/KM, Vehicle/capita should be measured since it increases the detailed scale of measurement and gives more accurate results.

Basic statistical parameters should be same for every city since this will encourage growth at a faster rate as it will provide lower level cities a motivation to grow like their bigger counterparts.

'The Alliance for Healthy Cities: A network of cities for comprehensive qualityoflife centered urban development' by Dr. Prof. Keiko Nakamura, Managing Director (MD), Head of Secretariat of the Alliance for Healthy Cities (AFHC)

A brief overview of various problems emerging in health related issues in cities.

These were illustrated by depiction of various pictures of different organizations and by display of newspaper clippings. Briefly interest in making cities a source of health rather than source of disease was shared.

'ESHUT towards alivablecity –acase of Owariasahicity, Japan, on integrated land use planning' by Dr. Prof. Keiko Nakamura, Managing Director (MD), Head of Secretariat of the Alliance for Healthy Cities (AFHC)and Mr. Sadashi Toyoda, AFHC

Brief introduction to demographic and growth rate given initially followed by the regional and land use plan in that region.

The Owariasahi Healthy City Programdescribedwith a brief on how land readjustment is implemented to make a healthy city

Supporting physical and non-physical factors discussed. The concept of integrated land use planning and city bus system was given further importance.

Brief of various public bus systems and citizen initiative programmes given. Management system and special mention on image character of cities that psychologically enhances the citiesstate of happiness were mentioned.

How exactly does the city bus contributes to a healthy city was further mentioned by showing improvement in access to service, providing access to important facilities and social service, universaldesign and its impact which improved the public transport users was shown.

Sharing with citizens, of a vision towards healthy city development,citizens' involvement for effective and efficient management, development in an integrated manner were some of the strategies that were shared in this presentation.

Inter-relationships of health and urbanenvironmental indicators were explained schematically. Need for entire gamut of government intervention indicated by graphic display of health care variables compared to health status in cities.

The process of development shown schematically with concluding slide gave a view on network of cities expands a movement for better urban health.

'Multi-Modal Performance Evaluation' by Mr. Todd Litman, Executive Director – Victoria Transport Policy Institute (VTPI)

Performance indicators, transport statistics and definition of the parameters of "Paradigm Shift" wasthe major focus of discussion.

Basic issues of public transport and their basic impact were dealt with the perspective that that these systems donot encourage exercise in persons and tend to make commuters lazy.

A conventional evaluation where comparing cost for operation and maintenance was illustrated with help of comparison table.

'Tbilisi Sustainable Urban Transport Project: Improved Project Design to Better Measure Long Term Impacts' by Mr. Arnaud Dauphin, Urban Development Specialist (Transport) – Asian Development Bank (ADB)

The use of transport household survey, its major features and benefits were presented.That apart, benchmarking, accessible safe environment friendly transport, sustainability were discussed in detail with emphasis on the need for determining the right kind of data, then to access it.

The procedure for collecting of data, statistics and feedback along with financial mechanism and organizational set up were highlighted.

A case study was discussed. The manner in which zones were divided, survey conducted, and use of IT technology, the problems faced and recommendations made were elaborated.

UMI 4B: Leveraging Strategies for Better Finances

Session Chair: Shri Anil P. Gupta, President & Head - Reliance Infrastructure

Rapporteur: ShriNeeraj Sharma, RITES

Speakers at the session included: -

Shri O.P. Agarwal, Advisor - World Bank; 'Issues in financing sustainable urban transport'
ShriAnouj Mehta, Director – Asian Development Bank (ADB); 'Global experience in financing urban mass rapid transit through PPP'
Mr. Xavier Hoang, Urban Transport Expert –AgenceFrançaise de Développement(AFD) on 'Leveraging land value capture along the MRT Mass Transit Corridor'

Major challenges faced in formulating strategies for better finances

Integration of public transportation system within urban development

Suitability of approaches (CEPAC or PPP) used for Indian context

Balance between densification and urban coherence, public investment maximization and market absorption

To resolve the risks like financial risk, political risk etc.

Operations &maintenance a major issue among various phases of financing

Ownership also a major issue - whether ownership will be lie withpublic sector, private sector or PPP.

Beneficiaries of public transport should be defined. Parking fare policies – financing through fares isimportant.

Major achievements and further opportunities

Two possible approaches for MRT and public land value capture – Brazilian CEPACs and Hong Kong multifunctional hubs have been used

Further opportunities in the area would be to make use of taxation structure to make the projects financially strong

Institutional Reforms and Innovations

Resources identified to bridge the gap, these beingtaxation, revenues from demand restraint measures, commercial exploitation of land and others (advertising revenues)

Betterment levy collected on land

Tax on vehicles – high registration fee can be used as deterrent for ownership of vehicles

Demand restraint measures like congestion tax, tolls and high parking charges are useful

Commercial exploitation of property is the best option

Implementation of policies and programs

Strong parking fare policy can assist cities to bridge the resources gap.

Viability gap funding is an important method by which to make better finances

Key messages and recommendations

There should be central planning agency for declaring firm policy directions that clearly prioritise

public mobility

UMI 5A: Fare Integration for Seamless Travel

Session Chair: Shri S.K. Lohia, Oficer on Special Duty (OSD) (Urban Transport - UT) and Ex-officio Joint Secretary, Ministry of Urban Development (MoUD)

Rapporteur: Ms. PriyankaGanguli

Speakers at the session included: -

Prof. Jason Chang, ACER and Mr. Joe Wang (WANG,Ching-Yao), ACER;'Case study of Taiwan: PPP Approach for development of e-payment systems'
Dr. Jin Young Park, Urban Transport Specialist – Asian Development Bank (ADB); 'Case study of Seoul and ADB's Effort for seamless travel'
Mr. SilvesterPrakasam, Director of Fare Systems – Land Transport Authority (LTA), Singapore; 'Fare Integration for seamless travel in Singapore'

'Case study of Taiwan: PPP Approach for development of e-payment systems' by Prof. Jason Chang, ACER and Mr. Joe Wang (WANG, Ching-Yao), ACER

National plan for e-payment and ticketing systems started in 2004 and by 2006 most cities were covered. By 2007 all cities covered.

Electronic Toll Collection (ETC) system development: Feb 10, 2006, National Bureau through a PPP approach launched this system: 980 km network, toll stations 22, total number of lanes 334.

E-card: 28 million smart cards issued. 25 million easy cards in Northern Taiwan, 900,000 Taiwan Easy-Go cards in Central and Eastern Taiwan - Card can be used to pay for curb parking, commuter rail, security, off-street parking, MRT, bus, taxi, and cable car, as well as for ferry, and regional bus (One Card Policy and Multi-Card compatibility).

Successful factors – strong support from Mayor and City Council, PPP, effective financial sustainability scheme comprehensive planning and design, administrative task force and supervisory committee in place.

'Fare Integration in Seoul and ADB's effort for seamless travel' by Dr. Jin Young Park, Urban Transport Specialist – Asian Development Bank (ADB)

Fare System in Korea - Single fare for urban bus

Distance based fare for urban metro and regional bus

Fares among different modes

Distance based fare charge (Seoul).

Most difficult barrier experienced in public transport is transfer.

Reduction of fare during transfer only possible by using smart card.

Benefits for Users:

One payment system for many services, civil service charge, fine and taxes

Seamless travel benefits for government

Smart management of public transport

- Flexible and efficient control over integrated public transport
- Demand responsive routing and scheduling, based on concrete demand data

Financial transparency

- Reduction of government subsidy

Enhanced public welfare

Benefits for operators

Cost Reduction

Revenue Increase

ADB's Efforts:

1. Emphasis on Sustainable Transport Infrastructure (STI)
2. New approaches: support ITS for Sustainable transport
3. new technical assistance project
4. ITS for better urban transport
5. Promotion of ITS for sustainable urban transport
6. ITSfor TDM

Recommendations:

Public responsibility for smartcard operation

Providing interoperability of smartcard for different modes and regions within countries

Employing private efficiency and marketing power

Caution for market based standard

Integration with GPS and wireless communication

Expanding smartcard's function for public transport management and TDM

'Fare integration for seamless travel in Singapore' by Mr. SilvesterPrakasam, Director of Fare Systems – Land Transport Authority(LTA), Singapore

Evolution:

1990-2002: Magnetic Card

2002-2009 Type C (Smartcard)

Driving Force:

Public transport operations should be self-funded

Lowest 10% of income earners spend no more than 8% of their income for public transport.

To continue improving the efficiency, LTA embarked on building of next generation national transportfare clearing house systems called Symphony. Singapore population: 4 million, cards: 15 million.

Capacity:

Can clear up to 30 million per day and scalable.Today over 5 million transactions per day.

Open card standard based on national transport card standard called CePAS to lower entry barrier.

Banks were not happy with the older card: they thought the security wasnot enough.

Banks looked for signed certificate: which is cryptographically signed

Benefits:

Accommodate multiple issuers, multiple acquirers

Upgrades path for proprietary e-purse standards (CashCard and EzLink)

Extend to all smart card like devices

Caused convenience and potential cost savings to residents

UMI 5B: Regional & Suburban Connectivity

Session Chair: Ms. NainiJayaseelan, Member Secretary - National Capital Region Planning Board

Rapporteur: ShriSharad Kumar Sharma

Speakers at the session included: -

ShriNaresh Chandra, Director (Technical) – Mumbai Railway Vikas Corporation (MRVC); 'Planning design and operation of suburban/ regional Services'
Mr. Oren Tatcher, Principal – Oren Tatcher Corporation (OTC) Ltd.; 'Integration of regional and city travel'
Shri O.P. Agarwal, Advisor - World Bank; 'Institutional, administrative and legal issues'

Major challenges

Overcrowding and overloading of system services used for transportation as in the case of Mumbai suburban rail transport services!Who will do the work – therailways or the cities, individual entities - lack of investment in the sector and the reason being the confusion in controlling unit of the sector as huge funds are required which are not patronized by the government

Use of obsolete technology in the Indian context

Encroachments on land further deteriorates the condition

Resettlement and rehabilitation of the existing population for improving the connectivity

Design challenges in the provision of new system

Region covers multiple jurisdictions- this is a major issue in regional connectivity

Major achievements and further opportunities

Sustainable urban transport projects have been initiated like in case of Mumbai, the Mumbai Urban

Transport Project.

Availability of loans for the projects in providing better regional and suburban connectivity.

Improvement of technology along with increasing the carrying capacity of system modes

Institutional Reforms and Innovations

Metropolitan Planning Organization has been set up in USA to undertake integrated planning for the region

SyndicatDes Transports d'Ile-de-France (STI F) in Paris region procures services from RégieAutonome des Transports Parisiens(RATP) and OPTI LE

Mumbai Metropolitan Regional Development Authority (MMRDA) in Mumbai which is infrastructure planning and implementation entity is not only a service operating entity?

Planning body in Delhi is the National Capital Region Planning Board (NCRPB)but it has no operational rolein the implementation of policies and programs

Appropriate institutional arrangement set up under law specifically for public transport can be useful

Setting up of national law on urban transport with a view to better integratedifferent bodies

Key messages and recommendations

There should be integrated planning approach for the region to improve regional and suburban connectivity

An institutional body should be responsible for all urban transport issues. This body should also have planning role for infrastructure

National / State govt. participation should be readily available for resolving disagreements

B. Regional EST Forum Session

The Conference cum Exhibition on Sustainable Mobility held from 3rd to 6th December 2011 at New Delhi, India, included the Urban Mobility India (UMI) Conference 2011 and the Sixth Regional Environmentally SustainableTransport (EST) Forum in Asia. The annually held Regional EST Forum in Asia, which is the key componentof the Asian EST Initiative, provides a strategic and knowledge platform for sharing experiences and disseminating best practices, policy instruments, tools, and technologies among Asian countries in relation to various key aspects of EST underlined in the Aichi Statement (2005). Currently covering twenty- three Asian countries, the high-level policy Forum aims at not only promoting an integrated approach to deal with a range of social, economic, and environmental issues in the transport sector, but also in fostering interagency coordination as well as facilitating partnerships and collaboration between governments and international organizations such as development banks, bilateral and multilateral donors.

The EST Forum consisted of eight sessions.These are briefly described in the following pages.

EST 1:Moving forward on the Bangkok 2020 Declaration

Session Chair: ArbabAlamgir Khan, Minister for Communications-Pakistan

Facilitator: Michael Replogle, Global Policy Director and Founder – Institute of Transport Development Policy (ITDP)

Rapporteur: Heather Allen, Programme Director – Transport Research Laboratory (TRL)

The speakers at the session included: -

C.R.C. Mohanty, Environment Programme Coordinator - United Nations Centre for Regional Development (UNCRD); “The Bangkok 2020 Declaration - a vision for Asia in promoting sustainable transport towards a Green Economy”
Cornie Huizenga, Joint Convener - Partnership on Sustainable Low Carbon Transport (SLoCaT); “Implementing the Bangkok 2020 Declaration - benefits and opportunities”
Lloyd Wright, Senior Transport Specialist - Asian Development Bank (ADB);“2020 and Beyond: The Green Economy transition for transport in Asia and the Pacific”
Official release of the joint Asian Development Bank (ADB) – GesellschaftfürInternationaleZusammenarbeit(GIZ) publication; "Changing Course in UrbanTransport: An Illustrated Guide"
Lewis M. Fulton, Senior Transport Energy Specialist - International Energy Agency (IEA); “Global modal shift scenario - complementing Energy and CO2 benefits through implementing” the Bangkok 2020 Declaration

*A brief report on the session is placed at Annexure VI

EST 2: Country Reporting in Response to Bangkok2020 Declaration - Initiatives, Achievements,Policies and Programs

The speakers at the session included: -

Session Chair: Thomas Hamlin, Convener in Sustainable Low Carbon Transport (SLoCAT) - Division for Sustainable Development / United Nations Department of Economic and Social Affairs (DSD/ UN DESA) **Facilitator:**Heather Allen **Rapporteur:**Marie Thynell	**Session Chair:** Chikako Takase, Director - United Nations Centre for Regional Development (UNCRD) **Facilitator:** Sophie Punte **Rapporteur:**Simon Ka Wing Ng	**Session Chair:** O. P. Agarwal, Advisor - World Bank **Facilitator:** CRC Mohanty**Rapporteur:**Bert Fabian
Group 1	Group 2	Group 3
Bangladesh India Japan Lao PDR Myanmar Nepal Philippines	Bhutan Cambodia Indonesia Rep. of Korea Maldives Pakistan	Afghanistan Malaysia Mongolia Singapore Sri Lanka Thailand Viet Nam
Panel Discussion	Panel Discussion	Panel Discussion
Lloyd Wright RoelofWittink HolgerDalkmann	Michael Replogle Lewis M. Fulton Cornie Huizenga	Manfred Breithaupt Charles Melhuish Yoshitaka Motoda

Some of the key areas covered were: -

Integrated approach to transport planning in a rapidly urbanizing scenario for Asia

Public health and safety as core elements in transport policy, planning, financing, and development

People and environment friendly transport infrastructure in urban design and development

Modal integration and modal share development to break the current motorization trend

Sustainable management of two- and three-wheelers in Asia

Making every Asian city pedestrian and bicycle friendly for social equity

Intelligent Transport Systems (ITS) – an option for smarter, low carbon, energy/fuel efficient, and socially inclusive transport

Greening Freight Operations

Rail Development as an Efficient Mass Transit Option for Asia

Suburban and Regional Connectivity as Pro-poor Growth Strategy

Innovative Financing for Sustainable Urban Transport

EST 3A: EST as the Basis for NAMAs (NationallyAppropriate Mitigation Actions)

Session Chair: S. Sundar, Distinguished Fellow - The Energy and Resources Institute (TERI)

Facilitator: Cornie Huizenga

Rapporteur: AnupBandivadekar

The speakers at the session included: -

'Environmentally Sustainable Transport as the Basis for NAMAs' by Akshima T. Ghate, Fellow and Area Convener, Centre for Research on Sustainable Urban Development and Transport Systems - The Energy and Resources Institute (TERI)
'Opportunities and challenges of applying NAMAs in the transport sector in Asia: from Cancun to Durban' by Thomas Hamlin, Technical Adviser, Energy, Transport and Climate Change, Division for Sustainable Development (DSD), UN DESA
'Mainstreaming transport co-benefits approach: a practical guide for evaluating transport projects' by Jane Romero, Transport Specialist, Climate Change Group, Institute for Global Environmental Strategies (IGES)

*A brief report on the session is placed at Annexure VI

EST 3B: Modal Share Development: How to Breakthe Trend

Session Chair: Faridullah Khan, Managing Director, ENERCON-Pakistan

Facilitator: Sophie Punte

Rapporteur: Bert Fabian

The speakers at the session included: -

'Making sustainable mobility a reality – how to break the trend' by SanthoshKodukula, Urban Transport Specialist –GesellschaftfürInternationaleZusammenarbeit - Sustainable Urban Transport Project (GIZ-SUTP)
'Sustainable mobility alliance to improve mode share of public transport' by Heather Allen, Programme Director – Transport Research Laboratory (TRL)
'How to build healthy and livable cities through safe and dedicated bicycle infrastructures – case of Changwon' by Buok Rhee,- Changwon Health Centre, and SanghyukBae, Researcher - Seoul National University (SNU)

*A brief report on the session is placed at Annexure VI

EST 4A: EST for Green Economy

Session Chair: Paljor J. Dorji, Deputy Minister, National Environment Commission-Bhutan

Facilitators: A.T.M. Nurul Amin, - North South University (NSU) and Sungwon Lee, Head of the Center for Transport Economics and Social Cohesion – Korea Transport Institute (KOTI)

Rapporteur: C.R.C. Mohanty

The speakers at the session included: -

'Win – win transport solutions for green economy climate mitigation' by HolgerDalkmann, Director – The World Resource Institute Center for Sustainable Transport (EMBARQ)
'Green economy policies in the transport sector – prospects and challenges' by Shreekant Gupta, Board member – Clear Air Initiative (CAI) Asia
'Pro – poor transport policy towards Green Economy by GeetamTiwari, Tripp Indian Institute of Technology (IIT) - Delhi

*A brief report on the session is placed at Annexure VI

EST 4B: Rail Development as an Efficient Mass Transit Option

Session Chair: Rohana Kumara Dissanayake, Deputy Minister of Transport - Sri Lanka

Facilitators: ProdyutDutt, Principal Transport Specialist, Asian Development Bank (ADB)

Rapporteur: Abdul Quium, United Nations Economic and Social Commission for Asia and the Pacific (UN ESCAP)

The speakers at the session included: -

'The rail sector and sustainable development: building a Green Economy' by Mukul Saran Mathur, Head of UIC Asia Regional Unit - International Union of Railways (UIC)
'Railway Development for Low Carbon, Green Growth in Korea' by Jaehyun Park, Senior Researcher - Korea Railroad Research Institute (KRRI)

*A brief report on the session is placed at Annexure VI

EST 5A: Green Freight and Co-Benefits

Session Chair: Ildefonso T. Patdu, Jr., Assistant Secretary, Department of Transportation and Communications-Philippines

Facilitator: Cornie Huizenga

Rapporteur: Simon Ka Wing Ng

The speakers at the session included: -

Strategies for green and energy efficient freight system in Asia - case of Green Freight Program in China' by Sophie Punte, Executive Director - Clean Air Initiative (CAI) Asia

*A brief report on the session is placed at Annexure VI

EST 5B:Sustainable Management of Two and Three Wheelersin Asia

Session Chair: SommadPholsena, Minister, Ministry of Public Works and Transport-Lao PDR

Facilitator: Mr. Charles Martin Melhuish, Expert, EST

Rapporteur: Bert Fabian

The speakers at the session included: -

'Regulatory and institutional framework to control the drivingforces of two-and-three wheelers'byAnupBandivadekar, - International Council on Clean Transportation (ICCT)
'New roadmap for motorcycle emission standard and fuel quality in Vietnam' by DucHuu Do, Deputy General Director - Vietnam Register
'Cost – effective technology measures and financing options' by Bert Fabian, Transport Program Manager - Clear Air Initiative (CAI) Asia

*A brief report on the session is placed at Annexure VI

The Way Forward

*A brief report on the session is placed at Annexure VI

C. Round table discussion

Round Table 1 : Public Private Partnership (PPP), When and Where to Use?

