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सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF HOUSING AND URBAN AFFAIRS

Digital India
Power To Empower

PROCEEDINGS OF UMI 2017

10th UMI Conference cum Exhibition and CODATU XVII Conference

Intelligent, Inclusive & Sustainable Mobility

4th to 6th November, 2017, HICC, Hyderabad

INSTITUTE OF URBAN TRANSPORT (INDIA)
www.urbanmobilityindia.in

PREFACE

As enunciated in the National Urban Transport Policy, 2006 (NUTP), the Ministry of Housing & Urban Affairs, Government of India has taken the initiative to organize an annual Conference-cum-Exhibition on Urban Mobility India (UMI) for dissemination of information, facilitate exchange of ideas and update on best urban transport practices.

The 10th Urban Mobility India (UMI) Conference was held from 4th to 6th November, 2017 at the Hyderabad International Convention Centre (HICC) in collaboration with CODATU, holding its joint XVIIth Conference, and Government of Telangana. The Conference and Exhibition was inaugurated by Hon'ble Vice President of India, Shri Venkaiah Naidu on 4th November, 2017 making it a unique event. The theme of the conference, "Intelligent, Inclusive and Sustainable Mobility" calls for provision of safe, seamless and affordable public transport to the commuters. The Institute of Urban Transport (India) provided the technical and logistics support in organizing the conference.

During the conference, urban transport experts, practitioners, resource persons, researchers, scholars and senior government officials from different states across India and delegates from many countries embraced the event. About 1,000 delegates attended the conference including 150 international delegates from 25 countries.

After three days of deliberation, knowledge sharing and exchange of ideas through 2 special sessions, 3 Plenary Sessions, 18 technical Sessions, 12 International Scientific Committee Sessions, & 6 Research Symposiums, the conference provided the much needed insight to the students, researchers, industry and other stakeholders about the futuristic approach to be followed in transport sector. On the concluding day, awards were conferred by Shri K.T Rama Rao, Hon'ble Minister of Urban Development, Telangana for best practices in the field of urban transport.

The proceedings and outcome of the conference are presented in this document. Presentation of technical papers and UMI photographs are available on the conference website- www.urbanmobilityindia.in.

(Mukund Kumar Sinha)
Officer on Special Duty (UT) & Ex-Officio Joint Secretary
Ministry of Housing & Urban Affairs
& Director General
Institute of Urban Transport (India)

CONTENTS

REPORT CARD

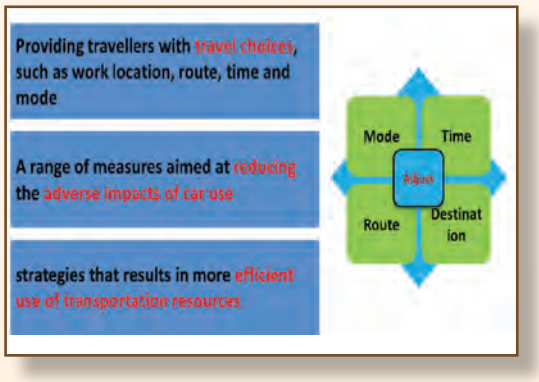
Urban Mobility India Conference provides a forum for stakeholder participation in understanding various contemporary issues of urban transport; benefiting from the experiences of international and domestic experts; sharing knowledge about the best practices in terms of last-mile connectivity approaches; eco-friendly systems; transit-oriented development strategies; model integration; smart multi-level parking; ease of doing business; innovative resources; safe and secure transport system, among others. 10th UMI Conference had a total of 56 sessions attended by more than 900 delegates from 23 foreign countries and 20 Indian states (Annexure 1 programme). The outcome of this annual event is summarized below:

Arrival of Chief Guest

GENERAL OUTCOMES

1. The Conference underlined a unanimous view on reorientation of urban transport planning, financing and execution to promote "Intelligent, Inclusive and Sustainable Mobility".
2. For effective mobility solutions, complementarity among different modes of transport needs to be promoted in place of the existing competition.
3. With new paradigms of urban mobility and changing user behaviour, India is moving towards a new trend of an urban transportation system which needs to be realized in the quickest possible timeframe, to overcome present mobility constraints.
4. Inadequacies in present regulatory and policy framework were discussed and improvements indicated in the new framework.
5. Strengthening capacity building of all stakeholders to meet mobility challenges is the need of the hour.
6. More qualitative research is required to study modal shares for further evidence-based mobility solutions.