Anchor: *Cherian Thomas, Chief Executive Officer (CEO) – Infrastructure Development Finance Company (IDFC)*

The discussion commenced with the anchor defining PPP & by elucidating another major 5 points on which the discussion continued further. The first point was on "what are PPP-able and non PPP-able projects". The discussion revealed that a PPP-able project should be mainly to increase efficiency and to understand and balance the operational and financial parameters. Suggestions were also made on the need to have proper guidelines declared by the governmenton all relevant parameters, not the least of these being, for example, on the input into and return to be realized from a PPP project; to whom should a PPP project be assigned and at what share. All operating parameters and desirable outcomes should be clearly detailed before implementing of a PPP project.

Experiences with PPP models in India and abroad were then narrated. Examples such as the Delhi Airport Metro line, Indore, Jalandhar, Delhi Bus Transport were suggested as good PPP models. The Latin America PPP in bus system and its quality and specifications was handed out as another admirable example. For a good PPP model, efficiency is the important outcome. Clarity in objectives and commercial viability should be clearly discernible and implementation should be monitored, with proper regulations to ensure about the inflow and outflow of money. The main reasons for dissatisfactory performance of the PPP model is the imposition of non-profitable rules and the limitations imposed.

Then again the challenges that are encountered were with regard to construction, the structure, and the establishment of the standards for implementing and monitoring the PPP projects. Most participants agreed that concerns of safety, acquisition of land and raising of funds for the project are the major challenges faced in PPP projects. Issues such as concessions to be allowed to the private sector by local government authorities, and the levels of risk to be taken by government require careful consideration. Additionally, proper regulatory structureneeds to be instituted at the state, regional and national level. The discussions conceded that good decision making is invariably facilitated by proper consideration and examination of detailed and reliable feasibility report and clarity in stated objectives.

Thereafter the discussion revolved on funding, the mechanism for raising revenue, and the service mechanisms by which the forward movement of the project is secured. Where does the private sector get the money from? Are subsidies required to be given by the government?Would not the facility of providing advertisement fluxes near intersectionsincrease the likely disturbance to the driver and increase the probability of accident occurrence?. Should such flux be allowed to be provided? If not where else can it be provided? A definite proportion of share of revenue should be fixed before the start of project. Erection of toll gate should be avoided as far as practicable to minimizeimpediment to traffic flow. Railways have less

participation in PPP which should be increased.

A way forward was suggested indicating to the importance of scale factor for revenue, land factor in PPP, share of land value to private operators etc. Suggestions were also made to improve the syllabus of engineering courses both at graduate and post graduatelevels and to include more content about PPP, urban transport, rail engineering etc.

Round Table 2 : How to Control the growing Number of Cars and Two-Wheelers?

Anchor:*Ms. Anumita Roy Choudhury, Executive Director –CSE*

1. Rationale for restraint on the use of car: With hidden subsidies that include low charges for road usage and generous parking supply, cars have taken over the urban road space, increased energy demand and at the same time, the emission of pollution and greenhouse gases. If cities do not act on time to prevent the explosion in numbers of personal vehicles our cities will choke on the emissions that will occur, and make them unlivable. This will also block equitable distribution of road space to other sustainable road users.

The Anchor recommended that India will have to restrain usage of personal vehicles at the early stages of motorization as there is no onesilver bullet. Globally, cities are using a combination of strategies. They are making car parking prohibitive;adding high premium to car ownership; exacting dues for entering prime busy areas; setting vehiclequota, allowing only a fraction of them on roads at a time; or just not allowing them in the city centre.They are also giving people more options to cars. Indian cities will have to prepare their own framework.The restraint strategies will hinge on travel demand management strategies as well as infrastructure design and city planning strategies. Cities will require phasingtheir plans.

2. Indian cities can adopt a multi-pronged approach to car restraint

Stop incentivizing the motor car in any manner whether in the form of fiscal subsidy, direct and hidden or through car-centric road infrastructure. The call of the hour is to limit car infrastructure and augment public transport. For instance, cities like Tokyo have restricted car infrastructure in terms of wide roads and parking facilitiesbut have good public transport connectivity. Limiting infrastructure for cars will be crucial. For example,in Singapore despite stringent pricing and restrictive measures on car ownership, car modal share ishigh. Once the car is bought and good car infrastructure is available, shift from cars to public transport for daily travel is relatively less significant.

Support and scale up sustainable modes of public transport, walking and cycling as an effective alternative cars. Avoid and shift can be enabled if well connected and integrated public transport isavailable with good last mile connectivity. But it is also not desirable to wait indefinitely for the perfectsystems to be in place. Even if there is public transport deficit, it is important to disincentivise the car.There will be transitional glitches but this will help to scale up the alternatives to tide over the gap. If the key principle of the National Urban Transport Policy that asks for equitable allocation of road space among all the road users is adopted and enforced, sustainable modes will get their legitimatespace and induce demand for alternative modes. This

will also disincentivise personal vehicle usage.

Enforce direct restraint strategies on car usage that include parking, higher taxes, road and congestion pricing, etc. Parking levy will be an important first generation restraint measure. Travel demand management strategy based on parking pricing and pricing caps should be evolved with the objective of reducing the using of public roads by private vehicles. The pricing restraints can reduce daily peak hour commuting by cars and promote alternatives. This will also discourage short distance car travels that can be easily substituted by walking, cycling and use of para-transit. There is a huge need for resources and funds for public transport augmentation in our cities. Also a part of the funding need for public transport can be met if the cars are made to pay for the externalities.

Protect and promote compact and dense city design to reduce dependence on cars. This is an inherent advantage of most Indian cities. This must be retained and strengthened through careful town planning and design to keep the trip distances short and accessible through public transport,walking and cycling. Disempower the car by removing its privileges. An important way of doing this will be to not to let infrastructure design reinforce class biases. Give priority access to walking, cycling and public transport in all modal interchanges and in right of way. Remove privileges that the cars enjoy.

Small cities and towns with less number of cars have the opportunity to avoid automobile dependency: The usage of non-motorized transport and para-transit is still enormous in bigger cities. These are the opportunity to avoid dependence on cars if careful policies are followed upfront to scale up the alternatives and prevent car centric investments.

3. Two-wheelers need separate strategy

Need better understanding of the two-wheeler ownership to refine the strategy for its restraint: Strategies for the two-wheeler segment will require a better understanding of its ownership pattern. This could be the first step towards personal vehicle ownership that is likely to graduate to car ownership. There can be concern over gender safety in poorly managed public transport or para transit systems, and poor walk space that can lead to more women buying two-wheelers etc.

Improved public transport, para-transit, walking and cycling are the most important strategies for restraining two-wheelers: Good, efficient and affordable alternatives can influence the sensitive segment of two-wheelers and enable modal shift.

4. Automobile industry to reinvent and readjust in the car restraint regime. A positive response has come from the car makers that are also the bus makers. Mercedes Benz that participated in the discussions sees an opportunity in the potential bus market that will open up and accelerate further. The company has interest in investing in the new bus systems and the BRT. This indicates a positive approach towards the changing mobility and transportation paradigm. The industry can reinvent itself to respond to the change.

5. Reform governance to address car restraint. City governance will have to respond to meet the objective of the larger public good. Road and neighborhood management and design should change to allow people more choices.

Round Table 3 : Should Rail Transit be Preferred to Bus-based Modes?

Anchor:*Shri B.I. Singal, Director General (DG) – Institute of Urban Transport (IUT)*

The session, was anchored by Mr. B.I. Singal, Director General, IUT, who commenced the proceedings with the perennial controversy, especially so with many cities opting for BRT. As the initial cost of BRT is quite low in comparison to most rail-based transit, he threw open the question of why not BRT?

The key challenge most felt was a lack of proper understanding of which type of system to opt for whiledeciding on a public transport system for a city. The challenge as many felt was also related to how either would be perceived to be suited or not suited in different contexts.

The participants by large, were of the consensus that the type of system to be adopted should be based on the scale of the city (in terms of population size, expanse, density). While bus-systems offer flexibility and might be suited for dispersed destinations, rail-based cater to greater demand because of their high capacity and speeds and are suited to major corridors of the city. There were concerns expressed on the higher pollution levels of diesel-run bus-based systems. However, there were suggestions that these could be overcome through use of alternate energy sources such as electricity, CNG.

There was a vehement advocacy of rail-based systems for very fast-growing metro/metropolitan cities, as mobility was extremely crucial for fast growing economies. Also it was agreed upon that rail and road based systems should not be viewed as competing systems; rather they should be taken as complementing systems. Some cities may need a judicious combination of both. The house was a bit divided on the right option for medium-sized cities with some rooting for BRT while others suggesting light rail transit (LRT). Those who suggested LRT were of the view that since LRT has the flexibility to share the road space with other modes (as in the case of many European cities and some US cities), it was very suitable to Indian medium-sized towns, which are often faced by the problem of narrow right-of-ways. It was also pointed out that whilethe initial cost of BRT is much lower than that of LRT, the life-cycle cost of LRT has been proved to be lower than that of BRT.

The key recommendation that emerged from the session was that the decision to select the type of system should be based on aspects such as scale of the city, road space availability, demand and capacities, pollution levels, accidents and culture/attitude of the people.

Round Table 4 : What Kind of Bus should be used for BRT?

Anchor:*ShriShivanandSwamy, Professor, CEPT University - Ahmedabad*

The aim of the round table discussion was to deliberate on the factors that affect the selection of a suitablevehicle for an efficient, safe and attractive BRT system. It was agreed that the success of a BRT system liesin providing a metro like experience to its users. Hence, security, comfort, safety, punctuality and look and feelof the whole system need to be developed thoughtfully and sustained as much, and provide improvements further. Secondly, public transport systems specifically BRT systems need to be branded and marketed to make them attractive options for transit.

The session kick started with a presentation by Mr. Frank Spennmann elucidating the key factorsthat need consideration when choosing an appropriate BRT vehicle. These included bus floor height, power technology, size of bus, quality of bus.

1. Floor Height: There are various types of low floor and high floor buses available. In order to provide level boarding service, which is an essential component of a BRT service, both low floor and high floorbuses can be used. While low floor buses have a higher cost, they can be used on all the routes and construction cost of bus stops is also lower. High floor buses cost less but can only operate on routes with high platforms that also increase the cost of construction of stations due to requirement of additional ramps etc.
2. Power technology: The power technology adopted for BRT vehicles should be efficient, non-polluting, reliable and require minimum maintenance. While various power technologies such as Diesel Euro IV, CNG, Hybrid and Trolley systems are available for use by buses, all have advantages and disadvantages. With latest technology available, diesel vehicles are considerably less polluting in terms of particulate matter. Diesel vehicles also offer good reliability and efficiency. CNG, a very popular option in India, is good in terms of environment, maintenance and reliability. However; the availability of CNG is a limitation. It was also pointed out that CNG is less susceptible to theft thandiesel.Choice of fuel mode can impact cutting losses of that nature. While hybrid technologies are good for environment, thereis dearth of cost efficient and affordable options. Trolley type buses are good for environment butthey are complex to install, and maintain. Prof Dalla Chiara added that technology is now available forproviding wireless electric charging facilities at bus stops and that arena should be explored further. With global warning concerns raising across the world and local pollution levels reaching alarminglevels it must be seen that the adopted fuel technology should be non-polluting, low sulphur and non-carcinogenic.
3. Size of Bus: Buses are available in sizes ranging from 10 meters to 20 meters articulated buses. The size of the buses mainly depends on the planned frequency of service, capacity of service and load factors. It was suggested that while smaller buses may suffice for 2000-3000 phpd, 20 meter articulated buses maybe required for volumes over 10,000 phpd.

4. Quality of Bus: In addition to the purchase cost of the bus, maintenance cost and life cycle cost are also important considerations. Hence in recent time 'overall cost' or 'total cost of ownership' has emerged as a more realistic indicator of the financial implications of a bus system. Factors such as fuel efficiency, expected life time, up time in operation, strength of body structure and good chassis design add to the one time purchase cost of the bus but offer significant savings later in terms of upkeep and maintenance. Hence the cheapest buses may not be the best option always and careful consideration is required to calculate the overall cost over the life cycle of the vehicle.

Several speakers indicated that if BRT systems depend solely on fare box collections for cost recovery, good quality infrastructure maynot be feasible. Hence, assistance from state or central government is necessary to put high quality systems in place that are able to attract ridership and encourage modal shift.

Other suggestions:

It may be a challenge to provide different user classes in BRT as most systems aim to provide off board ticketing to maximize efficiency.

Advertising should be allowed in the interior of the buses to increase revenue. However return from advertising cannot be expected to be more than 2-3% of overall revenue.

Along with the design of trunk services, design of feeder services are also necessary and desirable, which should be preceded by suitable research.

Challenges:

Lack of technology: While China and Brazil have many options in terms of availability of vehicle manufacturers;this is not so in India. The duties on imported vehicles are prohibitively high. As a result, the available options may not always be the best-fit options.

MrShivanandSwamy also added, from his BRT experience in Ahmedabad, that it is very hard to procure vehicles with desired specifications in India as there are only a limited number of suppliers. In case of Janmarg, the buses had to be custom made to suit the requirements of the design of the road and public.

Good Quality vs Cost: While good quality low floor, air conditioned vehicle with solid structure may be desired; these have a very high purchase cost. On the other hand, lower quality buses may cost less at the outset but require major investments thereafter in upkeep and maintenance.

For example, MrMadhavPai indicated that of 110 buses bought in Indore, 62 had to be scrapped due to highmaintenance cost and the rest had to be refurbished at a cost of 30% of original cost. He added that desired buses are not readily available and in most cases authorities have to do with what is available.

Institutional Reforms:

Accept BRT.MrLohia raised the concern that many municipalities are keen to invest in expensive metro systems but do not show ample interest in providing high quality air-conditioned bus systems that can provide similar service at a lower cost. He added that some cities have money grant but are delaying the procurement process of buses for fear of losses. He insisted that BRT should be seen as an attractive andcost effective solution to transit needs and metro systems are not the ultimate solution to every city's needs.

Round Table 5 : Sustainable Mobility and Large Housing Projects

ANCHOR: *EMBARQ Sponsored*

EMBARQ India hosted the roundtable, with support from the Shell Foundation. The objective of the session was to convey the message that incorporating principles of sustainable mobility in urban development hasnot only a positive impact on the environment but also increases the safety of the inhabitants. Judith Pollock, Business Director of sustainable transport for Shell Foundation, moderated the event, while EMBARQ'sAmit Bhatt, HolgerDalkmann, Sanjay Sridhar and MadhavPaimade presentations.

Housing projects incorporating principles of sustainable mobility can eventually secure reduced motorized travel and increase ofupto 30% reductions in emissions and fatalities. 'Sustainable mobility' means the development of infrastructure that enables and promotes travel by walking and cycling, through mixed land use, public space creation and connectivity to public transport. EMBARQ India aspires to lead the conceptualization & planning of such housing projects and the dissemination of case studies & best practices in partnership with private developers, housing development authorities and the Ministry of Housing and Urban Poverty Alleviation (MHUPA).

Car ownership in cities across India is under 15%. As many as 70% of trips in urban environments are non-work (school,shopping, social, and recreational) trips.However, site layouts and designs for large housing projects are allconceptualized and planned around the car. Incorporating principles of sustainable mobility into these projectswill ensure non-work trips happen on foot or by bicycle. This will lead to increased physical activity and better health, reducedfatalities & injuries from accidents, reduction in greenhouse gas emissions & air pollution and the creation of cohesive communities. Changing this status quo is critical given the pace of growth in the urban housing market in India, which is growing at approximately 3 million units per year.

The housing sector is no stranger to innovations that reduce environmental externalities. For instance, residentialand commercial buildings have long been identified as one of the largest end users of energy. Globally, carbonreductions of 715 million tons were targeted by 2010 through improvements in the energy efficiency of building and appliances. Market mechanisms have evolved to ensure such efforts are both profitable and socially beneficial.

Incorporating principles of sustainable mobility into housing projects will build on these accomplishments andhelp achieve even larger reductions in externalities. The experience of the city of Aguascalientes in Mexico is informative. In 2010, the city, in conjunction with EMBARQ Mexico and other local partners, organized a workshop on incorporating the principles of sustainable mobility in new housing projects. As a result of theguidelines developed at this workshop, the layout of a planned housing development for 40,000 people wasredesigned from one that was autocentric to one that emphasized walking, cycling and public transport. Thenew design will not only reduce travel related fatalities and carbon emissions, but will also cost less to develop.

For far too long, cities have aspired to integrate land development and transport using a top down approach viamaster plans. Incorporating sustainable mobility in housing projects presents an opportunity to build a desirable urban form using a bottom up approach, one development at a time. It is an opportunity to transform the housing development paradigm to one that is more efficient, equitable and accessible.

Round Table 6 : National Mission on Sustainable Habitat (NMSH) - Development of Standards

Anchor:*Ms. ShreyaGadepalli, Senior Programme Director, Institute of Transport Development Policy (ITDP) -India*

The National Mission on Sustainable Habitats (NMSH) policy document, which is part of the Prime Minister's climate change agenda, has been in the making forsome-time .The document looks at urban transport and urban development through a holistic vision.

In its present form, the document identifies key principles, the standards for each of these principles and benchmarks to measure whether progress is being made to achieve these standards. The principles are:

1. Walk
2. Cycle
3. Connected blocks
4. Public transport
5. Mixed use
6. Dense development
7. Compact cities
8. Shift (restrict private vehicle use and shift to low-pollution modes)

The document also attempts to provide some guidance on institutional mechanisms and implementation formats. The discussion provided further guidance to make this document holistic in the true sense. The key issues identified were: -

1. Urban Freight - develop standards and guidance on management of urban freight including rationalization of vehicle types and parking of freight vehicles, especially within the city. Standards for freight terminals and distribution networks.
2. Standards for healthy environments - standards of air, water, drainage, noise in addition to urban transport and development
3. Protection - protecting historical, cultural and natural assets. As part of impact assessment, create an inventory beforehand so that as projects come forward, the protection of those historical or cultural assets areadequately factored.
4. Guidance on revitalization of city core or old city precincts - from developers perspective, it does notmake sense to invest in inner city since these do not occur to be desirable environments. Public and green space is often lacking. Possibility of consolidating wasted space, as required by DCRs

into larger public use spaces. Address the issue of gentrification when conditions in poor areas improve. Creation of traffic cells which reduce/reroute through traffic.

5. Community participation to develop local area plans
6. Communications andoutreach by cities and states to gain public support - give people more information. Address issues of public transport system rationalization and information. Set standards and benchmarks on thisMake this document consistent with policy documents of other working groups within NMSH and Climate Change Agenda
7. Provide clear guidance to city level planning and implementation agencies on measuring benchmarks - Consolidate a list of data to be collected, and create appropriate formats for collection of that data.
8. Different standards for cities of different sizes - explore this angle. Some standards might be universal while others need localization/contextualization. Specific standards may differ as long as the spirit is maintained.
9. National Standards guiding state standards and programs - in some cases the standards can be prescriptive while in others not so. Strong financial and regulatory incentives may help. Give funding for theprocess of standards optimization and adoption by cities and states. Review their own standards and harmonize them with NMSH over a period of time. Those who adopt quicker will be given further funding for program implementation.

Round Table 7 : Should the City Have Bus Services by Private Sector or Public Sector or a Mix?

Anchor:*Shri P.K. Gupta, Chairman cum Managing Director (CMD) – Delhi Transport Corporation (DTC)*

Shri P. K. Gupta gave a brief background of the Delhi traffic scenario and indicated that there are presently 50 lakhvehicles and a further 4.5 to 5 lakh vehicles are being added on the roads every month. This would have serious impact on the environment as 80% of the air pollution is due to road transport. He said that to curb the emissions from vehicles the bus fleet in the city has been converted to CNG. There are 6135 buses operated by DTC of which 2500 are non-AC and 1200 are AC buses. The aim is to increase the strength to 11000 buses and it is proposed that 60% of these buses would be operated on PPP. Currently DTC is operating 1 cluster of 200 to300 buses on PPP. In total there would be 17 clusters with 6600 buses. In the discussion that followed by and large the salient contributions were:

The advantage of the PPP is that there are lower cost of operations as the private operator saves on the costs of operations on account of lower salaries and maintenance cost. The company saves on the capital cost of the buses. However when going on PPP the following aspects should be controlled by the government:

- Fare
- Routes and schedules
- Design of buses

There is always gap between the costof buses and raising revenue through their commercial use The revenue can be increased by providing high quality service and through sales and marketing. The quality of service need to bemonitored and this could be done by installing GPS on buses and through customer feedback and this shouldbe done both by the private operator and the SPV. The participants were of the view that to ensure quality of service, the concession agreement plays a very important role.

A question was raised on what proportion of the bus service should be given on PPP. There are three aspects of bus operations:

- Planning
- Execution
- Monitoring

The cities need to develop their capacity on planning and monitoring, while for operation of bus service,the private sector can be roped in.

Thus it is important to monitor the bus services over a variety of parameters and that a mix of private and public participation in bus service is also necessary as there are always some social obligations which needs to be served.

Round Table 8 : Time and Cost Overruns in Projects - Causes and Solutions

Anchor:*Shri S. D. Sharma, Executive Director/Civil, Delhi Metro Rail Corporation (DMRC)*

Examples of Delhi metro rail and highway projects were narrated alongwith statistical data. The concern raised is the committed political will to outsource projects to private players.Beside land acquisition was another major concern.Discussion on land acquisition revealed that the majority agreed that land acquisition and project implementation should move simultaneously.Detailed Project Report should be made well before implementing a project, covering all aspects and parameters in detail so that minimum changes are effected after implementation commences.Major changes like change in the geometric design, materials to be used for the construction, increase in pricesetwill cause delay in the Target Date of Completion (TDC) of the project as mentioned in the contract. There are several instances of the TDC being settled long after the contracts have been finalized and sanctioned. This is a wrong practice. The TDC should invariably be decided at the time of signing of the contract only.

Case studies in Afghanistan and DMRC were also discussed.Delays on account of natural extremity may not be entirely avoided; however, these can be minimized with diligent planning. However while element of time delay may not be avoidable this can and should be factored into the project tenure.Careful and quality monitoring of the project is essential to reduce the time overrun. Suggestion was made to monitor through submission and scrutiny of quarterly or half yearly reports.The contractor, engineer and the employers are to work as a team and better the coordination between the different agencieswill secure better and efficient results.Another cause for delay is the tardiness of sanction of necessary permissions by different authorities.There is a felt need for

the institution of a centralized agency to grant relevant and necessarypermissions for the project. There should be strong contract document adequately covering all quantifiable parameters, such as pricing detail, design etcso that there is little scope for conflict between different agencies be they the contractor, or the workers or for that matter the government itself.The greater the transparency in these procedures, the lesser will be the occasion to be targeted on grounds of corruption and inefficiency.

The role of engineer is an important parameter both, at the time of design and implementation. There should be a high level of administrative and technical competency. Such an executive should be empowered to make decisions that impact meaningfully. He should have the capability to handle workers and at the same time, to lead upfront with a manifest and visible willingness to work.There should be established channels of communication so that higher echelons are informed of decisions in time. Effective public relations skills need to be captured and deployed so as to bring about desirable awareness among the public about the project implementation, the discomforts to be experienced during construction and development, and accommodated, and the eventual outcomes to be enjoyed in due course. Financial sanctions should be timely evaluated. Mapping of utilitiesthough important and desirable is very often neglected.Non availability of contractors in difficult areas is another major concern –this can be resolved by ensuring and displaying higher standards of safety or using a special force like the military to work in that zone.

The session concluded with dissemination of statistical values on the number of projects completed, those still under construction and development and extended beyond the TDC. The necessity for transparency in decision making was reiterated more than once.

Round Table 9 : Cycle Sharing

Anchor:*Dr. AnvitaArora, Chief executive officer (CEO) - iTrans*

A brief PPT on promotion of cycling in Indian cities was made by the anchor where the issues in Public Bicycle Schemes were highlighted. Thereafter the topic opened up for discussion as follows:

'Is there any point of having (Public Bike Sharing) PBS in a country where it is easy to buy bikes but only the poor bicycle'?

This question received a mixed response. However the general view was - 'JUST START' the project. The question was felt to be one that really cannot be answered until and unless the scheme itself got underway and the response to it made itself evident

The next major question was 'How can the PBS deal with the informal cycle rental shops - conflict or partners'?

Here it was discussed whether to go from Upper level to Down for implementation or vice versa. This also received a mix response and the solution given was to give equal importance to both level and to solve it mid-way.

Further another question taken was 'When there is no cycling infrastructure –and it is not safe to

cycle - why PBS'?

This question too received a mix response and the majority felt that this project should not wait for government to approve its infrastructure facility and this be designed by adopting atleast minimum infrastructure which ensures safety of users.

Are there any specific opportunities for PBS?

To this the response was "JUST START".

Further since India does not have static laws for cycle users or loss,legislations and implementation of laws was suggested. Insurance of cycles and in PBS system security to cycle to be given was also suggested. It was also suggested that this scheme should be started in small cities as the captive ridership for this is not sure. With this the session concluded with a vote of thanks.

D. Research symposium

Introduction

The second research symposium on urban transport was heldon 3rd December 2011 at the 4th Urban Mobility India Conference and Exhibition 2011 at the ManekshawCentre, New Delhi.

The symposium was a platform to highlight current research carried out by the academic and research institutions in urban transport, especially by young researchers, in post-graduate and Ph.D. programmes. The purpose was to:

1. Encourage further young researchers working on various facets of urban transport and provide an opportunity for networking,
2. Improve the quality of research through peer review process, and,
3. Contribute towards the database compiled by the Institute of Urban Transport, New Delhi to identify gaps for future research funding

Young researchers (undergraduate, post-graduate and Ph.D level students) working in the areas of urban transport were invited to submit abstracts with submission based on the work carried out by them as part of their academic or research work.

Call for Papers and Selection

All the academic institutions with postgraduate studies in urban transport were informed of the research symposium and were invited to encourage wide participation from their respective institutions. A list of these institutions is given at Annexure IIIAdditionally, and to widen the publicity on the symposium prominent academicians were personally contactedas well.Abstracts were sought on the following six themes: -

1. Accessibility and Safety
2. Public Transport
3. Transport and Environment
4. Urban Land Use and Transport
5. Non – Motorised Transport
6. Traffic Management and Operation

A site was created on the institute's website (http://www.iutindia.org/urban/) to facilitate online submission and review of abstracts. There was good response with over sixty abstracts received by the end of September 2011.

Experts in urban transport from the country's most reputed academic institutions were requested to carry outthe review of the abstracts so received. A list of the names of reviewers along with their affiliated institutions is at Annexure V. Each reviewer was asked to give three choices of themes for assigning the abstracts for review.

Each abstract was assigned to three reviewers not affiliated to the author's institution. The reviewers were assigned the abstracts which they could perform online without having the knowledge of name(s) of author(s).The review was carried out objectively based on the following six criteria, each on a scale of 1 (min) to 5 (max) marks.

1. Originality
2. Objectives: Clarity and Appropriateness
3. Methodology: Technically Sound
4. Timeliness: in Indian context
5. Usefulness: to researchers and practitioners
6. Language

Thus while each reviewer could award a maximum of 30 marks (6x5=30), each abstract was assessed for a maximum of 90 (30x3=90) marks. The abstracts were arranged in descending order based on the marks obtained and first 36 abstracts were chosen for paper presentations and next 22 abstracts were chosen for poster presentation, with an aim to give exposure to maximum young researchers of the country's highest level conference on the urban transport.

In addition to the objective assessment, the reviewers also gave their valuable comments for improvement of the quality of the abstracts, which were then conveyed to the authors along with the acceptance note and further instructions for the submission of papers / posters. The names of authors for paper and poster presentation are contained in the lists at Annexure V.

Conduct of Research Symposium

The symposium began with welcome address by Shri S. K.Lohia, OSD (UT), MoUD, Government of India, in which heemphasized the need for proactive coordination between researchers and practitioners. The keynote speech was deliveredby Dr K Sivaramakrishnan, IAS (Retd), former Secretary, Urban Development, Government of India, current Chairperson,Centre for Policy Research, who stressed the necessity of research to be relevant to the ground realities and users of transportation systems.

The paper presentations were divided into six technical sessions with two sessions being held parallel at a time. Each technical session contained six presentations of 12 minutes each, with fifteen minutes question and answer session after every three presentations, as given in the programme of Research Symposium at Annexuure I.

The symposium concluded with a panel discussion when several vital points such as the importance of providingcheaper education, providing a broad base of researchers and independence of research. The panel discussion concluded with the closing remarks of DrSudhir Krishna, Secretary (UD), MoUD, Government of India.

Research Agenda: The Way Forward

Chair: Dr. Sudhir Krishna, Secretary (UD), Ministry of Urban Development, Government of India

Co-Chair:B.I.Singal, Director General, Institute of Urban Transport

Panel Coordinator: Prof. GeetamTiwari, TRIPP, IIT Delhi

Experts:

Prof. A. Kundu, Jawaharlal Nehru University

Prof. Dinesh Mohan, TRIPP, IIT Delhi

Prof. P. K.Sikdar, International Road Federation, New Delhi

CoEs representatives:

Prof. R.Sivanandan, IIT Madras

Prof. Shivanand Swami, CEPT, Ahmedabad

Prof. C.S.R.K. Prasad, NIT Warangal

Panel Discussion Summary

Urban Transport research does not include social sciences

While the Urban centers just about doubled, the urban population increased by 6 times from 1901 to 2011

Urban Freight movement is highly neglected in urban transport research

Research and Practice are not linked in India

Development of Intelligent Transport System suitable for Indian cities

Need for technology demonstration projects

Need of a Highway Capacity Manual of India

Need to look at life cycle costs- modes with high infrastructure requirement have higher CO2 emissions

Need of slower cities with predictable travel time- higher speed means higher risk

Sheer lack of knowledge production in India

Requirementof India specific text books for urban transport

Forum for Scientific research

Technical Session 1(a)

Technical Session 1(a)	Accessibility and Safety
Chair	Prof. D. Mohan
Rapporteur	PankajPrajapati
Rahul Tiwari, IIT Madras	Unconventional Transport Measures for Improving Accessibility and Safety in Disaster Prone Hill Areas – Case Study of Gangtok, Sikkim
Deepty Jain, IIT Delhi	Impact of different infrastructure improvements on accessibility of different type of users
Prutha N Shah, CEPT Ahmedabad	Modelling Travel Behaviour of Men and Women
HemangiAshishDalwadi and ManjiriAkalkotkarCEPT Ahmedabad	Exploring the Sustainable Transportation Indicators by comparing two Neighborhoods: A case of Ahmedabad city
NinaadSurendra Kumar Athalye, SVNIT	Identification of Black Spot Zones on National Highways: A Case study of Bhopal City
SanthiJagadeeswariTarlapu and Dr. C. MallikarjunaIIT Guwahati	Factors Influencing Non – Motorised Mode Choice: A review

Unconventional Transport Measures for Improving Accessibility and Safety in Disaster Prone Hill Areas – Case Study of Gangtok, Sikkim; by Rahul Tiwari, IIT Madras

The study provides rationale for transport proposals and also provides a long-term strategy for the desirable mobility pattern of a city's populace.

Improvement of pedestrian facilities proposed by means of improving existing steps and stairs interestingly.

Other areas covered - ropeways, porters as NMT alternative, parking, and freight terminals.

Impact of different infrastructure improvements on accessibility of different type of users; by Deepty Jain, IIT Delhi

Improving speed of motorized vehicles will benefits only small group of society and increase discomfort and problems for majority

Increasing further speed of buses on BRT while reducing speed of PMV will Increase travel time as compared to existing situation

Modal shifts to be taken into account as a result of improving level of service

Need to evaluate impacts of strategies on all users before decision making

Modelling Travel Behaviour of Men and Women; by Prutha N Shah, CEPT Ahmedabad

Application of discrete choice analysis presented on how to get the overview of the behavioural difference of both the genders.

Some suggestions to factor gender considerations in; ensuring safe access to pedestrian environment, public transport fleet and facilities, promoting adequate and sustainable intermediate modes, mobilityand transfer improvements through transfer, stations and terminals, and focus on economic opportunities.

Exploring the Sustainable Transportation Indicators by comparing two Neighborhoods: A case of Ahmedabad city; byHemangiAshishDalwadiand ManjiriAkalkotkar, CEPT Ahmedabad

Reduction in VKT by motorized vehicle will result in good street connectivity, physical access to transit facilities, and transit services within walking distance;

Indicators of physical characteristics & travel characteristics are interrelated and interdependence on each other which should be balanced;

Services located within 250 to 400 m can be defined as accessible neighborhood; It is observed that there is a link between street connectivity and accidents;

Mix of land use and accessibility to transit has an impact on an individual's decision to use public transport

Basic amenities available and accessible within walking distance to reduce congestion, pollution and parking issues within the neighborhood

Identification of Black Spot Zones on National Highways: A Case study of Bhopal City; by NinaadSurendra Kumar Athalye, SVNIT

The study shows that vehicle access roads donot have impact on accident patterns along with traffic speed and volume.

Factors Influencing Non – Motorised Mode Choice: A review; by SanthiJagadeeswariTarlapu and Dr. C. Mallikarjuna, IIT Guwahati

Rapid Declination of NMT share- necessary measures to be taken.

As life style and geographical differences vary significantly between developing and developed countries it is necessary to adopt wisely measures appropriate for developing countries.

Technical Session 1(b)

Technical Session 1(b)	Public Transportation
Chair	Dr. R.R. Kalaga
Rapporteur	Rahul Goel
S M Hassan and Madhavi M, IIT Delhi	Effect of GDP on share of public transport and non-motorized vehicles in small and medium sized cities
ChaphekarUnmeshPradip, CEPT Ahmedabad	Institutional Reforms in Public Transport - 'A Need of New and Comprehensive Outlook
SungdikongroImchen, CEPT Ahmedabad	Transit Options For Hill Cities: A case of Kohima
Margie Parikh, IIMAhmedabad	Simultaneous Pursuit of Efficiency and Innovation: Exploring Ambidexterity in Organization Design in the Public Urban Transport
*RanjanaPrakashMenon, University of Hyderabad	Critique of Pune's approach to transportation through an analysis of itsbudget
*PawanDwivedi, SPA Delhi	Mobility Characteristics of Users In Mass Transit System in Metropolitan City of Delhi: Case Study Delhi Metro

* The papers were presented at the session. The extract however is not available.

Effect of GDP on share of public transport and non-motorized vehiclesin small and medium sized cities; by S M Hassan and Madhavi M, IIT Delhi

Effect of GDP per capita on modal share of PT and NMT

PT share increases with GDP per capita in cities with low GDP (USD 15,000)

Beyond 15000, PT share increases with GDP

Institutional Reforms in Public Transport - 'A Need of New andComprehensive Outlook; by ChaphekarUnmeshPradip, CEPT Ahmedabad

Institutional reforms in Public Transport

Comparison between best practices of Public Transport from around the world- London, Singapore, Hyderabad and Mumbai

Suggested Structural, Behavioral and Procedural reforms

Emphasis on level of interaction, accountability with a political will

Transit Options For Hill Cities: A case of Kohima; by SungdikongroImchen, CEPT Ahmedabad

Transit Option for Hill Cities: A case of Kohima

Evaluation of transit modes

Constraints: Geography, Landslides, City form

PRT – the most feasible system

System has financial risk, skilled labour requirement, safety issues, and political risk

Simultaneous Pursuit of Efficiency and Innovation: ExploringAmbidexterity in Organization Design in the Public Urban Transport; by Margie Parikh, IIM Ahmedabad

Exploring "Ambidexterity in Organization Design" in Public urban transport

Highlighted reasons why BRT was not made an extension of existing Municipal Transport Services

Ahmedabad Janmarg Limited(AJL) was created as an SPV for BRTS operation

Effective system: Separate body for planning, regulation, monitoring and rewarding operations to private players

Technical Session 2(a)

Technical Session 2(a)	Urban Land Use and Transport
Chair	Dr. G. J. Joshi
Rapporteur	Deepty Jain
Prianka Bhattacharya, SPA Delhi	Transport Planning and Design Strategies for Green city
AmitArora,	Mobility patterns in residential neighborhoods of Delhi: characteristics and issues
Vishnu B,	Behavioral influence of worker's tour on non-worker's tool
Subodh Kant Dubey,	A comparative study of Route Choice Modeling using fuzzy logic and adaptive neuro-fuzzy
Mansha Swami,	Impact of feeder services in ridership of BRTS in Surat city
Satish Kumar Eerni,	Forecasting urban sprawl and traffic conditions in Tiruchirappalli city

Transport Planning and Design Strategies for Green city; by Prianka Bhattacharya, SPA Delhi

To find best design options at macro and micro level along with technological inputs for green city (green field development).

Urban form – grid-linear, linear and grid patterns were analyzed for each transport scenario: only pedestrian, only cycle, only auto-rickshaw and pedestrian + cycle + auto-rickshaw

Cities can be classified as per area, density and population - average trip length decreases with increase in density.

As per the analysis, grid + linear urban form has least average trip length with better distribution of population and employment in the area.

Mobility patterns in residential neighborhoods of Delhi: characteristics and issues; by AmitArora,

In Indian context neighborhoods are classified by income, cultural parameters, geography and caste.

In Delhi neighborhoods identified and were evaluated for per capita trip rate and self-containment index.

The transport indicators are sensitive to land use, socio-economic characteristic, availability of transit modes, demography and trip chaining

Behavioral influence of worker's tour on non-worker's tool;by Vishnu B,

Need to appropriately predict travel pattern by using activity based approach.

Database is analyzed:

Impact of time of day and family types are evident on determining travel pattern

As per the analysis-

Tours taking place after evening peak hours are influenced by presence of kids of age between 16 and 18.

Tours in afternoon is influenced by household income and lack of vehicle ownership

Early start time by head of family has positive impact on tour making before morning peak hour period

As level of disaggregation increases goodness of fit is consistent.

A comparative study of Route Choice Modeling using fuzzy logic and adaptive neuro-fuzzy; by Subodh Kant Dubey,

Fuzzy logic facilitates understanding complexity in a simple way especially when it is difficult to understand impact of different factors

Results obtained from fuzzy logic and neuro-fuzzy modelings are comparable with observed data withTheil's error of 0.06 and RMSE of 0.0306.

However, data size using fuzzy logic increases requirement of high capacity machines

Impact of feeder services in ridership of BRTS in Surat city; by Mansha Swami,

Study impact of cost and frequency of IPT on ridership of BRT system in Surat

With help of stated preference survey and applying binomial logit, model shift from PMV to IPT is analyzed

As value of cost of IPT increases, ridership on BRT is likely to decrease

As frequency of IPT increases, BRT ridership is positively impacted

With appropriate and managed IPT system it is likely that

- 40-55% of people from LIG will shift to BRT,
- 50-65% of people from MIG will shift to BRT
- Leisure trips from HIG are likely to shift resulting in shift of 37% people fromHIG?

Forecasting urban sprawl and traffic conditions in Tiruchirappalli city; by Satish Kumar Eerni,

Quantify urban sprawl and analyze existing transport conditions

It is expected that built up areas will grow by 55% by 2030

High congestion levels found in the city

Technical Session 2(b)

Technical Session 2(b)	Public Transportation
Chair	Prof. (Dr.) Sanjay Gupta, SPA Delhi
Rapporteur	GauravPandey
Pradeep Singh Kharola, IIT Delhi	Financing Urban Public Transport Systems - An 'Economic Firm' Approach
Vimal Kumar Gahlot, MNIT	Evaluation of City Public Transport System Using GIS
Khelan M Modi, CEPT Ahmedabad	Towards an Integrated Public Transport System - A case of BRTS and city services, Ahmedabad
Swapna Ann Wilson, St. Xaviers College Trivandrum	Pedestrian Routes and their linkage to Transit Terminals: Lifelines of Urban Mobility: A case of Ahmedabad City

Financing Urban Public Transport Systems - An 'Economic Firm' Approach; by Pradeep Singh Kharola, IIT Delhi

There is need to lower taxes on public transport to increase its competitiveness and further induce modal shift from private to public.