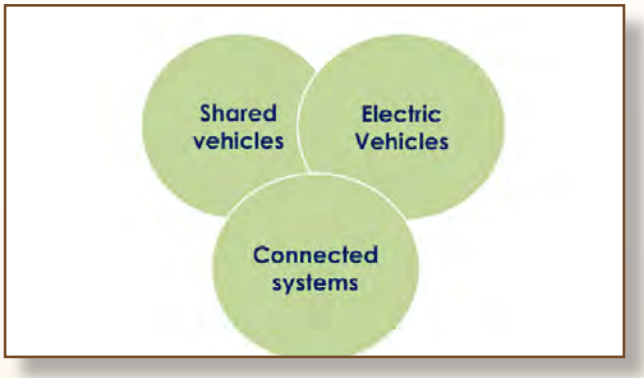
What does Intelligent mobility Deliver?



Cities must set a vision for what they want to achieve with technology, rather than letting technology set the agenda

Benefit of Multimodal Integration

What seems to be the future



THEMATIC DISCUSSIONS AND OUTCOMES

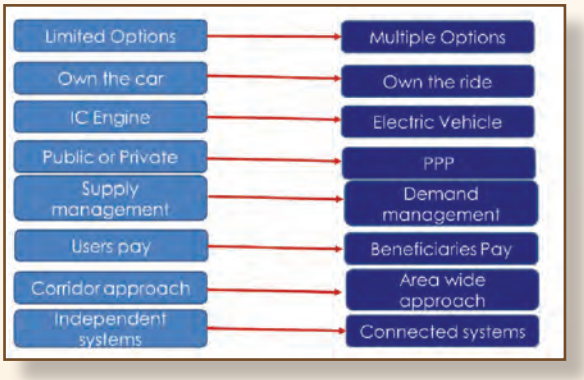
Emerging Trends In Mobility

a) Transition from owning a car to owning the ride.

b) Not only the user but also the beneficiary to pay for new transport projects.

c) Moving towards electric vehicles – Study on City Bus Sector Assessment in India, commissioned by KfW and undertaken by IUT strongly recommended for financing electric vehicles and associated infrastructure projects.

Emerging trends



Metro Systems

a) Metro rail no more a transportation project in isolation, but be taken up as an urban transformation initiative, in the context of comprehensive urban mobility solutions.

b) Metro rail is the flavour of the season with more and more cities aspiring to it which should be looked at as an opportunity to rewrite transport planning, financing and execution.

c) Government of India's recent new Metro Rail Policy 2017 widely welcomed.

d) Innovative financing and non-fare revenue options Including value capture financing, to be fully explored to finance metro systems.

5D BIM + ERP - One project one platform

Seamless connectivity for metro commuters

CMRL has tied up with corporate big-wigs like OLA & UBER for enhancing and promotion last mile connectivity at several metro stations.

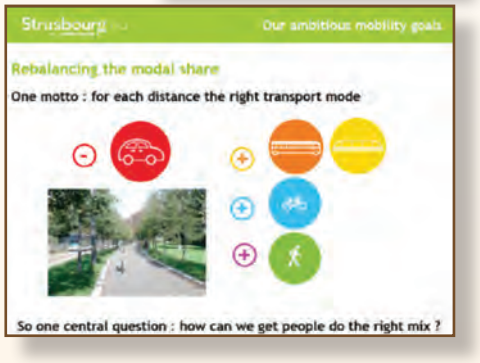
Shared Mobility

a) Shared mobility options to be promoted for demand management.

b) Shared mobility to be extended to Freight movement as well.

c) Regulatory framework required to promote eco-friendly IPT modes in an enabling ecosystem.

NMT



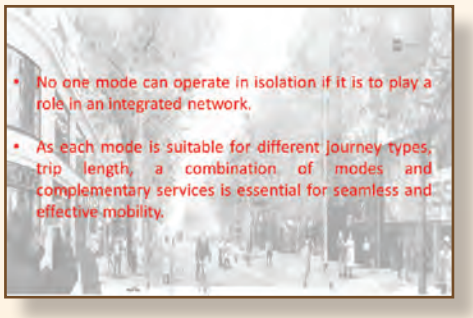
a) Pedestrian planning should be an integral part of city planning.

b) Provision of pedestrian and cycling tracks ensures much desired first and last mile connectivity, besides reducing private vehicle trips for short distances.

c) ITS to be extended to NMT modes as well to improve user experience.

d) Extensive adoption of ITS is the need of the hour to better utilize transportation assets.