Usage cost (i.e operational cost + taxes) should be considered by transport planners rather than total cost

Profits brought in by public transit should be infused back into system which is currently not the case and as a result bus operators are discouraged

Benefits in terms of congestion and emission reduction should also be considered while carrying out feasibility study for public transit systems

Effective congestion or emission tax levy would require efficient ITS infrastructure which is currently not available in India

With improvements in vehicle technology, vehicle emission reduction benefit of public transport is becoming insignificant.

Evaluation of City Public Transport System Using GIS; by Vimal Kumar Gahlot, MNIT

How to evaluate performance of existing network?

Use of passenger-Km as performance measure is misleading as more passenger on short trip is equivalent to less passenger on longer trip and hence there is need to find new measures

Towards an Integrated Public Transport System - A case of BRTS andcity services, Ahmedabad; by Khelan M Modi, CEPT Ahmedabad

Active integration is more efficient than passive integration

Feeder services should be as close to doorstep as possible otherwise it only serves captive mode and not choice mode

Rail transit has bigger catchment than BRT, generating more revenue

There is need to develop GIS based toolkits to evaluate transit coverage

Economics cannot be ignored for sustainable transport systems

Attitudinal (i.e. captive or choice) studies should be done to study pedestrian movement

Enforcement of integration policies is an issue

Latent demand for walking should be given due importance during planning

Pedestrian Routes and their linkage to Transit Terminals: Lifelines ofUrban Mobility: A case of Ahmedabad City; by Swapna Ann Wilson, St. Xaviers College Trivandrum

Hawkers attract people to walk and this can be used in designing better footpaths

Interchange design should be contextual

Due to increase in women commuters, exclusive women feeder or public transit has become viable option

Safety of women while walking to public transit should not be ignored

Age, gender, lighting, temporal distribution of type of hawkers should be studied while designing public transit for women

Designing facilities for men and women separately would only elevate the difference between two and this should not be practiced

Technical Session 3(a)

Technical Session 3(a)	Modeling Techniques
Chair	Prof R Sivanandan
Rapporteur	ShaliniRankavat
MariyaKhatoon, IIT Delhi	Statistical analysis to measure pedestrian risk at Foot of Flyover
GS Sasane, IIT Bombay	A Sustainable Approach of Modeling Regional Solid Waste TransportationSystem: Mumbai Metropolitan Region (MMR), a Case Study
KarthikeyaPavan Kumar Pisipati, NIT Warangal	Use Analysis of Warangal City - An "Activity Based Approach"
ShivprasadBhagwanraoKhedkar, IIT Madras	Modelling the Influence of Cross Roads and Fringe Conditions on Travel Time
AshishDhamaniya, IIT Roorkee	Factors Affecting Capacity Of Urban Roads - A Review
Subodh Kant Dubey, BITS Pilani	Headway Modeling: From Singular Model to Mixture Model

Statistical analysis to measure pedestrian risk at Foot of Flyover; by MariyaKhatoon, IIT Delhi

Adequate gap size or mininimum safe gap to cross the road is 16 sec. (4 lanes) for pedestrians.

About 50% pedestrians cross the road in less than 10 sec of waitingat the foot of flyover, due to continuous flow of traffic.

Waiting Time parameter has a significant effect on the gap size accepted by pedestrian.

Construction of flyovers increases the risk to pedestrian.

A Sustainable Approach of Modeling Regional Solid Waste Transportation System: Mumbai Metropolitan Region (MMR), a Case Study; GS Sasane, IIT Bombay

Macro level planning was done using TRANSCAD - all possible route options from each TS (Transfer station) to each RLF (Regional Land Fill) were considered while finalizing the route.

Result obtained was that average solid waste cost/ton amounted to Rs.439.50whereas the actual transport cost for solid waste transport is Rs697.70/ton at present in Mumbai.

So, even if a small percentage of collection and transportation cost is reduced this will result in to substantial total saving over a number of years.

Use Analysis of Warangal City - An "Activity Based Approach"; by KarthikeyaPavan KumarPisipati, NIT Warangal

Theactivity based modeling approach offers greater insights into how and why people travel at individual and micro level.

A complete analysis of individual activity travel patterns was made which highlighted the importance of household socio-economics in travel decision making of the individual.

Travel duration was regressed against activity duration and activity frequency and thereby travel duration models were developed for different alternate formulations (Home, work, education, recreation and others).

The conclusion wasthat activity travel duration depends on activity's duration and activity frequency

The models developed can be employed for the micro-simulation of daily activity-travel patterns of individuals, which can be helpful in forecasting of activity based travel demand models for the future.

Modelling the Influence of Cross Roads and Fringe Conditions on Travel Time; by ShivprasadBhagwanraoKhedkar, IIT Madras

Travel time and congestion index were calculated for road segments of 500m and 1000m considering the influence of cross roads and fringe conditions (in Chennai).

Road-side encroachments, trees, parked vehicles, poles, construction works, bus stops, pedestrian crossing, trading activities, etc. have significant impact on travel time; these factors are termed as fringe conditions.

Signalized crossing roads, signalized joining roads and (v/c) were the variables which were significant.

500 m segments were poorer than 1000m segments as speeds are more uniform in 1000 m segments.

Factors Affecting Capacity of Urban Roads - A Review; by AshishDhamaniya, IIT Roorkee

Capacity of an urban road is influenced by factors that are internal or external the traffic stream.

Internal factors = traffic composition and presence of slow moving vehicles which will affect the capacity

External factors = geometric conditions, climate and other environmental conditions

This presentation was of literature review on studies on effect of local conditions of capacity of urbanroads.

Headway Modeling: From Singular Model to Mixture Model; by Subodh Kant Dubey, BITS Pilani

It was pointed that research on time headways has focused mainly on light and heavy-tailed distributions such as exponential, Gamma, Erlang, lognormal and weibull. But these do not provide a good fit in right tail region.

It is very important to model tail data effectively, as tails contain significant proportion of data.

In this paper power law based distributions have been proposed as they offer better tail fit than light and heavy tailed distribution.

It was found from the study that time headways follow power law.

When the frequency of an event varies as a power of some attribute of that event (e.g. its size), the frequency is said to follow a power law.

When a histogram of the data plotted on logarithmic horizontal and vertical axes (log-log scale) can be approximated using a straight line equation, then it is said to follow a power law.

To examine whether the time headway data follow a power law or not, rank frequency plot of the observed headway data for a flow range of 550 vph to 4100 vph are plotted on log-log scale.

It was found that the data points plotted on the log-log scale follow a linear form.

Similar observations were found for flow range 550 vph, 1473 vph and 1959 vph. So it was concluded that time headway data collected under heterogeneous for different traffic volume follow a power law.

Pareto-2 distribution was found to model time headway data in all the three regions (lower left tail, middle portion and right tail) up to a flow level of 1500 vph better than all the other distributions statistically.

Technical Session 3(b)

Technical Session 3(b)	Traffic Management and Operations and Environment
Chair	Prof C. S. R. K. Prasad
Rapporteur	Sumeet Gupta
AbhijitGhosh, IIT Delhi	Financial Operational and Safety Performance of Bus System - Case Study DTC
VivekArora, IIT Delhi	Comparison of Environmental Impacts by Different Technologies of Bituminous Road Resurfacing on the basis of Life Cycle Assessment
ParthaPratimSarkar, IIT Guwahati	Travel behavior analysis using a simple O-D survey
RinalKomalChheda, IIT	Optimal solid waste transportation management system

Bombay	
Pradeep Kumar D, NIT Warangal	Corridor Management Using Service Level Benchmarks(A Case Study of Visakhapatnam City)
Basil B,NIT Tiruchirappalli	Urban Speed Management - A case study of Tiruchirappalli city

Financial Operational and Safety Performance of Bus System - Case Study DTC; byAbhijitGhosh, IIT Delhi

Evaluation of public transit bus system in Delhi &comparison between low floor and standard bus service using Multi Criteria Analysis method from different perspectives is done

The operational efficiency i.e. fleet utilization, operating speed, & dwell time value of low floor bus model is better as compared to standard bus model

Low floor model is more viable and sustainable than the standard model in terms of net profitability, safety as well as operational efficiency.

Comparison of Environmental Impacts by Different Technologies ofBituminous Road Resurfacing on the basis of Life Cycle Assessment; by VivekArora, IIT Delhi

Identifying and quantifying the life cycle inventories involved in the process of different technologies of bituminous road resurfacing & to study the environmental impacts of these inventories.

The results concluded, for every cycle of preventive maintenance, on Delhi roads:

Saving of energy usage to the tune of 586 Million MJ.

Conserving water by 160 Thousand of kilo gallons.

Carbon Footprint is reduced by 31 Million Kgs.

Thus, a case of CDM can be persuaded which could create additional source of income.

Travel behavior analysis using a simple O-D survey; by ParthaPratimSarkar, IIT Guwahati

To know the accuracy of the information (mode related) available with the trip maker while choosing a particular mode, to know the effect of the data available to the modeler in the presence and absenceof detailed network data for Agartala city & to find the variables that affect the travel behavior in thecontext of small cities in a developing country

Gender has significant effect on two-wheeler ridership. More male trip makers are found to be using motor cycle

Auto-Rickshaw and Two-Wheeler are preferred by young people.

People with higher educational qualification prefer motor-cycle and car as travel mode.

Utility of all the mode decreases with increase in the travel time and distance.

Bicycle ownership has negative effect on utility of auto-rickshaw, two wheeler and car.

Optimal solid waste transportation management system; by RinalKomalChheda, IIT Bombay

Finding the vehicle operating cost for various links

Finding the shortest path from a ULB to each RLF using Dijkstra's algorithm

Assigning every ULB to the RLF that contributes to the least cost over the years

RLF assigned to a ULB changes with 5-year periods due to population increase on the route or if the RLF has reached its maximum capacity eg. Mira-Bhayandar, Thane

Trips are decided based on future growth of solid waste and decrease in capacities of RLFs. Thus the cost for one 5 year period may not be the least cost but over the 25 year planning period, it will give us the most efficient distribution

Additionally, vehicles will be routed from less densely populated paths, thus reducing the exposure of the masses to solid waste and the associated pollution.

Issue of vehicle effectiveness raised by participants

Corridor Management Using Service Level Benchmarks(A Case Study of Visakhapatnam City); by Pradeep Kumar D, NIT Warangal

Physical inventory of the corridors in the study area

Evaluating the corridor using Service Level Benchmarks by MoUD

Performance Report for all the parameters chosen

The results obtained with service level benchmarks give a better idea of complete monitoring of theperformance of urban transport in a city.

A complete monitoring from time to time should take place to know the deficiencies in the urban corridors.

Therefore, SLB concept can be an effective tool in identifying the performance gaps in urbantransport.

All the JNNURM cities should take up service level benchmarking exercise.

Issue of pavement conditionraised

Urban Speed Management - A case study of Tiruchirappalli city; by Basil B, NIT Tiruchirappalli

To provide effective traffic management measure in regulating speed of vehicles

To reduce the rate of fatalities within the urban centre

To explore the use of ITS tools in the area of Urban Speed Management, applicable to Tiruchirappalli city

To explore the use of Image Processing Techniques in estimating speed of moving vehicles

The analysis shows that accidents are concentrated morein the midblock sections than at the intersections.

Intelligent Transportation System technologies such as use of speed cameras along with number plate reader systems should be utilized to acquire the traffic speed data and provide thenecessary driver feedback measures like variable message signs, voice messages to enable improvement in the efficiency of the system.

Issues raised by participants that fatalities of pedestrians and cyclists not highlighted, and that traffic separation was not considered.

The Way Forward

1. Stand-alone National Institutions

2. NationalInstitute for Urban Transport (NIUT)

Research on all aspects of urban transport and logistics by all modes

Leading role in formulation of national transport policy and technology development

Sponsor research in and by other organizations

Have about 30-50 professionals at the post-graduate level by end of 12th Plan, 100-200 professionals by 13th Plan

On campus of existing IIT/IISc/NIT

National Institute for Urban Hill Transport (NIUHT)

National Institute for Urban Water Transport (NI UWT)

3. Scientific Research Board attached to Ministry of Urban Development

Multi-disciplinary research department for applied research on current concerns and future technology development

At maturity, these research institutes should have annual budgets of about 1% of the turnover of the sector

Professional staffing at a high level, about 50% of the staff by direct recruitment, rest on deputation from field and academic institutions. CSIR type service conditions. Report directly to the Secretary.

Manage all research projects, research funding and liaison with academic institutions.

4. City Level

All city municipalities to have urban transport planning departments with post graduate professionals: more than 20 in cities>5m, more than 5 in cities> 1m

All large public transport agencies to have research and planning departments.

5. Academic

20 academic institutions to have interdisciplinary urban transport research units by end of 12th Plan

No unit to be permitted in a uni-dimensional department. All proposals must demonstrate collaboration of 2 or more disciplinary units

Establish 20 chairs for urban transport research – with multidisciplinary work as an essential condition

E. Valedictory & Closing Session

Mr. Faruhath Ali,the Deputy Minister of Transport and Communications of the Republic of Maldives announced that the Seventh Regional EST Forum in Asia would be hosted jointly by their Ministry of Housing and Environment (MHE) and the Ministry ofTransport and Communications (MORC) 2012, in the Maldives in 2012, and that their country was aiming to be a carbon neutral country in the future. This official announcement made by the Republic of Malidives was warmly welcomed. A

At this session The representatives of private sector companies,including shippers,freight carriers,third-party logistics providers, and industry associations, announced the Private Sector Declaration on Green Freight in Asia towards a Green Economy, in support of the sustainable transport goals under the Bangkok 2020 Declaration. Whilesupporting the implementation of green freight programmes and initiatives throughout Asia with a vision tohelping countries reduce fossil fuel dependency, improve air quality, and minimize CO_2 emissions that contribute to climate change while maintainingeconomic growth, they called on government agencies, international bodies, development banksand other relevant stakeholders to collaborate with the private sector to green the freight sector in Asia. They further invited shippers, carriers, and third-party logistics providers to sign the open Declaration.

Expressing deep appreciation to the Ministry of Urban Development of Government of India, WHO, and MOEJapan, for successfully co-organizing the Forum, Ms. Chikako Takase, Director of UNCRD, urged all international organizations, bilateral and multilateral donor agencies, including development banks, to provide necessary technical and financial assistance to developing countries in implementing the Bangkok 2020 Declaration. Underscoring the importance of transitioning to a green economy in the context of sustainable development and poverty eradication, she encouraged the international community and stakeholders to enrich their discussions in the Rio+20 process in support of sustainable transport and, in particular, encouraged the participating countries to bring forward the outcome of the Conference to the debate at Rio+20 process. She welcomed the decision of the Government of the Republic of Maldives to host the Seventh Regional EST Forum in 2012, and highlighted that the Seventh Forum should address the specific transport issues and challenges faced by Small Island Developing States (SIDS). As requested by the conference, she also encouraged the Ministry of Urban Development of the Government of India to submit the outcome of the Conference to the UNCSD Secretariat as an input to the Rio+20 process.

With the objective of creating a common protocol for fare integration and collection, as well as parking and tollacross the country and to provide the commuter with a seamless, efficient, and hassle-free travel experience across India, the Union Minister for Urban Development in India, Mr. Kamal Nath, launched the National Common Mobility Card (NCMC), by the name 'More', signifying the national bird "Peacock". Seamless connectivity across multiple modes of transportation will increase the popularity and acceptability of public transport nationally and make public transport more appealing to the end user. The Ministry of Urban Development, under the NUTP, envisages a single ticketing system covering not only all modes of

public transport in the country but also for parking and toll. For this purpose, it is spearheading a national programme of inter-operable Automatic Fare Collection (AFC) systems. A single CMC card can be used across cities and differentmodes of transport. The implementation of 'More' will be partly funded by the central government under the JNNURM scheme covering the buses sanctioned under the scheme. It is expected that NCMC would benefit public transport organizations by significantly increasing overall efficiency; providing control and better management of tariff structure; reducing cash handling and hence lesser pilferage and fraud; and better planning based on reliable passenger statistics.

In order to promote sustainable urban transport in India, the Union Minister also honored exemplary work shown by different state organizations and presented Awards for Excellence in Urban Transport. Theawards are given each year by the Ministry of Urban Development of the Government of India based on the recommendations made by a high powered committee from among the nominations received. The awardsfor 2011 include: (a) Karnataka State Road Transport Corporation for inclusive development and introduction of the Modern City Bus Service in Tumkur; (b) Mumbai Area Traffic Control System for Commendable Emerging Initiatives Category under Best Intelligent Traffic Control System; (c) Pune Commissionerate of Police as runners up in the category of Best Intelligent Transport System Project; (d) Ahmedabad Municipal Corporation for the best project under Best Intelligent Transport System Project; (e) Delhi Integrated Multimodal Transit System Ltd for the commendable Emerging New Initiative under the category PPP initiative in Urban Transport; (f) Bhopal Municipal Corporation for the bestproject under the category PPP initiative in Urban Transport; (g) Pune Commissionerate of Police and BangaloreTraffic Police as joint winners for New Initiative in Traffic Engineering and Management; (h) Delhi Metro Rail Corporation for best Clean Development Mechanism (CDM) Project for modal shift; and (i) Graduates Welfare Association, Fazilka for their project of FazilkaEcocabs dial-a-rickshaw under the category of best NMT project.

Delivering the valedictory address, the Union Minister for Urban Development in India, Mr. Kamal Nath, statedthat India was preparing for massive urban transformation. The new growth story in India is about the growthof cities as more than half of the global population resides in cities. As India with 1.2 billion people begins tourbanize rapidly, with a young mobile population- as over 30 per cent are in cities already - urban renewal anddevelopment has to become the policy priority of the Government of India. Acknowledging the current contribution to the national GDP by the urban population being more than 60 per cent and expected to reach 70 per cent soon,India is committed to building cities of hope and happiness that are livable, clean, energy efficient, and sustainable. Whileexpressing concern over growing motorization, which is causing increasingly more pollution, energy use, and high road fatalities and injuries, he urged the necessity for a concrete blueprint of planning and implementation to prevent an irreversible trend towards unsustainable cities. The minister also emphasized the need to include the poor in the urban and transportation planning in order to minimize the magnitude of social and economic impacts of pollution and climate change in cities.

While sharing the financing need for India's urban transport sector - more than US$20 billion per year for the next twenty years - he emphasized the need to focus on innovativefiscal policies such as land monetization along high capacity mass transit corridors, transport tax and parkingreforms (linking parking charges to the value of the land), and other tax reforms to meet the growing investment demand. The NUTP of India focuses on the mobility needs of the people, equity, integrated land-use and transport planning, cycling, and walking. In order to facilitate public transport in mega-cities on high demandcorridors, the Ministry has taken up metro rail projects in several major cities of India with a model of 50-50 ownership of and cost sharing between the central and state government. Several BRT projects in major Indian cities have also been taken up under JNNURM. Along with the 12th Five-Year Plan, India is also finalizing the National Habitat Standards (NHS) to guide investment and planning of urban transport. Steps will also be initiated forbenchmarking of urban transport in various cities in accordance with Standard Service-Level Benchmarks adopted by the Ministry in 2009. The Union Minister finally recognized the integrated conference to be a meaningful collaboration between UMI 2011 and the Regional EST Forum to benefit decision makers and government representatives from EST countries, city managers, researchers, experts, planners, engineers, architects, entrepreneurs, manufacturers and suppliers of various urban transport technologies, and students in terms of experience, knowledge sharing and networking.

ANNEXURE I: Detailed Conference Programme

URBAN MOBILITY INDIA CONFERENCE & EXHIBITION-2011 & SIXTH REGIONAL ENVIRONMENTALLY SUSTAINABLE TRANSPORT (EST) FORUM

PROVISIONAL PROGRAMME

Conference Chair: Prof. Saugata Roy, Hon'ble Minister of State (Urban Development), Government of India

DAY 1 - Saturday, 3 December 2011

08:00 – onwards	**REGISTRATION**
09:00 – 17:00	**URBAN MOBILITY INDIA 2011 - RESEARCH SYMPOSIUM**

PROGRAMME OF UMI 2011 RESEARCH SYMPOSIUM					
0900h	**0930h**	**Opening session** Opening Address by Shri S.K. Lohia, OSD(UT) and Ex-officio Jt. Secretary, Ministry of Urban Development, Govt. of India Introduction to Symposium by Dr. Geetam Tiwari Key Note Speech by: **Shri K.C. Sivaramakrishna,** former Secretary, Ministry of Urban Development and **Research Professor and Chairman Centre for Policy Research** Vote of Thanks Venue: Ashoka			
0930h	**1115h**	**Technical Session 1(a): Accessibility and Safety** 12-min presentations followed by 15-min Q&A after every three papers Venue: Ashoka Chair: Prof D Mohan Rapporteur: Pankaj Prajapati		**Technical Session 1(b): Public Transportation** 12-min presentations followed by 15-min Q&A after every three papers Venue: Taber Chair: Dr. R.R. Kalaga Rapporteur: Rahul Goel	
		Rahul Tiwari IIT Madras	Unconventional Transport Measures for Improving Accessibility and Safety in Disaster Prone Hill Areas – Case Study of Gangtok, Sikkim (70)	S M Hassan Mahdavi M IIT Delhi	Effect of GDP on share of public transport and non-motorized vehicles in small and medium sized cities (72)
		Deepty Jain IIT Delhi	Impact of different infrastructure improvements on accessibility of different type of users (67)	Chaphekar Unmesh Pradip CEPT Ahmedabad	Institutional Reforms in Public Transport - 'A Need of New and Comprehensive Outlook' (70)
		Prutha N Shah CEPT Ahmedabad	Modelling Travel Behaviour of Men and Women (66)	Sungdikongro Imchen CEPT Ahmedabad	Transit Options For Hill Cities: A case of Kohima (66)

		Hemangi Ashish Dalwadi	Exploring the Sustainable Transportation Indicators by comparing two Neighborhoods : A case of Ahmedabad city (60)	Margie Parikh IIM Ahmedabad	Simultaneous Pursuit of Efficiency and Innovation: Exploring Ambidexterity in Organization Design in the Public Urban Transport (62)
		Ninaad Surendrakumar Athalye SVNIT	Identification of Black Spot Zones on National Highways: A Case study of Bhopal City (58)	Ranjana Prakash Menon University of Hyderabad	Critique of Pune's approach to transportation through an analysis of its budget (57)
		Santhi Jagadeeswari Tarlapu, IIT Guwahati	Factors Influencing Non-Motorised Mode Choice: A review	Pawan Dwivedi SPA Delhi	Mobility Characteristics of Users In Mass Transit System in Metropolitan City of Delhi: Case Study Delhi Metro (59
1115h	**1145h**	**Tea Break and Poster session** **Venue:** Foyer Area and RXN Area			
1145h	**1320h**	**Technical Session 2(a): Urban Land Use and Transport** 12-min presentations followed by 15-min Q&A after every three papers Venue: Ashoka Chair: Prof Shivanand Swami Rapporteur: Deepty Jain		**Technical Session 2(b): Public Transportation** 12-min presentations followed by 15-min Q&A after every three papers Venue: Taber Chair: Prof S Gupta Rapporteur: Gaurav Pandey	
		Pianka Bhattacharya SPA Delhi	Transport Planning and Design strategies for Green city (68)	Pradeep Singh Kharola IIT Delhi	Financing Urban Public Transport Systems – An 'Economic Firm' Approach (70)
		Amit Arora SPA Delhi	Mobility Patterns in Residential Neighbourhoods of Delhi: Characteristics and Issues (66)	Vimal Kumar Gahlot MNIT	Evaluation of City Public Transport System Using GIS (67
		Vishnu B IIT Madras	Behavioral influence of worker's tour on non- workers tours (58)	Mahesh Kumar Raman IIT Delhi	Bus Route Planning for Patna City (66)
		Subodh Kant Dubey BITS Pilani	A Comparative study of Route Choice Modeling using Fuzzy logic and Adaptive Neuro-fuzzy (57)	Khelan M Modi CEPT Ahmedabad	Towards an Integrated Public Transport System – A case of BRTS and city services, Ahmedabad (61)
		Mansha Swami SVNIT	Impact of Feeder Services on Ridership of BRTS in Surat City (57)	Swapna Ann Wilson St. Xaviers College, Trivandrum	Pedestrian Routes and their linkage to Transit Terminals: Lifelines of Urban Mobility City of Ahmedabad a case (56)
		Satish Kumar Eerni *NIT Tiruchirappalli*	Forecasting Urban Sprawl and Traffic Conditions in Tiruchirappalli City	Prageeja K *NIT Calicut*	Alternative Strategies for Mass Transportation-An Indigenous Way
1320h	**1420h**	**Lunch Break** Venue: Foyer Area			
1420h	**1555h**	**Technical Session 3(a): Modeling Techniques** 12-min presentations followed by 15-min Q&A after every three papers		**Technical Session 3(b): Traffic Management and Operations and Environment** 12-min presentations followed by 15-min Q&A after every three papers	

		Venue: Ashoka Chair: Dr. R Sivanandan Rapporteur: Shalini Rankavat		Venue: Taber Chair: Dr. CSRK Prasad Rapporteur: Sumeet Gupta	
		Mariya Khatoon IIT Delhi	Statistical analysis to measure pedestrian risk at Foot of Flyover (78)	Abhjit Ghosh, IIT Delhi	Financial Operational and Safety Performance of Bus System – Case Study DTC
		GS Sasane IIT Bombay	A Sustainable Approach of Modeling Regional Solid Waste Transportation System: Mumbai Metropolitan Region (MMR), a Case Study (70)	Vivek Arora IIT Delhi	Comparison of Environmental Impacts by Different Technologies of Bituminous Road Resurfacing on the basis of Life Cycle Assessment (61)
		Karthikeya Pavan Kumar Pisipati, NIT Warangal	Modelling the Influence of Cross Roads and Fringe Conditions on Travel Time	Partha Pratim Sarkar IIT Guwahati	Travel behavior analysis using a simple O-D survey (58)
		Shivprasad Bhagwanrao Khedkar IIT Madras	Modelling the Influence of Cross Roads and Fringe Conditions on Travel Time (65)	Rinal Komal Chheda IIT Bombay	Optimal solid waste transportation management system (56)
		G.S. Rao, IIT Roorkee	Factors Affecting Capacity of Urban Roads –A Review	Pradeep Kumar D NIT Warangal	Corridor Management Using Service Level Benchmarks (55)
		Subodh Kant Dubey BITS Pilani	Headway Modelling: From Singular Model to Mixture Model (60)	Basil B, NIT Tiruchirappalli	Urban Speed Management - A case study of Tiruchirappalli city (55)
1555h	**1625h**	**Tea Break and Poster session** Venue: Foyer Area & RXN Area			
1625h	**1700h**	**Closing Session** **Panel Discussion** **Moderator: Dr. Sudhir Krishna, Secretary,Ministry of Urban Development** • Research report by Shri B.I. Singal, DG, IUT • Discussion on report by invited panelists Dr. D. Mohan, Dr. P.K. Sikdar and Dr. A. Kundu • Response from representatives of CoEs – Dr. R. Sivanandan, Dr. C.S.R.K. Prasad, Prof. Shivanand Swamy **Vote of Thanks** by Venue: Ashoka			

DAY 2 - Sunday, 4 December 2011

08:00 – onwards	**REGISTRATION**

PROGRAMME OF THE INTEGRATED CONFERENCE (UMI 2011 + SIXTH EST FORUM)

JOINT INAUGURAL SESSION (09:30 – 11:30) – Venue: Zorawar	
09:30 – 09:40	Welcome Remarks by Shri S.K. Lohia, OSD(UT) & Ex-officio Joint Secretary, Ministry of Urban Development, Government of India
09:40 – 09:45	Opening Remarks by Ms. Chikako Takase, Director, UNCRD/DESA
09:45 – 09:50	Address by Dr. Poonam Khetrapal Singh, Deputy Regional Director, World Health Organization South-East Asia Region
09:50 – 09:55	Address by Mr. Osami Sagisaka, Director General, Environmental Management Bureau, Ministry of the Environment, Government of Japan
09:55 – 10:00	Special Address on Role of Railways in Urban Transport by Shri A.P. Mishra, Member (Engineering), Railway Board
10:00 – 10:25	Keynote Address 1: Metro Rail Revolution in India by Dr. E. Sreedharan, Managing Director, Delhi Metro Rail Corporation (DMRC)
10:25 – 10:50	Keynote Address 2: Premature death and particulate matter (PM) pollution - a critical challenge in urban management by Mr. Robert O'Keefe, Vice President of the Health Effects Institute (HEI) and Chairman of CAI-Asia
10:50 – 11:10	Inaugural Address by Dr. Sudhir Krishna, Secretary, Ministry of Urban Development, Government of India
11:10 – 11:15	Vote of Thanks by Mr. Choudhury Rudra Charan Mohanty, Environment Programme Coordinator, UNCRD
11:15 – 11:20	Group Photo
11:20 – 11:30	Inauguration of Expo by Dr. Sudhir Krishna, Secretary, Ministry of Urban Development, Government of India
11:30 – 12:00	**Tea/Coffee Break – Venue: Foyer Area**
JOINT PLENARY SESSION 1: PUBLIC HEALTH AND SAFETY IN SUSTAINABLE URBAN TRANSPORT (12:00 – 13:30)	
Venue: Zorawar Session Chair: Shri Sudhir Krishna, Secretary (Urban Development), Ministry of Urban Development-India Facilitator: Shri S.K. Lohia, OSD(UT) and EO Joint Secretary, Ministry of Urban Development-India Rapporteur: Mr. Charles Martin Melhuish	
12:00 – 12:15	Implementing a system approach in support of the Decade of Action for Road Safety 2011-2020 by Dr. Chamaiparn Santikarn, Regional Advisor - Injury and Violence Prevention (IVP), WHO/SEARO
12:15 – 12:30	Mainstreaming road safety in transport operations and financing in Asia by Mr. Oleg Tonkonojenkov, Senior Transport Specialist, ADB
12:30 – 12:45	Preventing traffic deaths and injuries through sustainable transport measures, Dr. Madhav Pai, Director, EMBARQ India
12:45 – 13:30	Q&A / Open Discussion
13:30 – 15:00	**Lunch / Visit to EXPO**

PARALLEL SESSIONS (15:00 – 16:30)				
UMI 1A: **Integrated Approach to Transport Planning**	**UMI 1B:** **Bus Operations**	**Round Table 1:** **Public Private Partnership (PPP), When and Where to Use?**	**Round Table 2:** **How to Control the growing Number of Cars and Two-Wheelers?**	**EST 1:** **Moving forwards on the Bangkok 2020 Declaration**
Venue: Zorawar Session Chair: Prof. P.K. Sarkar Rapporteur: Ms. Taru Jain	**Venue: Talwar** Session Chair: Dr. P.S. Rana Rapporteur: Ms. Chidambara	**Venue: Shamsher** Anchor: Shri Cherian Thomas, IDFC	**Venue: Taber** Anchor: Ms. Anumita Roy Choudhury, CSE	**Venue: Ashoka** Session Chair: Arbab Alamgir Khan, Minister for Communications-Pakistan Facilitator: Michael Replogle, Global Policy Director and Founder, ITDP Rapporteur: Heather Allen, Programme Director, TRL
Facilities for transport sensitive groups by Ms. Shreya Gadepalli, ITDP	Successful reform in bus operation – case of Seoul by Dr. Joonho Ko, Research Fellow, Seoul Development Institute			The Bangkok 2020 Declaration – a vision for Asia in promoting sustainable transport towards a green economy by C.R.C. Mohanty, Environment Programme Coordinator, United Nations Centre for Regional Development (UNCRD)
Congestion charging: options and impacts by Mr. Todd Litman, Executive Director, VTPI	Improving financial viability of city bus operations – case study of Bangalore by Shri Ingalalgi, Chief Manager (MIS), Bangalore Metropolitan Transport Corporation (BMTC)			Implementing the Bangkok 2020 Declaration – benefits and opportunities by Cornie Huizenga, Joint Convener, Partnership on Sustainable Low Carbon Transport (SLoCaT)
				2020 and Beyond: The Green Economy transition for transport in Asia and the Pacific by Lloyd Wright, Senior Transport Specialist, Asian Development Bank (ADB) (followed by Official release of the joint ADB-GIZ publication, "Changing Course in Urban Transport: An Illustrated Guide")
Greening the transport for poverty alleviation by Mr. Holger Dalkmann, Director, EMBARQ	Paradigm shift in PPP for bus operations in India by Prof. Shivanand Swamy, CEPT			Global modal shift scenario - complementing Energy and CO2 benefits through implementing the Bangkok 2020 Declaration by Lewis M. Fulton, Senior Transport Energy Specialist, International Energy Agency (IEA)

Possible solutions for a transport system compliant with the energy supply and the environment: measurable analyses by Prof. Bruno Dalla Chiara, "Politecnico di Torino" (I - Eu), EBTC	Evolving Sustainable City Service for medium size cities Shri Gaurav Gupta, Managing Director (MD), Karnataka State Road Transport Corporation (KSRTC)			
Q&A / Open Discussion	Q&A / Open Discussion			Q&A / Open Discussion
16:30 – 17:00	**Tea/Coffee Break – Venue: Foyer Area**			

PARALLEL SESSIONS (17:00 – 18:30)						
UMI 2A: **Transportation Systems Management**	**UMI 2B:** **Last Mile Connectivity**	**Round Table 3:** **Should Rail Transit be Preferred to Bus-based Modes?**	**Round Table 4:** **What Kind of Bus Should be Used for BRT?**	**EST 2:** **Country Reporting in Response to Bangkok 2020 Declaration – Initiatives, Achievements, Policies and Programs**		
Venue: Zorawar Session Chair: Shri Anil Baijal, former Secretary, MOUD Rapporteur: Shri Shanbhag Sandeep Uday Kumar	**Venue: Ashoka** Session Chair: Shri S.K. Manglik Rapporteur: Ms. Ammu Gopala Krishnan	**Venue: Mayur** Anchor: Shri B.I. Singal, DG/IUT	**Venue: Avadh** Anchor: Shri Shivanand Swamy, CEPT University, Ahmedabad	**Venue: Shamsher** Session Chair: Thomas Hamlin, DSD/ UN DESA Facilitator: Heather Allen Rapporteur: Marie Thynell	**Venue: Taber** Session Chair: Chikako Takase, Director, UNCRD Facilitator: Sophie Punte Rapporteur: Simon Ka Wing Ng	**Venue: Talwar** Session Chair: O. P. Agarwal, World Bank Facilitator: CRC Mohanty Rapporteur: Bert Fabian
Traffic engineering measures for improving the flow of traffic by Mr. Mahesh Thakur, Executive Engineer, Municipal	Planning for access to public transport stations – Case of Hyderabad by Shri N.V.S Reddy, Hyderabad Metro rail			<u>Group 1</u> Bangladesh India Japan	<u>Group 2</u> Bhutan Cambodia Indonesia	<u>Group 3</u> Afghanistan Malaysia Mongolia

Corporation of Greater Mumbai	Planning for safe and effective pedestrian and bicycle facilities by Mr. Julien Allaire, Technical Director, CODATU Paris			Lao PDR Myanmar Nepal Philippines	Rep. of Korea Maldives Pakistan	Singapore Sri Lanka Thailand Viet Nam
Use of ITS for efficient and effective traffic management by Mr. Takahiko Uchimura, Vice President, ITS Japan	Transforming cycle rickshaw – Case of Fazilka by Shri Navdeep Asija, Fazilka Eco Cabs					
Q&A / Open Discussion	Q&A / Open Discussion			Panel Discussion Lloyd Wright Roelof Wittink Holger Dalkmann	Panel Discussion Michael Replogle Lewis M. Fulton Cornie Huizenga	Panel Discussion Manfred Breithaupt Charles Melhuish Yoshitaka Motoda

19:45 onwards	**Welcome Reception hosted by Hon'ble Minister of State (Urban Development) – Venue: Foyer area and RXN Area**

DAY 3 - Monday, 5 December 2011

PARALLEL SESSIONS (09:30 – 11:00)					
UMI 3A: **Mass Transit Options**	**UMI 3B:** **People and Environment Friendly Urban Transport Infrastructure Planning**	**Round Table 5:** **Sustainable Mobility and Large Housing Projects**	**Round Table 6:** **National Mission on Sustainable Habitat – Development of Standards**	**EST 3A:** **EST as the Basis for NAMAs (Nationally Appropriate Mitigation Actions)**	**EST 3B:** **Modal Share Development: How to Break the Trend**
Venue: Zorawar Session Chair: Dr. M. Ramachandran, former Secretary, MOUD Rapporteur: Shri Amit Singh Baghel	**Venue: Ashoka** Session Chair: Shri O.P. Agarwal, World Bank Rapporteur: Shri Probhat Kumar Paul	**Venue: Talwar** EMBARQ Sponsored	**Venue: Mayur** Anchor:Ms. Shreya Gadepalli, ITDP-India	**Venue: Shamsher** Session Chair: S. Sundar, Distinguished Fellow, TERI Facilitator: Cornie Huizenga Rapporteur: Anup Bandivadekar	**Venue: Taber** Session Chair: Faridullah Khan, Managing Director, ENERCON-Pakistan Facilitator: Sophie Punte Rapporteur: Bert Fabian
State of art planning design and operation of BRT – case of Gujarat by Shri I.P. Gautam, Principal Secretary (UD), Gujarat	Urban Street design guidelines by Shri Sandeep Gandhi, IIT, Delhi			Environmentally Sustainable Transport as the Basis for NAMAs by Akshima T. Ghate, Fellow and Area Convenor, Centre for Research on Sustainable Urban Development and Transport Systems, The Energy and Resources Institute (TERI)	Making sustainable mobility a reality – how to break the trend by Santhosh Kodukula, Urban Transport Specialist, GIZ–SUTP (Sustainable Urban Transport Project)
Challenges faced by private parties in planning design and operation of rail/guided transit by Shri Anil P. Gupta, Reliance Infrastructure	Parking policy as a tool to enable modal shift by Ms. Anumita Roychoudhury, CSE			Opportunities and challenges of applying NAMAs in the transport sector in Asia: from Cancun to Durban by Thomas Hamlin, Technical Adviser -Energy, Transport and Climate Change, Division for Sustainable Development (DSD), UN DESA	Sustainable mobility alliance to improve mode share of public transport by Heather Allen, Programme Director, Transport Research Laboratory (TRL)
Multimodal integration through design of interchanges by Dr. Dario Hidalgo, Embarq	Designing feeder services for system integration by Mr Binyam Reja, World Bank			Mainstreaming transport co-benefits approach: a practical guide for evaluating transport projects by Jane Romero, Transport Specialist, Climate Change Group, Institute for Global Environmental Strategies (IGES)	How to build healthy and livable cities through safe and dedicated bicycle infrastructures – case of Changwon by Buok Rhee, Changwon Health Centre, and Sanghyuk Bae, Researcher, Seoul National University (SNU)

Presentation by Mr. Nenad Zdravkovic, Dopplemayr Hybrid Transit Systems – Case study of Thane by Shri K.D. Lala, City Engineer, Thane Municipal Corporation					
Q & A / Open Discussion	Q & A / Open Discussion			Q & A / Open Discussion	Q & A / Open Discussion
11:00 – 11:30	**Tea/Coffee Break – Venue: Foyer Area**				
PARALLEL SESSIONS (11:30 – 13:00)					
UMI 4A: **Livable Cities and Bench Marking**	**UMI 4B:** **Leveraging Strategies for Better Finances**	**Round Table 5:** (continued)	**Round Table 7:** **Should the City Have bus Services by Private Sector or Public Sector or a Mix?**	**EST 4A:** **EST for Green Economy**	**EST 4B:** **Rail Development as an Efficient Mass Transit Option**
Venue: Zorawar Session Chair: Shri S. Sunder, Distinguished Fellow, TERI Rapporteur: Ms. Vishakha Varshney	**Venue: Ashoka** Session Chair: Shri Anil P. Gupta, Reliance Infrastructure Rapporteur: Shri Neeraj Sharma	**Venue: Talwar** Anchor : EMBARQ	**Venue: Mayur** Anchor: Shri P.K. Gupta, CMD, DTC	**Venue: Shamsher** Session Chair: Paljor J. Dorji, Deputy Minister, National Environment Commission-Bhutan Facilitators: A.T.M. Nurul Amin, North South University (NSU) and Sungwon Lee, Head of the Center for Transport Economics and Social Cohesion, KOTI Rapporteur: C.R.C. Mohanty	**Venue: Taber** Session Chair: Rohana Kumara Dissanayake, Deputy Minister of Transport, Ministry of Transport-Sri Lanka Facilitator: Prodyut Dutt, Principal Transport Specialist, ADB Rapporteur: Abdul Quium, UN ESCAP
ESHUT towards a livable city - a case of Owariasahi City/Japan on integrated land use planning by Prof. Keiko Nakamura and Mr. Sadashi Toyoda	Issues in financing sustainable urban transport by Shri OP Agarwal, World Bank			Win-win transport solutions for green economy and climate mitigation by Holger Dalkmann, Director, The World Resource Institute Center for Sustainable Transport (EMBARQ)	The rail sector and sustainable development: building a Green Economy by Mukul Saran Mathur, Head of UIC Asia Regional Unit, International Union of Railways (UIC)