Inclusive Mobility



a) Urban transport planning needs to acknowledge the right of access to public spaces for the poor and the marginalized.

b) Restoration of the first right of pedestrians to road use is required.

c) Accessible and affordable urban transport enables inclusive mobility solutions.

New Urban Planning and Financing Tools

a) GoI's recent TOD Policy widely welcomed.

b) Potential of VCF as innovative tool to finance urban infra-projects highlighted.

c) Capacity building required to enable wider adoption of TOD and VCF.

Comprehensive set of measures

Urban Transport and Environment

a) Transport sector accounts for over 25% of green-house gas emissions; so we need eco-friendly mobility solutions.

b) 30% to 60% of trips in Indian cities are walkable and hence carbon neutral. This potential needs to be fully captured through appropriate infra-development.

c) Transport sector-led ecological degradation has a huge adverse impact on GDP and hence green transport systems need to be promoted.

Car Sharing

This edition of UMI at Hyderabad effectively underscored inseparability of intelligent mobility, inclusive mobility and sustainable mobility and called for an integrated approach to address these issues in an effective manner.

Glimpses of Delegates Participation

INAUGURAL SESSION

- *Welcome Address* by Shri Durga Shanker Mishra, Secretary, Ministry of Housing and Urban Affairs, Government of India.
- *Address* by Mr. Dominique Bussereau, President, CODATU and Mr. Alexandre Ziegler, Ambassador of France to India.
- *Address* by Shri Hardeep Singh Puri, Hon'ble Minister of State (I/C) for Housing and Urban Affairs, Government of India.
- *Address* by Shri Mohammad Mahmood Ali, Hon'ble Deputy Chief Minister, Government of Telangana.

Dignitaries at Inaugural session

- *Release of Publication on Urban Transport* by the Chief Guest.
- *Inaugural Address* by the Chief Guest, Shri M. Venkaiah Naidu, Hon'ble Vice President of India.
- *Vote of Thanks* by Shri Manoj Kumar, Additional Secretary (D&C), Ministry of Housing and Urban Affairs, Government of India.

Highlights

Welcome Address by Secretary MoHUA

1. At the inaugural session of the 10th Urban Mobility India Conference–cum–Exhibition and CODATU XVIIth Conference, 2017, Shri Durga Shanker Mishra, the Secretary of the Ministry of Housing and Urban Affairs, Government of India, welcomed the dignitaries, delegates, distinguished guests and participants and gave a brief background of the annual conference organised by the MOHUA. He said that this year's conference was being organised in association with CODATU and in collaboration with the Government of Telangana. He expressed his gratitude to the Hon'ble Vice-President of India, Shri M. Venkaiah Naidu, for sparing precious time out of his busy schedule to grace the occasion and for addressing the august gathering. He said that about 900 delegates had registered for the annual event, including 150 foreign delegates from 23 countries making this 10th UMI bigger in scale than the previous years. He accentuated the importance of the theme of the Conference "Intelligent,

Lighting of Ceremonial lamp

Inclusive and Sustainable Mobility" which was to be deliberated in the Plenary, Special and Technical Sessions. He iterated that this annual event serves as a platform in which different stakeholders responsible for urban mobility could participate and share their views and best practices in the field across the world. Eight previous editions of the UMI Conference were held in Delhi and it was during the 8th UMI Conference, the then Hon'ble Minister for Urban Development and now The Vice-President of India, desired to organise this Conference in the State Capitals. To commemorate his words, the 9th UMI Conference was held at Gandhinagar (Gujarat) and this year it was organised at Hyderabad (Telangana). To conclude the welcome note, he lauded all the dignitaries and delegates present in the inaugural session and hoped that the deliberation would be very fruitful in the next three very eventful days.

2. In his address, Mr. Domonique Bussereau, President of CODATU, enlightened the gathering that they organise two-three Conferences annually to focus on the sustainable urban transport issues in various cities across the globe. He mentioned that the 10th UMI was the right opportunity for CODATU to be a partner, as it would help in strengthening cooperation with the Government of India. He admired the efforts made by the Indian Government in the field of urban transport particularly in metro rail and desired for active collaboration between India and France as well as CODATU, in this regard. He showed an interest in sharing the successful models in this new age of mobility between the cities of north and south. He thanked their Indian friends and appealed to all the cities to work together towards achieving the desired goals.