Multi-modal performance evaluation by Mr. Todd Litman, Executive Director, VTPI	Global experience in financing urban Mass Rapid Transit through PPP by Shri Anouj Mehta, ADB			Green economy policies in the transport sector - prospects and challenges by Shreekant Gupta, Board member CAI-Asia	Railway Development for Low Carbon, Green Growth in Korea by Jaehyun Park, Senior Researcher, Korea Railroad Research Institute (KRRI)
Tbilisi Sustainable Urban Transport Project: Improved project design to better measure long term impacts by Mr. Arnaud Dauphin, Urban Development Specialist (Transport), ADB	Leveraging land value capture along the Mass Transit Corridor by Mr. Xavier Hoang, AFD			Pro-poor transport policy towards Green Economy by Geetam Tiwari, Indian Institute of Technology (IIT)-Delhi	
Q & A / Open Discussion	Q & A / Open Discussion			Q & A / Open Discussion	Q & A / Open Discussion
13:00 – 15:00	**Lunch – Venue: Foyer Area and RXN Area**				
PARALLEL SESSIONS (15:00 – 16:30)					
UMI 5A: **Fare Integration for Seamless Travel**	**UMI 5B:** **Regional & Suburban Connectivity**	**Round Table 8:** **Time and Cost Overruns in Projects - Causes and Solutions**	**Round Table 9:** **Cycle Sharing**	**EST 5A:** **Green Freight and Co-Benefits**	**EST 5B:** **Sustainable Management of Two and Three Wheelers in Asia**
Venue: Zorawar Session Chair: Shri S.K. Lohia, OSD(UT) and Ex-officio JS, MoUD Rapporteur: Ms. Priyanka Ganguli	**Venue: Ashoka** Session Chair: Ms. Naini Jayaseelan, Member Secretary, National Capital Region Planning Board Rapporteur: Shri Sharad Kumar Sharma	**Venue: Talwar** Anchor: Shri S. D. Sharma, Executive Director/Civil, DMRC	**Venue: Mayur** Anchor: Dr. Anvita Arora	**Venue: Shamsher** Session Chair: Ildefonso T. Patdu, Jr., Assistant Secretary, Department of Transportation and Communications-Philippines Facilitator: Cornie Huizenga Rapporteur: Simon Ka Wing Ng	**Venue: Taber** Session Chair: Sommad Pholsena, Minister, Ministry of Public Works and Transport-Lao PDR Facilitator: Charles Martin Melhuish Rapporteur: Bert Fabian
Case study of Taipei by Prof. Jason	Planning design and operation of			Strategies for green and energy efficient freight system in Asia – case of Green	Regulatory and institutional framework to control the driving forces of two-and-

Chang and Mr. Joe Wang (WANG,Ching-Yao)	suburban/regional services by Shri Naresh Chandra - MRVC			Freight Program in China by Sophie Punte, Executive Director, CAI-Asia	three wheelers by Anup Bandivadekar, International Council on Clean Transportation (ICCT)
Case study of Seoul and ADB's effort by Dr. Jin Young Park, Urban Transport Specialist, ADB	Integration of regional and city travel by Mr. Oren Tatcher, Principal, OTC ltd.			GoGreen Program – Best practices in Asia and beyond by Björn Hannappel, Senior Expert, Deutsche Post DHL	New roadmap for motorcycle emission standard and fuel quality in Viet Nam by Duc Huu Do, Deputy General Director, Vietnam Register
Fare Integration for Seamless Travel in Singapore by Mr. Silvester Prakasam, Director, LTA-Singapore	Institutional administrative and legal issues by Shri OP Agarwal, World Bank			Discussion on the Declaration of Private Sectors on Green Freight towards a Green Economy	Cost-effective technology measures and financing options by Bert Fabian, Transport Program Manager, CAI-Asia
Q & A / Open Discussion	Q & A / Open Discussion			Q & A / Open Discussion	Q & A / Open Discussion
16:30 – 17:00	**Tea/Coffee Break – Venue: Foyer Area**				

JOINT PLENARY SESSION 2: NMT – AN INTEGRAL PART OF THE URBAN PLANNING (17:00 – 18:30)	
Venue: Zorawar Session Chair: Mr. Daniel M. Nicer, Assistant Secretary, Department of Environment and Natural Resources-Philippines Facilitator: Dr. Marie Thynell, Göteborg University Rapporteur: Mr. Santhosh Kodukula, Urban Transport Specialist, GIZ–SUTP	
17:00 – 17:15	Our cities ourselves: principles for transport in urban life by Mr. Michael Replogle, Global Policy Director and Founder, ITDP
17:15 – 17:30	Cycling as an essential element of livable cities - key design principles by Mr. Roelof Wittink, Director, Dutch Cycling Embassy
17:30 – 17:45	Innovative and pro-poor modal integration - integrating NMT into public transport system by Mr. Manfred Breithaupt, GIZ
17:45 – 18:30	Q & A / Open Discussion

19:45 onwards	**Reception hosted by Delhi Development Authority (DDA) – Venue: Foyer area and RXN Area**

Day 4 – Tuesday, 6 December 2011

JOINT PLENARY SESSION 3: INTELLIGENT TRANSPORT SYSTEMS FOR "BETTER CITY, BETTER LIFE" (09:00 – 10:30)	
Venue: Zorawar Session Chair: Dr. P.K. Sikdar, Vice President, IUT Facilitator: Mr. Silvester Prakasam, Director, Fare System Division, LTA-Singapore Rapporteur: Dr. Jane Rovira Romero, Policy Researcher/Transport Specialist, Institute for Global Environmental Strategies (IGES)	
09:00 – 09:15	Three pillars for ITS development: National vision, investment, strong government leadership by Mr. Stephen Ezell, Senior Analyst, Information Technology and Innovative Foundation (ITIF)
09:15 – 09:30	Moving towards the next generation Intelligent Transport Systems in Japan by Mr. Takahiko Uchimura, Vice President, ITS Japan
09:30 – 09:45	Implementing Intelligent Transport Systems in developing and developed countries– Shri Himanshu Bhatt, IBM
09:45 – 10:30	Q & A / Open Discussion
ADOPTION OF THE CHAIR'S SUMMARY (10:30 – 11:30)	
Venue: Ashoka Session Chair: Prof. Saugata Roy, Hon'ble Minister of State (Urban Development), Government of India	
10:30 – 11:30	Adoption of the Chair's Summary
11:30 – 12:00	**Tea/Coffee Break – Venue Foyer Area**
JOINT VALEDICTORY SESSION (12:00 – 13:30) – Venue: Zorawar	
12:00 – 12:05	Joint Announcement of the Ministry of Housing and Environment (MHE), and Ministry of Transport and Communications (MOTC) of the Republic of Maldives by Mr. Faruhath Ali, Deputy Minister, Ministry of Transport and Communications, Govt. of Maldives
12:05 – 12:10	Declaration of Private Sectors on Green Freight towards a Green Economy by Ms. Sophie Punte (CAI-Asia) and Mr. Kevin Bennett (SSCCAP)
12:10 – 12:35	Presentation of the summary of proceedings of the Conference by Prof. Sewa Ram, Head Transport Planning, School of Planning and Architecture, Delhi
12:35 – 12:45	Valedictory Address by Ms. Chikako Takase, Director, UNCRD/DESA
12:45 – 12:50	Launch of National Common Mobility Card by Hon'ble Shri Kamal Nath, Minister for Urban Development
12:50 – 13:00	Presentation of Urban Mobility Awards by Hon'ble Shri Kamal Nath, Minister for Urban Development
13:00 – 13:25	Valedictory Address by Shri Kamal Nath, Honorable Minister for Urban Development
13:25 – 13:30	Launch of UMI 2012 and Vote of Thanks by Shri B.I. Singal, Director General, Institute of Urban Transport (India)
CLOSING LUNCH (13:30 – 15:00) – Venue: Foyer area and RXN Area	
EST FIELD TRIP (15:00 – 17:00) A) Delhi Metro B) Delhi BRT corridor C) Operations Control Room (OCC) of the Delhi Integrated Multi-Modal Transit System Ltd.	

ANNEXURE II: List of Organizing Committee Members

1. Shri. S. K. Lohia, OSD (UT), Chairman-OC
2. Dr. S. Gangopadhyay, Vice President/IUT
3. Shri. S.K. Jagdhari, Vice President/IUT
4. Shri.RakeshKaul, Hony. Treasurer/IUT
5. Shri.B.I.Singal, Director General/IUT
6. Prof .VinayMaitri, Hony.Jt. Secretary/IUT
7. Shri. M. L. Chotani, Director/AMDA
8. Dr. K. Ravinder, Hony. Secretary/IUT
9. Shri. C.L. Kaul, Executive Secretary/IUT
10. Shri.Sandeep Sharma, Manager (Coordination)
11. Shri. I.C. Sharma, NPM/SUTP
12. Shri. R. Srinivas, Associate, TCPO
13. Shri.DikshantNegi, Asstt. Manager, SIAM

ANNEXURE III: List of Exhibitors

S .No	Name of Organization
1	GIRO
2	Cubic Transportation System India Pvt. Ltd
3	Sunovatech
4	HBL Power Systems Ltd
5	Trapzee Group
6	Power Electronics
7	THANE MUNCIPAL CORPORATION
8	Navi Mumbai Municpal Corporation
9	Karnataka State Road Transport Corporation
10	Ceipiemonte S c p a
11	Citi Labs Inc
12	DCC Doppelmayr Cable Car Gmbh& Co
13	Allision Transmission
14	MMRDA
15	JAIPUR DEVELOPMENT AUTHORITY, JAIPUR
16	Delhi Integrated Multi Modal Transit System Ltd
17	IBM

List of Sponsors (Reserve Category)

S. No	Name of Organization
1	Ministry of Urban Development, Govt. Of India -UMI
2	Ministry of Urban Development, Govt. Of India - 6th EST Forum
3	Bangalore Metropolitan Road Transport Corporation
4	Delhi Metro Rail Corporation
5	Surat Municipal Corporation
6	Ahmedabad Janmarg Limited
7	Chennai Metro Rail Ltd.
8	DULT, Karnataka
9	Hyderabad Metro
10	Kolkata Metro Rail
11	Municipal Corpn. PimpriChinchwad
12	Municipal Corpn., Vizag
13	AICTSL, Indore
14	Delhi Development Authority, New Delhi
15	Rites Ltd, Gurgaon
16	Mott MacDonald
17	SUTP
18	NBCC
19	Municipal Corporation, Bhopal
20	Jaipur Metro Rail Corporation
21	Municipal Corporation, Pune
22	Municipal Corporation Of Thane
23	Bangalore Metro Rail Corporation Ltd.
24	APSRTC
25	HUDCO
26	UTI-TISL

List of Sponsors (Private Sector)

S. No	Name of Organization
1	Cubic Transportation System India Pvt. Ltd
2	Mercedes Benz India Private Limited
3	Society of India Automobile Manufacturer
4	Embark Shell Foundation
5	Reliance Infrastructure Ltd

ANNEXURE V:

S.No	NAME	ORGANISATION
1	AkhilaUnnikrish	NIT Warangal
2	Anil Kumar A	NIT Warangal
3	Syamkumar A	NIT Warangal
4	Athira Anil	NIT Warangal
5	Subbarami Reddy B	NIT Warangal
6	Ram Kumar B	NIT Warangal
7	Suresh Ch	NIT Warangal
8	Jandhyala V S Gopal	NIT Warangal
9	Jayatheja A	NIT Warangal
10	Mahaboob Peera K	NIT Warangal
11	Koganti Naga Priyanka M.Tech	NIT Warangal
12	Bhargavi K	NIT Warangal
13	Bapuji BMV	NIT Warangal
14	Pravin Balwant K	NIT Warangal
15	Rajesh Chari	NIT Warangal
16	Hamdard RG	NIT Warangal
17	Rajesh Poli	NIT Warangal
18	Ramadurgaprasad P	NIT Warangal
19	Chaitanya S	NIT Warangal
20	Kharimullah S	NIT Warangal
21	Shanmugam O	NIT Warangal
22	Sonia B.I.	NIT Warangal
23	Arjun Kumar T	NIT Warangal
24	Jasti Pradeep Chaitanya	NIT Warangal
25	Pradeep Kumar D	NIT Warangal
26	Karthikeya Pavan Kumar Pisipati	NIT Warangal
27	Rajendra Verma	ITDP
28	Vidhya Mohankumar	ITDP
29	Pooja Sanghani	ITDP
30	Chris Kost	ITDP
31	Tarun Cherian George	SPA
32	Naveen Sharma	SPA
33	Parth Soni	SPA
34	Mayank Dubey	SPA
35	Tarun Songra	SPA
36	Rahul Shukla	SPA
37	Aditi Arya	SPA
38	Sampada Rajendra Khokle	SPA
39	Abhinav Kumar	SPA
40	Chirag Chutani	SPA
41	Ankit Kathuria	SPA

42	Garima Singh	SPA
43	Prakash Chand Arya	SPA
44	Kumaraswamy Enugala	SPA
45	Pawan Dwivedi	SPA
46	Pianka Bhattacharya	SPA
47	Amit Arora	SPA
48	Ankit Vora	CEPT
49	Ankur Dwivedi	CEPT
50	Dave Yash Dilipbhai	CEPT
51	Dhwani K Shah (Ms)	CEPT
52	Manu Singhal	CEPT
53	Nanda Kishore Karpurapu	CEPT
54	Parmar Bhaumik Hareshkumar	CEPT
55	Patil Ritesh Ramesh	CEPT
56	Purohit Aditya Milind	CEPT
57	Richa Pandey (Ms)	CEPT
58	Sangeeth K	CEPT
59	Sayan Roy	CEPT
60	Shah Ruchita Rajeshbhai (Ms)	CEPT
61	Multani Kruti Shrenikbhai (Ms)	CEPT
62	Ravi Krishna H	CEPT
63	A Dheeraj	CEPT
64	Ghatate Aditya Satish	CEPT
65	Anurav Jain	CEPT
66	Chintala Rahul	CEPT
67	Deshmukh Akshay Pravin	CEPT
68	Gallavalli Dileep Chakravarthy	CEPT
69	Harale Ajay Bhaskar	CEPT
70	Narender Kumar	CEPT
71	Saini Vijay Sundaram	CEPT
72	Sam Thomas Cheriyan	CEPT
73	Saurav Choudhury	CEPT
74	Shrishimal Hitesh Ashok Kumar	CEPT
75	Sonani Hemalbhai Devjibhai	CEPT
76	Sushant Sudhir	CEPT
77	Toridabtin Kynta Tiewsoh	CEPT
78	Virupakshayya Swami H M	CEPT
79	Singh Abhilasha	CEPT
80	Deepty Jain	CEPT
81	Prutha Shah	CEPT
82	Hemangi Dalwadi	CEPT
83	Unmesh Pradip Chaphekar	CEPT
84	Sungdikongro Imchen	CEPT
85	Khelan Modi	CEPT
86	Swapna Ann Wilson	CEPT

87	Shraddha Jain	CEPT
88	Mr. Abhijti Lokre	CEPT University, Ahmedabad
89	Margie Parikh	IIM
90	Ranjana Prakash Menon	Parisar
91	Subodh Kant Dubey	Bits-Pilani
92	Satish Kumar Eerni	NIT Tirichirapalli
93	Vimal Kumar Gahlot	MNIT Jaipur
94	Prageeja K	NIT Calicut
95	Subodh Kant Dubey	Bits-Pinai
96	Basil Basheerudeen	NIT Tiruchirapalli
97	C V Ravi Sankar	NIT Tirchy
98	Rohit Singh Chouhan	Maulana Azad NIT
99	Cheela Vnkata Ravi Sankar	MVGR College of Engineering
100	Ravi Nashikkar	SVNIT, Surat
101	Abdul Azizi	SVNIT, Surat
102	Ajinkya Vijay Kumar Mali	SVNIT, Surat
103	Yash K Hivarkar	SVNIT, Surat
104	Ramizraja Mohamadyasmin Munshi	SVNIT, Surat
105	Ninaad Surenakumar Athalye	SVNIT Surat
106	Krishna Saw	SVNIT Surat
107	Mansha Swami	Svnit Surat
108	Vruti D. Maniyar	SVNIT Surat
109	Arpan Mehar	IIT Roorkee
110	Ravi Gadepalli	IIT Delhi
111	Jyoti Chava	IIT Delhi
112	Sudeep Grover	IIT Delhi
113	Jaspreet Singh Bakshi	IIT Delhi
114	Sajid Iqbal	IIT Delhi
115	S. M. Hassan Mahdavi M.	IIT Delhi
116	Gaurav Harishchana Pandey	IIT Delhi
117	Abhijit Ghosh	IIT Delhi
118	Vivek Arora	IIT Delhi
119	Mariya Khatoon	IIT Delhi
120	Sasane G. S.	IIT Bombay
121	Rinal Chheda	IIT Bombay
122	Shivprasad Bhagwanrao Khedkar	IIT Madras
123	G S Rao	IIT Roorkee
124	Rahul Tiwari	IIT Madras
125	Santhi Jagadeeswari Tarlapu,	IIT Guwahati
126	Vishnu B	IIT Madras
127	Mahesh Kumar Raman	IIT Delhi
128	Pradeep Singh Kharola	IIT Delhi
129	SSLN Sarma	Organizers IIT Delhi
130	Rahul Goel	Organizers IIT Delhi
131	Sumeet Gupta	Organizers IIT Delhi

132	Shalini Rankavat	Organizers IIT Delhi
133	Pankaj Prajapati	Organizers IIT Delhi
134	Mahesh Rajput	Organizers IIT Delhi

Annexure VI: Chair's Summary

Chair's Summary

Conference cum Exhibition on Sustainable Mobility

(An integrated conference of the Urban Mobility India 2011 and Sixth Regional EST Forum in Asia)

3-6 December 2011; Manekshaw Centre, DhaulaKuan, New Delhi, India

I. Introduction

The Ministry of Urban Development (MOUD) of the Government of India, United Nations Centre for Regional Development (UNCRD), United Nations Department of Economic and Social Affairs (UNDESA), World Health Organization Regional Office for South-East Asia (WHO/SEARO), and the Ministry of the Environment (MOE) of the Government of Japan co-organized the Conference cum Exhibition on Sustainable Mobility from 3rd to 6th December 2011 in New Delhi, India.This included the UrbanMobility India (UMI) Conference 2011 and the Sixth Regional Environmentally Sustainable Transport (EST) Forum in Asia. The integrated conference was attended by approximately 700 participants, comprising high-level government representatives from twenty-one countries, including Afghanistan,Bangladesh, Bhutan, Cambodia, People's Republic of China, Indonesia, India, Japan, Republic of Korea (hereinafter, Korea), Lao PDR, Malaysia, the Maldives, Mongolia, Myanmar, Nepal, the Philippines, Pakistan, Singapore, Sri Lanka, Thailand, and Viet Nam, Subsidiary Expert Group Members of the Regional EST Forum, international resource persons, representatives from various UN and internationalorganizations, Indian officials from the central government, state government, urban local bodies andparastatals as well as academics, students, nongovernmental organizations (NGOs), and representatives from the private sector.

1. The organizations participating in the Conference included the United Nations Economic and Social Commission for Asia and the Pacific (UN/ESCAP), World Health Organization Regional Office for the Western Pacific (WHO/WPRO), World Bank, Asian Development Bank (ADB), AFD, Institute for Transportation and Development Policy (ITDP), International Energy Agency (IEA), World Resource Institute's Center for Sustainable Transport (EMBARQ), Transport Research Laboratory (TRL), CleanAir Initiative forAsian Cities (CAI-Asia) Center, German International Cooperation (GIZ), Japan InternationalCooperation Agency (JICA), International Council on Clean Transportation (ICCT), The Energy and Resources Institute (TERI), South Asia Environment Cooperative Programme (SACEP), Health EffectsInstitute (HEI), Institute for Global Environmental Strategies (IGES), Alliance for Healthy Cities (AFHC),International Union of Railways (UIC), Institute

of Urban Transport (IUT,India), Center for Science andEnvironment (CSE),India, Partnership for Sustainable Low-Carbon Transport (SLoCaT), Seoul DevelopmentInstitute (SDI), ASEAN Working Group on Environmentally Sustainable Cities (AWGESC), Dutch CyclingEmbassy, Institution for Transport Policy Studies (ITPS), Korea Transport Institute (KOTI), Korea Railroad Research Institute (KRRI), and others.

2. The annually held Regional EST Forum in Asia, which is the key component of the Asian EST Initiative, provides a strategic and knowledge platform for sharing experiences and disseminating best practices,policy instruments, tools, and technologies among Asian countries in relation to various key aspectsof EST underlined in the Aichi Statement (2005). Currently covering twenty three Asian countries, the high-level policy Forum aims at not only promoting an integrated approach to deal with a range of social, economic, and environmental issues in the transport sector, but also fostering interagency coordination as well as facilitating partnerships and collaboration between governments and international organizations such as development banks, and bilateral and multilateral donors.

3. At the Fifth Regional EST Forum in Asia held in August 2010 in Bangkok, Thailand, twentytwo Asian countries, international organizations, bilateral and multilateral donor agencies, NGOs, research organizations, international experts and resource persons agreed on theBangkok 2020 Declarationin order to demonstrate renewed commitment to realizing a promising decade of actions and measures for achieving sustainable transport in Asia. It was the first time that Asian governments and other transport stakeholders endorsed a joint declaration which incorporates a comprehensive set of goals (twenty EST goals) under three key broad strategies – Avoid, Shift, and Improve – within a clear time frame (2010-2020).

4. The UMI Conference cum Exhibition is an annual flagship event of MOUD-India. As one of the emerging economies in the world, India faces a huge challenge in the urban transport sector. The Government ofIndia formulated the National Urban Transport Policy (NUTP) in 2006 with a strong emphasis on moving people rather than vehicles, building capabilities at the state and city levels to address the problems associated with urban transport, and undertaking the task of developing sustainable urban transport systems. The Jawaharlal Nehru National Urban Renewal Mission (JNNURM), a massive city modernization scheme, was also launched in 2005, envisaging a total investment of over US$20 billion over seven years. In this context, the UMI Conference and Exhibition has been organized since 2008 in order to encourage states and cities to reform their urban transport systems by disseminating information and facilitating exchange of ideas, and recognizing good urban transport initiatives by presenting Urban Mobility Awards to selected best practices.

5. The integrated Conference on Sustainable Mobility was organized with the objectives of reviewing the progress made by Asian countries in achieving the goals under the Bangkok 2020 Declaration as well as addressing sustainability issues in urban transport. The conference also aimed to contributetowards enhanced regional input to Rio+20 by addressing sustainable transport in the context of moving towards a green economy.

II. Opening Session

1. Welcoming all the participants as well as introducing recent achievements under the NUTP and JNNURM, Mr. Sanjeev Kumar Lohia, Officer on Special Duty (Urban Transport) and Ex-Officio Joint Secretary, MOUD-India, stressed that the most challenging impact of urban growth and rising income levels in Asian developing cities is the mobility crisis. Moreover, even though a significant number of initiatives have been taken up in this region, much is still required to be done in cooperation with various stakeholders in order to build the rapidly urbanizing cities in Asia as livable, clean, energy-efficient, and sustainable as possible.

2. While addressing the importance of the forthcoming UNCSD 2012 (Rio+20) and one of its main themes, a green economy, in the context of sustainable development and poverty eradication, Ms. Chikako Takase, Director of UNCRD, emphasized that the integrated strategy (Avoid-Shift- Improve) that governs the goals outlined in the *Bangkok 2020 Declaration* has set a clear roadmap for Asian countries and cities towards a more sustainable future. She also remarked that pre- and post-Rio+20 processes offera significant opportunity not only to address the objectives and goals under theBangkok 2020 Declaration,but also to address EST as an essential element in pursuing a green economy.

3. Inviting the attention of the participants to the UN Decade of Action for Road Safety 2011- 2020, Dr. PoonamKhetrapal Singh, Deputy Regional Director of WHO/SEARO, shared with participants that WHO and the UN regional commissions, in cooperation with the UN Road Safety Collaboration and other stakeholders, have prepared a Plan of Action for the decade. She also underscored that the provision of safe, sustainable, and affordable transport should be a prime objective in the planning and design of transport systems that will stop and reverse the trend that, without action, would continue to witness the loss of millions of lives on the roads each year.

4. Expressing his appreciation to the Government of India as well as other Asian countries for their support to his country following the Great East Japan Earthquake in March 2011, Mr. OsamiSagisaka, Director General of MOE-Japan, not only encouraged participants to move forward towards the realization of people-friendly and environmentally sustainable transport, but also urged other bilateral and multilateral donor agencies to provide necessary and timely support in further strengthening and expanding the EST initiative in this region and other parts of the world.

5. Delivering the keynote address on the metro rail revolution in India, Dr. E. Sreedharan, Managing Director of Delhi Metro Rail Corporation (DMRC), emphasized that urban rail transit has a definite role to play in addressing the issues of energy efficiency, air pollution, and greenhouse gas (GHG) reduction at the local and global levels. Indeed, the Delhi Metro is the only metro that is credited for emission reduction via the Clean Development Mechanism of the Kyoto Protocol. He underlined the importance of multi-modal integration for a city-wide urban rail transport network.DrSreedharan also commended the fare integration envisaged by MOUD through a National Common Mobility Card, while at the same time, urged the need for setting up an exemplary public-private partnership (PPP) model for financing, and the support of the central government institutional framework for promoting urban rail transit.

6. In his keynote address, Mr. Robert O'Keefe, Vice President of the Health Effects Institute (HEI)

and Chairman of CAI-Asia, underscored that in many Asian countries the ambient levels of particulate matter (PM) exceed current WHO air quality guidelines, resulting in around 795,000 premature deaths in Asian cities caused by air pollution. He pointed out that excessive motorization and non-walkable environments have led to a series of negative chain effects, such as sedentary lifestyles, obesity, an increase in incidence of cardiovascular disease, and growing susceptibility to air pollution. He concluded that in both the developed and developing world, reducing air pollution will certainly extend longevity of human lives, and the conception and institution of a sustainable transport policy is essential to achieve that goal.

7. Concluding the opening session, Dr. Sudhir Krishna, Secretary for Urban Development, MOUD-India, maintained that a systematic approach needs to be applied for promoting sustainable urban mobility with various policies and measures, including the improvement of public transport service, introductionof various policies such as parking, advertisement, transit-oriented development, land-use and transport integration, provision of alternative modes to motorized transport, establishment of a dedicated urban transport fund, implementation of various road pricing policies, and higher taxation on private cars.

III. Implementing the Bangkok 2020 Declaration - Sustainable Transport Goals for 2010-2020: Issues, Opportunities, and Challenges

1. The Bangkok 2020 Declaration gives a common understanding of EST based on three key strategies – Avoid, Shift and Improve. Twenty goals have been set out to help frame policies, and the EST Forum provides an important arena for knowledge exchange and learning, leading to implementation and scalingup of actions. Best practices and good examples from the region have been collected and aligned to the delivery of the *Bangkok 2020 Declaration's* goals to help this process.

2. The *Bangkok 2020 Declaration* and the two major themes of the Rio+20 Summit of implementing the green economy and institutional reform to deliver this are closely associated. Transport is not directly an agenda item but, nonetheless, out of the 600 submissions from various countries, organizations, and civil society as input to the Rio+20 process, 246 submissions highlighted transport as a key issue to be addressed and several Asian countries made specific reference to transport. Indeed, transport is a cross-cutting issue that plays an important role in delivering all eight Millennium Development Goals (MDGs) and is a key enabler for the green economy.

3. Since 2005, there has been a slow process of raising awareness and at the same time a new paradigm for EST is emerging. However, due to the natural inertia in the transport sector between the implementation of policies and tangible results, the next ten years will be critical for future success.

4. It is a matter of considerable concern that most of the trends across Asia show decline in the use of sustainable modes such as walking, cycling, and publictransport. In most Asian countries, the majority of trips are still made on foot, with cycling and public transport closely following, especially in low-income countries. However as people's incomes rise and motorized transport becomesmore affordable, it quickly becomes the mode of choice. Securing and retaining high modal shares of the

sustainablemodes will take considerable efforts byall governments. Beside a combination of technology, behavioural,and cultural change is required. Identifying the possible tipping points where a step change in behaviour and technology will be crucial for success.

5. Energy and energy security will almost certainly be a key issue over the next ten years. According to IEA, peak oil production from conventional sources has already been reached. As transport relies, and will continue largely to rely on fossil fuels for the majority of trips this issueis of huge importance. Growth in energy use from the freight sector is of particular significance and passenger transport world-wide is also expected to double, and then triple, by 2050. Much of this growth will take place in Asia. The scenarios of the IEA align with the Bangkok Declaration'spolicy packages of Avoid, Shift and Improve and show that it is possible to keep to the internationally recognized target of limiting the average global temperature rise to below two degrees Celsius above pre-industrial levels. However, this requires substantial deployment of technology and transportation demand management as well as a significant shift to rail and public transport. New infrastructure as well as system optimization and the provision of alternatives to the private car are essential components for this to become a reality.

6. New thinking and streams of funding for financing sustainable transport are required. There are a growing number of possible innovative sources becoming available. The role of the private sector is well known but other possible sources include how to integrate climate finance, looking at how to manage energy security and monetizing co-benefits from health or improved safety could be ways to fund a more holistic approach to delivering sustainable transport.

7. Increased awareness and capacity building can be achieved via strategic alliances and partnerships with a variety of stakeholders. The example of the multi-stakeholder partnership – SloCaT, a unique association of more than sixty international organizations, financing institutions, and other major agencies, all working on sustainable, low carbon transport - is a resource for governments and other transport actors to tap in to draw expertise and knowledge. Making transport sustainable by addressing all three pillars of sustainability – environmental protection, social equity, and financial sustainability – in the first instance will deliver low carbon transport.

8. The key challenges are now to scale the commitments up and to create greater visibility for transport in the international discussion towards Rio+20. The cooperation of regional bodies such as UN/ESCAP, ASEAN, SACEP, and multilateral development banks in implementing the *Bangkok 2020 Declaration* was urged. Asia has a significant challenge: the sheer numbers of people living in the region and the migration trends from rural to urban areas mean that speed will be of the essence if the aspirations of a green economy and present development trends are to converge.

IV. Sustainable Urban Mobility for Better City and Better Life

A. Integrated approach to transport planning in a rapidly urbanizing scenario for Asia

1. Economic development leads to urbanization which impacts mobility. It becomes imperative

to meet the travel demand of all sections of society, including the socially/economically/physically challenged, and the urban poor. Mobility, accessibility, and affordability should be the key objectives of transport planning. Various factors such as land use, safety, mobility, reliability, equity, accessibility, and efficiency of transport network performance should be considered while preparing a transport plan of a city. The focus of a transport plan should be on mobility planning rather than the movement of vehicles. The key challenge is tocontain growth of personalized vehiclesand at the same time create and cultivate a conscious preference for the public transport system. Equity should be considered while providing transport supply. Personalized modes of transport can be contained by congestion pricing while ensuring that an alternative transport system is available. The transport plan should consider the changing energy scenario and latest technological options. The transport planshould include land-use integration, and fine-meshed and well-integrated pedestrian facilities and cyclenetwork. Universal design of the transport network should be adopted, keeping in mind the needs of theurban poor. While preparing the transport plan, people's participation should be encouraged. Transportdemand management, including pricing policies, should be applied for containing the growth of personalized modes but, at the same time, an alternate sustainable transport supply should be ensured.

B. Public health and safety as core elements in transport policy, planning, financing, and development

1. The meeting noted the large number of deaths and injuries attributable to road accidents that were occurring in the Asian region. Some estimated figures suggest that more than half a million people are killed annually on the region's roads and millions more are seriously injured. The numbers are set to rise steeply as the quantity of vehicles is expected to continue to increase sharply over the next twentyyears. The UN has declared 2011-2020 as the Decade of Action for Road Safety. UN agencies, together with multinational collaborators and stakeholders, have prepared a Global Plan of Action for the Decade to provide a guiding document to address road safety issues. The key goal of the Plan is to initially stabilize the number of people affected by road accidents and then reduce the numbers based on forecasted growth. The Plan is expected to save globally about 5 million lives over the ten-year period.

2. The primary approach is to adopt the "safe system" approach which accepts that human error will inevitably mean that road accidents cannot be completely avoided. Thus, the major aim is to develop aroad system that can better accommodate human error and ensure that such accidents do not result in serious human injury. The meeting noted that mitigating activities will have to be conducted at the national and local levels and will support five pillars of action; namely, road safety management, safer roads and mobility, safer vehicles, safer road users, and post-accident response. For better enforcement and implementation of road safety principles, the meeting also recognized the need to shift the major share of responsibility from road users to the designers of the road system, road managers, automotive industry, enforcement agencies, policymakers, and legislative bodies, while making individual road users responsible for abiding by laws and regulations.

3. Transport also has a major impact on public health. Road accidents already rank fifth highest in terms of their impact on health and impose high costs on the health sector. In addition, air pollution attributable to road vehicles is a major cause of premature deaths each year due to their adverse impact on urban outdoor air quality. The ambient levels of PM in most of the Asian cities exceed current WHO Air Quality Guidelines. Given the large number of people living within close proximity of major roads, exposure to primary traffic-generated pollutants is a public health concern, and therefore deserves adequate attention by policymakers, citizens, NGOs, and other key stakeholders. With increasing motorization, more people are affected by illnesses derived from physical inactivity and obesity. There is considerable evidence which demonstrates those 30 minutes a day or 150 minutes a week of moderate physical activity reduces mortality. Strong awareness, coupled with concrete sustainable transport measures and solutions, could contribute to a safer and healthier future in Asia.

4. The development community provides considerable assistance and support to the road sector. The multilateral development banks (MDBs) provide in excess of US$30 billion annually to support the development of transport in the Asian-Pacific region and bilateral donors also contribute substantial additional funding. With the transport sector constituting approximately 20 per cent of their total operations, MDBs are in a good position to help countries address their road safety issues through the provision offunding as well as encouraging countries to implement needed policies that will enhance the effectiveness of this financial support. ADB has road safety as a core component of its newly adopted sustainable transport initiative while the World Bank provides considerable support through its Global Road Safety Facility. While both these initiatives are important, they need to be strengthened by scaling up the resources committed to road safety and by adopting aggressive road safety policies to ensure that adequate attention is paid to road safety. Such action would increase the effectiveness of the Decade of Action for Road Safety by strengthening the programmes undertaken by individual countries and help to achieve balanced sustainable transport.

C. People and environment friendly transport infrastructure in urban design and development

1. Many cities are currently in the process of investing a considerable amount of resources into road-related projects. These projects serve mainly the personal automobile user, while putting to disadvantage the non-motorized user. Cities are designing their streets using old geometric design guidelines. The current process does not consist of a stakeholder dialogue or review process.

2. There is a lack of awareness on the benefits of parking management and transportation demand management. Further, in terms of management concerns, the main reason why parking management or pricing needs to be implemented is due to the fact that a valuable amount of land is being lost for parking.

3. Cities planning to implement mass transit systems such as Bus Rapid Transit (BRT) require guidance regarding the kind of buses and the technology best suited for the system. It is suggested to the cities that instead of concentrating on bus specification and technology, they should focus on the need of the users. Cities aiming to implement a BRT system have to note that the success of the

system depends on providing a level of service that replicates the metro rail system experience while riding the bus and that it can be sold to public as a "branded product". Technology has to serve the need of the commutersrather than the other way around. Fare box revenues must be supplemented by non-fare box revenues.

4. The feeder systems to the mass transit systems need to be given importance like the trunk routes. Using Intelligent Transport Systems (ITS) such as off-board ticketing and informational dispersal throughITS will enable a wider usage of the feeder services. Further, it is necessary and desirable to move towards institutional integration between feeder services and trunk lines to improve both efficacy of the product and its wider acceptability among the commuting pubic.

D. Modal integration and modal share development to break the current motorization trend

1. Transport system quality (speed, reliability, convenience, comfort, and affordability) is significantly affected by the degree of integration between institutions, planning, transport and land use, infrastructure, user information, and payment systems. This integration is particularly important for creating a multi-modal transport system which avoids automobile dependency.

2. Some Asian countries, including India and Korea, are making significant progress towards establishing national goals, objectives, and institutional reforms to support integrated transport planning. Some cities have started to offer high quality, door-to-door, non-automobile travel options. Most Asian cities are implementing some policies and programmes intended to improve integration.

3. However, most cities could do much more to create truly integrated, multi-modal transport systems. Institutions and planning activities can and need to be better coordinated. Walkability and cycling can be significantly improved to provide local access and connections between other modes of transport like public transport. Public transit networks can have better integration between routes, schedules, fares, and user information. Intermodal terminals could have better designs and maintenance in order to make public transit attractive and attract affluent travelers who have the option of driving.

4. This indicates that there are many opportunities to significantly improve overall transport system efficiency and service quality through better integration at all levels. Information sharing and technical transfer can identify specific reforms to make this possible.

E. Sustainable management of two- and three-wheelers in Asia

1. In many Asian cities, rapid urbanization and motorization are greatly influenced by the rise of motorized two-wheelers in urban traffic and the ubiquitous three-wheelers serving as a para-transit mode. In some secondary and smaller cities, three-wheelers serve as the main mode of public transportation. So far, policies and support from both national and local governments have not been put in place in good measure to manage operations efficiently and reduce emissions.

2. There is a need to implement a comprehensive institutional and regulatory framework for twoand three-wheelers that can involve several elements such as, in particular, urban planning and transport demand management, emissions standards and vehicle technology, cleaner fuels, and

inspection and maintenance. Many cities have been implementing traffic schemes such as banning motorized two-wheelers in city centres and odd-even schemes for three-wheeler operations. Technologies also exist to make motorcycle emissions as clean as the cleanest gasoline engines. The use of alternative fuels and electric motorcycles and three-wheelers can also play an important role in reducing pollutant and GHG emissions of two- and three-wheelers. Several countries are supporting and facilitating the introductionof electric two- and three-wheelers. A few countries, including Viet Nam, are implementing comprehensive inspection and maintenance scheme. An emerging trend is the institutionalization of fuel economy standards. Countries can also consider replacing gross polluting vehicles, particularly two-stroke three-wheelers.

3. Financing is an important element to facilitate the adoption of cleaner technologies for motorized and non-motorized three-wheelers. The establishment of a revolving micro-financing scheme and fund can enable the replacement of two-stroke tricycles such as those being adopted in Metro Manila.

4. The meeting recognized the need for strengthening and harmonizing emission and safety standards for two- and three-wheelers on a regional basis.

F. Making every Asian city pedestrian and bicycle friendly for social equity

1. Non-motorized transport (NMT) is environment and health friendly and encouraging its use would be necessary to achieve the goals set by theBangkok 2020 Declaration. The concerns of NMT regarding safety and receiving due share need to be addressed by segregating its right of way coupled with supporting infrastructure such as safe and dedicated parking places. Priority is to be given to the construction of footpaths and cycle tracks as part of the design and construction of roads. There is a need to protect NMT infrastructures against encroachment through strict enforcement and community participation measures. Cycling is currently regarded as a poor man's means of transport. Initiatives such as cycle-sharing are necessary to improve its brand image and make it a fashion statement.

2. All cities need to encourage walking and cycling and to design cities that reduce mobility and increase accessibility. This approach needs to look at a basket of solutions. There is a need to restrain car and motorized two-wheeler transport, and instead serve sustainable modes in the most optimal way.

3. Present incentives encouraging unrestrained car use such as direct and hidden fiscal subsidies and car-centric road infrastructure need to be reformed to achieve greater social equity. Restraint strategies include parking fees, higher taxes, road and congestion pricing, traffic management, among others. The introduction of paying for parking can be an important first generation of measures. Small cities and towns with fewer cars have good opportunities to implement measures to avoid excessive automobile dependence.

4. International and national bodies are encouraged to provide support to local initiatives for the improvement of sustainable modes of transport, making them more comfortable and attractive and effective alternative for car use. These initiatives should also be scaled up through comprehensive policies.

Complete door-to-door journeys should be able to be made by walking and cycling and the provision of safe infrastructure and facilities is important. Bike sharing can tap the latent demand for cycling and is an opportunity for including the private sector.

5. Compact and dense city planning and design, that keep the majority of urban trips within walking and cycling distances, help make these modes attractive.

6. Improved public transport, para-transit, walking, and cycling are also most important strategies torestrain growth in motorized two-wheelers, that are often the first motorized vehicle people purchase. Modern bicycles are becoming easier to use and e-bikes can provide advantages as fully motorized two-wheelers for longer and more demanding trips. Such affordable alternatives need to be promoted to better influence this sensitive segment of commuters.

G. Intelligent Transport Systems (ITS) – an option for smarter, low carbon, energy/fuel efficient and socially inclusive transport

1. ITS empower actors in the transportation system towards seamless and cost-efficient travel – from commuters, to highway and transit network operators, to the actual devices, such as traffic lights – to make better-informed decisions, whether it is choosing which route to take; when to travel; whether to shift mode (take mass transit instead of using personal driving); how to optimize traffic signals; where to build new roadways; or how to hold providers of transportation services accountable for results.

2. ITS deliver six key classes of benefits: (a) increasing safety, (b) improving operational performance, particularly by reducing congestion, (c) enhancing mobility and convenience, (d) delivering environmental benefits, (e) boosting productivity and expanding economic and employment growth, and (f) providing authentic data for planning and management. ITS also represent an emerging new infrastructure platform, from which a whole host of new products and services are likely to emerge.

3. For future investments in the transport sector both in developed and developing countries, ITS must be a critical component of the “improve” strategies. The implementation and experience by some countries, including Japan, show that it can be safer, more cost efficient and environmentally friendly to manage and sustain existing transport systems through ITS than by building new infrastructure.

V. Greening the Freight Operations

1. Green freight is essential for a green economy. In Asia, road freight transport is expected to increase eight-fold between 2000 and 2050. An integrated approach employing avoid (reduce travel), shift (to other modes), and improve (energy efficiency and reduced emissions) strategies is needed, covering technologies, logistics solutions, and modal shift initiatives. Asian governments can and need to facilitate the application of suitable strategies through policies and regulations, investments in freight infrastructure, and the establishment of national green freight programmes, which can build on existing programmes such as US SmartWay.

2. At the Sixth Regional EST Forum, private sector companies, including shippers, freight

carriers, third-party logistics providers, and industry associations, announced the "Private Sector Declaration on Green Freight in Asia towards a Green Economy," acknowledging private sector responsibilities and lending support to governments for green freight initiatives and programmes that reduce fuel dependency, and air pollutant and CO2 emissions while maintaining economic growth.

3. Delegates recommended that national programmes should be established step-by-step, and focus first on raising the awareness of government agencies and stakeholders, expanding the knowledge basethrough research and studies, investing in infrastructure for efficient freight movement, and improving coordination between relevant government agencies through institutional framework. There is unanimous support for featuring freight transport more prominently in future EST Forums. A recommendation is to consider developing a regional agreement or convention to collectively address freight issues under the framework of the Regional EST Forum.

VI. Rail Development as an Efficient Mass Transit Option for Asia

1. Passenger rail systems (high-speed, regional rail, light rail, and metro) provide highly energyefficient, clean, potentially very low carbon passenger transport. Freight rail provides similarly energy-efficienttransport for commodities and markets that it serves, and with advanced technologies such as hybriddiesel or electric traction minimal emission can be secured. It is important that electricity generation be moved toward low carbon fuels in order to maximize the GHG benefits of rail.

2. There are still substantial unexploited opportunities for rail systems in virtually all countries around Asia. As evidenced by systems in Europe, very high-speed (~350 km/hr) rail can provide nearly complete substitution for air travel for distances up to 500 km, and significant market shares up to 1,000 km. Linked to systems, including extensive medium-high speed rail (<200 km/hr), and regional rail segmentscan provide an interconnected, unified system to efficiently provide a national transport service. Regional rail systems are particularly under-developed in many countries and can be used as the basis for transit-oriented regional development.

3. For urban travel, metros (underground and elevated) can provide a "backbone" with rapid, high density service, but given their cost these should be focused on dense, high travel corridors. Light rail and bus systems can be used as feeder services, linking most neighborhoods to the metro system. The efficiency of metro construction has improved considerably in some Asian countries, helping to cut costs.

a. Policies should be designed to balance rail service quality and costs with rail access to all income groups, and ensure the widest possible mobility benefits.

4. Freight rail systems need to be expanded in many countries, with better intermodal facilities. Investments in freight rail can be highly cost-effective, with important benefits in terms of reducing freight traffic on roads.

VII. Suburban and Regional Connectivity as Pro-poor Growth Strategy

1. The Bangkok 2020 Declarationclearly identifies the rising problem of transport for the poor, both in urban and rural areas in developing countries. The inability of urban and rural poor to access jobs and basic services such as health and education has been noted to be a major hindrance to economic growth and the achievement of the MDGs. Recognizing this critical issue, theBangkok 2020 Declarationidentifies Social Equity in transport, under Goal 17, as an important goal to be achieved by 2020 in the Asian region.

2. Increasingly, urban areas are becoming the major drivers of job creation and economic growth. However, this growth is bringing with it a significant increase in the population of urban poor, who often find themselves living in peripheral urban areas, away from the core parts of the city. Social inclusiveness and quality of life for all is a key aspect of a green economy, and it is critical that land-use policies as well as transportation investments take into account the mobility needs of the urban poor, so that job opportunities and economic growth are equitable.

3. Promoting sustainable low carbon transport in cities can help realize both the above opportunities. Currently, the urban poor living in Asian cities is the largest user of sustainable transport modes such as walking, cycling, and buses. It is critical that these modes are promoted so that the poor have affordable access to jobs, and the urban economy is socially inclusive for the urban poor in terms of access to jobs and markets. It is often seen that as urban land prices rise, the urban poor are pushedto the periphery, and their access to jobs is affected. Thus, promoting equitable land-use policies for allsections of society, which is tied to a high quality sustainable urban transport system, is a key integratedstrategy to ensure a socially inclusive and green economy. Increasing the knowledge about accessibility through promoting research is vital to provide a sustainable solution for all.

4. Promoting sustainable businesses in cities, which focus on the triple bottom line (environment, society, and economy), is a key part towards a green economy. Such businesses create jobs and contribute toeconomic growth, while mitigating impacts on the environment. Promoting social entrepreneurship in the transport sector presents the opportunity to promote sustainable urban transport, which creates jobs and ensure social inclusiveness. Examples in this regard include social entrepreneurs in the auto-rickshaw and taxi sector in developing countries, which in addition to improving the quality of transportservices provide employment opportunities for the low-income population. It is also critical to integratethe large informal sector seen in Asian cities, as part of the urban economy, to ensure job creation and social inclusiveness.

5. Often the poorest parts of Asian society are most exposed to the impact of climate change. More attention to climate change adaptation into future land-use and urban planning should be an integral part of future policies.

VIII. Innovative Financing for Sustainable Urban Transport

1. Transport investments over the next forty years to 2050 are projected to total US$276 trillion

in Asia and US$500 trillion globally, including private and public infrastructure, fuel, and equipment purchases. Transport efficient modes and planning to avoid unnecessary travel through local access offers lower overall capital cost while concentrating investment of vehicles to fewer large units and shifting large capacities of roadway to dedicated mass transit systems.

2. While policy and planning are at the heart of the solution, innovative, more sophisticated finance is required to address the present situational deteriorating environment of ineffective and inadequateurban planning, resulting in poorly regulated urban sprawl, inefficient locations of goods and manufacturing facilities relative to markets, and the unhindered growth of private vehicles. While climate change mitigation in other sectors requires newfinance sources, transport may be largely addressed by a shift of current finance towards more efficientsystem-level solutions. While governments wish to avoid public financing obligations, innovation has been demonstrated in the form of PPPs. Public finance covers mainly infrastructure costs and long-term investment while private operators compete to operate most efficiently under service agreementswith incentives to optimize. Blends of export finance, multilateral development finance, national finance,local government finance, and private sector finance can provide very effective capital and operating finance solutions.

3. Finance and commitment by government during the construction period is critical for the success of large-scale projects such as rail. Build, operate or lease transfer arrangements can allow private investmentto supplement public finance over the short term. Land development value capture around transit terminals is also an innovative means of financing transport system finance although land purchase is also sometimes a barrier to system construction. Since development benefits, pollution benefits, social inclusion benefits, and financial benefits are dominant, all costs of transport by the various modes should be included in the pricing of use of each mode.

4. Fuel pricing needs to include the full cost of production as well as pollution costs. Fuel tax, parking charges, and/or road use charges are needed to include the cost of roads for private vehicles in order to achieve a level playing field with public transit systems and the more efficient modes of transport. Instead, fuel subsidies, often a misdirected subsidy attempting to reach lower income groups, end up causing wasteful fuel use by industry and more affluent consumers. Carbon finance, if aligned with development strategies, could be a catalyst for change in transport system development. Global Environment Facility (GEF) transport funding addresses the barriers to more environmentally sustainable transport in urban and freight applications, including land-use design aspects, but GEF finance is dwarfed by the scale of finance required. The degree to which Nationally Appropriate Mitigation Actions(NAMAs) finance being considered under the UN Framework Convention on Climate Change can bedirected to the upfront data gathering and planning stages, will determine its strategic impact while insome cases the addition of some small revenue stream is enough to close a financing package. Having agreed to the *Bangkok 2020 Declaration* as well as recognizing that EST and NAMAs are mutually reinforcing, the EST countries of Asia are bringing forward sustainable transport development projectsfor consideration by financing agencies. ADB, among others, is pledging to significantly

increase theshare of finance for more sustainable transport projects. The SLoCaT partnership is proposing to expand this in the form of a global sustainable development goal and initiative to be responded to by multilateral development banks.

IX. The Way Forward ~ EST for a Green Economy Transition in Asia

1. The EST Forum, from its establishment in 2005, has emphasized the potential of an approach which actively integrates environmental, social, and economical sustainability; which will enable the EST Forum to make a significant contribution in realizing the vision of the Rio+20: realizing a sustainable green economy that protects the health of the environment while supporting achievement of the MDGsthrough growth in income, decent work, and poverty eradication. Participants emphasized the equity dimension of sustainable transport and linked to that the importance of non-motorized transport and public transport.

2. The transport sector is of particular relevance to the Green Economy and Sustainable Development and Poverty Eradication (GESDPE) theme of the Rio+20 conference because of the wide ranging environmental, economic, and social development benefits of a green economyinspired development ofthe transport sector. Promoting transport based on the green economy concept will enable cities andcountries to leapfrog towards a sustainable path, rather than repeating the same mistakes made earlier by industrialized countries.

3. The strategic approaches and goals outlined in the *Bangkok 2020 Declaration* set a clear roadmap for Asian countries and cities for a more sustainable future. Presentations by the EST Forum countries onimplementing theBangkok 2020 Declarationand its twenty goals indicated that various Asian countries have started re-orienting their transport sector towards the green economy concept.

4. Participants underscored the need of sustainable transport being fully reflected in the discussions and outcomes of the Rio+20 conference, including the adoption of a Sustainable Development Goal on Sustainable Transport. This will enable the transport sector in EST member countries to make a significantcontribution to GSEDPE; and stimulate these countries to put in place comprehensive policy and effective financing frameworks to catalyse the implementation of GESDPE transport infrastructure and services at a speed that can prevent the rapidly growing cities in emerging and developing economies from resulting in having to deal with increasingly unsustainable transport systems.

5. The participants recognized the symbiotic relationship between EST and green economy. The implementation of EST policies relevant to the green economy delivers environmental benefits, including reduced GHG emissions, improved energy efficiency, as well as socially inclusive transport and green employment.

6. Transitioning towards a green economy should include: (a) shifting transport financing priorities towards public transport and NMT; (b) promoting investment in green transport technologies; (c) building safe and clean transport networks in support of social equity and poverty alleviation; (d)

fostering effective collaboration and partnerships among the public sector, business, and civil society in support of green transport; (e) establishing supportive institutional frameworks, and (f) building a robust transport data and information base.

7. In this regard, the participants recognized that the Rio+20 process offers a significant opportunity to address the objectives and goals under theBangkok 2020 Declaration, and thereby provides a unique opportunity to contribute towards the realization of a green economy. The United Nations Conference on Sustainable Development (UNCSD), also known as Rio+20, to be held in Rio de Janeiro, Brazil, in June 2012, will focus on two themes: (a) green economy in the context of sustainable development and poverty eradication; and (b) institutional framework for sustainable development.

8. On behalf of the meeting participants, the delegates of Japan requested the Ministry of Urban Development of Government of India to submit the Chair's Summary to the UNCSD Secretariat as an input to the Rio+20 process.

X. Valedictory and Closing Session

1. Making a joint announcement, on behalf of the Ministry of Housing and Environment (MHE) and Ministry of Transport and Communications (MORC) of the Republic of Maldives, for hosting the Seventh Regional EST Forum in Asia in 2012, the Deputy Minister of Transport and Communications, Mr. Faruhath Ali, mentioned that the Maldives was aiming to be a carbon neutral country in future. The meeting welcomed the official announcement made by the Republic of Maldives.

2. The representatives of private sector companies, including shippers, freight carriers, third-party logistics providers, and industry associations, announced the Private Sector Declaration on GreenFreight in Asia towards a *Green Economy,* in support of the sustainable transport goals under theBangkok 2020 Declaration. While supporting the implementation of green freight programmes and initiatives throughoutAsia with a vision to helping countries reduce fossil fuel dependency, improve air quality, and minimize CO2 emissions that contribute to improving climate while maintaining economic growth, they called on government agencies, international bodies, development banks, and other relevant stakeholders to collaborate with the private sector to green the freight sector in Asia. They further invited shippers, carriers, and third-party logistics providers to sign the open Declaration.

3. Expressing deep appreciation to the Ministry of Urban Development of Government of India, WHO, and MOE-Japan, for successfully co-organizing the Forum, Ms. Chikako Takase, Director of UNCRD, urged all international organizations, bilateral and multilateral donor agencies, including development banks, to provide necessary technical and financial assistance to developing countries in implementing the Bangkok 2020 Declaration. Underscoring the importance of transitioning to a green economy in the context of sustainable development and poverty eradication, she encouraged the international community

4. and stakeholders to enrich their discussions in the Rio+20 process in support of sustainable transport and, in particular, encouraged the participating countries to bring the outcome of the Conference

to the debate at Rio+20 process. She welcomed the decision of the Government of the Republic of Maldives to host the Seventh Regional EST Forum in 2012, and highlighted that the Seventh Forum should address the specific transport issues and challenges faced by Small Island Developing States (SIDS). She also encouraged the Ministry of Urban Development of the Government of India to submit the outcome of the Conference to the UNCSD Secretariat as an input to the Rio+20 process, as requested by the Conference.

5. With the objective of creating a common protocol for fare integration and collection, as well parking and toll across the country and to provide the commuter with a seamless, efficient, and hassle-free travel experience across India, the Union Minister for Urban Development in India, Mr. Kamal Nath, launchedthe National Common Mobility Card (NCMC), by the name 'More', signifying the national bird "Peacock". Seamless connectivity across multiple modes of transportation will increase the popularity and acceptability of public transport nationally and make public transport more appealing to the end user. The Ministry of Urban Development, under the NUTP, envisages a single ticketing system over not only all modes of public transport in India, but also for parking and toll. For this purpose, it is spearheading a national programme of interoperable Automatic Fare Collection (AFC) systems. A single CMC card can be used across cities and different modes of transport. The implementation of 'More' will be partly funded by the central government under the JNNURM scheme covering the buses sanctioned under the scheme. It is hoped that NCMC would benefit public transport organizations by significantly increasing overall efficiency; providing control and better management of tariff structure; reducing cash handling and hence lesser pilferage and fraud; and better planning based on passenger statistics.

6. In order to promote sustainable urban transport in India, the Union Minister also honoured exemplary work shown by different state organizations and presented Awards for Excellence in Urban Transport. The awards are given each year by the Ministry of Urban Development of the Government of India based on the recommendations made by a high powered committee from among the nominations received. The awardees for 2011 include: (a) Karnataka State Road Transport Corporation for inclusive development and introduction of the Modern City Bus Service in Tumkur; (b) Mumbai Area Traffic Control System for the Commendable Emerging Initiatives Category under Best Intelligent Traffic ControlSystem; (c) Pune Commissionerate of Police as runners up in the category of Best Intelligent TransportSystem Project; (d) Ahmedabad Municipal Corporation for the best project under Best Intelligent Transport System Project; (e) Delhi Integrated Multimodal Transit System Ltd for the commendable Emerging New Initiative under the category PPP initiative in Urban Transport; (f) Bhopal Municipal Corporation for the best project under the category PPP initiative in Urban Transport; (g) Pune Commissionerate of Police and Bangalore Traffic Police as joint winners for New Initiative in Traffic Engineering and Management; (h) Delhi Metro Rail Corporation for best Clean Development Mechanism (CDM) Project for modal shift; and (i) Graduates Welfare Association, Fazilka for their project of FazilkaEcocabsdial-a-rickshaw under the category of best NMT project.

7. Delivering the valedictory address, the Union Minister for Urban Development in India, Mr. Kamal Nath, stated that India was preparing for a massive urban transformation. The new growth story in India is about the growth of cities as more than half of the global populationresides in cities. As India with 1.2 billion people begins to urbanize rapidly, with a young mobile population – as over 30 per cent are in cities already – urban renewal and development has to become the policy priority of the Government of India. As the urban population contributes to more than 60 per cent of the gross domestic product (GDP) which is expected to reach 70 per cent soon, India is committed to building cities of hope that are liveable, clean, energy efficient, and sustainable. While expressing concern over growing motorization,which is causing more pollution, energy use, and high road fatalities and injuries, he urged for a concrete blueprint of planning and implementation to prevent an irreversible trend towards unsustainable cities. He further urged the need to include the poor in the urban and transportation planning in order tominimize the magnitude of social and economic impacts of pollution and climate change in cities. While sharing the financing need for India's urban transport sector – more than US$20 billion per year for the next twenty years – he emphasized the need to focus on innovative fiscal policies such as land monetization along high capacity mass transit corridors, transport tax and parking reforms (linking parking charges to the value of the land), and other tax reforms to meet the growing investment demand.The NUTP of India focuses on the mobility needs of the people, equity, integrated land-use and transport planning, cycling, and walking. In order to facilitate public transport in mega-cities on high demand corridors, the Ministry has taken up metro rail projects in several major cities of India with a model of 50-50 ownership of and cost sharing between the central and state government. Several BRT projects in major Indian cities have been taken up under JNNURM. Along with the 12th Five-Year Plan, India isalso finalizing the National Habitat Standards (NHS) to guide investment and planning of urban transportand doing benchmarking of urban transport in various cities as per the Standard Service-Level Benchmarks adopted by the Ministry in 2009. The Union Minister finally recognized the integrated Conference as a meaningful collaboration between UMI 2011 and the Regional EST Forum to benefit decision makers and government representatives from EST countries, city managers, researchers, experts, planners, engineers, architects, entrepreneurs, manufacturers and suppliers of various urban transport technologies, and students in terms of experience and knowledge sharing and networking.