Domonique Bussereau, President CODATU

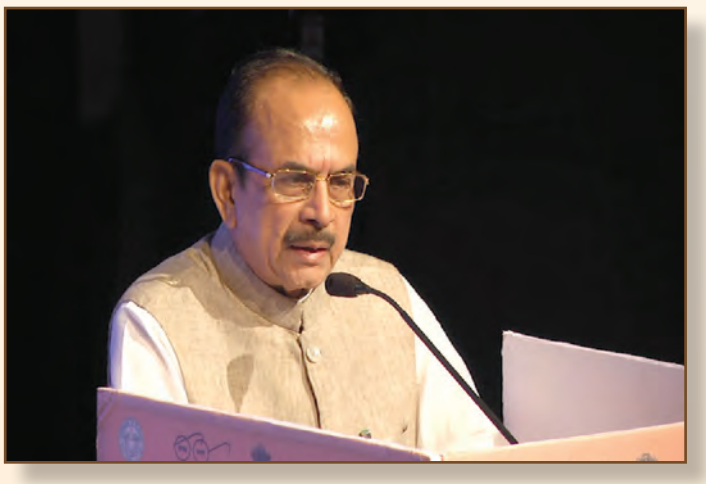
3. H.E. Mr. Alexandre Ziegler, the Ambassador of France to India, in his address expressed his pleasure and honour at being a part of the event. He thanked MoHUA, CODATU, IUT and other stakeholders for holding 10th UMI in conjunction with XVII CODATU conference.

Ambassador France Addressing the gathering

He said that sustainable human development is an international agenda to address the critical issues in urban areas. Transport is an enabling service for the people to reach their work, education and health. The Smart City and AMRUT programme, New Metro Policy and the Transit Oriented Development Policy are some of the recent initiatives which would give a further push to the development of various modes of transport. Tramway, BRT, City Bus Service and a Public Bicycle sharing system, need to be developed for sustainability. Electric vehicles need to be prioritized, for which France and India can work together. He conveyed the message from the Minister of Transport, France, who could not participate due to some urgent work in Paris. However, her video message was shown to the gathering. In her video message, she appreciated the cooperation of the Government of India and whished all the best to the joint conference of IUT and CODATU.

4. Addressing the gathering, Shri Mohammad Mahmood Ali, Hon'ble Deputy Chief Minister of Telangana expressed his happiness at holding the 10th UMI and XVIIth CODATU Conference jointly in Hyderabad. He also thanked the Vice-President of India for gracing the occasion.

Deputy Chief Minister of Telangana Addressing the Audience

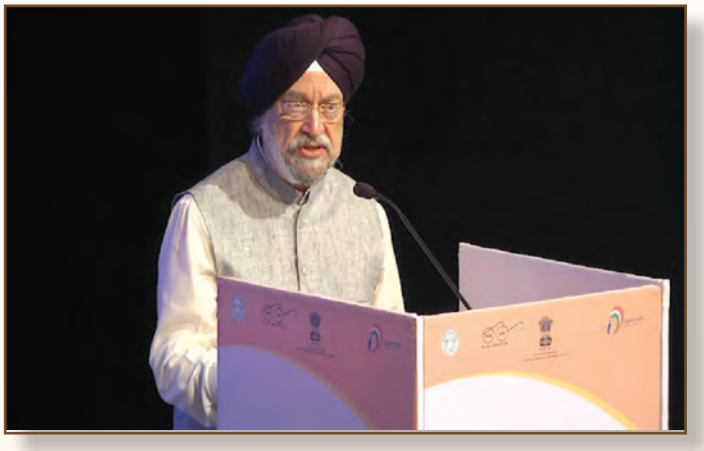


He raised the issue that the urban population is increasing quickly in Hyderabad, Telangana and traffic problems are becoming complex. The metro rail that is under construction is likely to be commissioned shortly which will help in improving the mobility services in the city.

5. In his address, Hon'ble Minister of State (I/C) for Housing and Urban Affairs, Shri Hardeep Singh Puri, shared that the inauguration of the 10th UMI Conference and CODATU XVII Conference was being held on the auspicious occasion of Guru Nanak Jayanti and Kartika Purnima. Organizing such a conference in this beautiful city of Hyderabad adds to the importance of the subject of urban transport. He said that presently every third person is living in an urban area

and the projections show that by 2051 about half of India's population will be in cities. Flagship programmes such as Smart City, AMRUT and Swatchh Bharat are very bold and ambitious initiatives and will have a transformative effect on India's urban landscape and will bring a paradigm shift in the sector. He expressed his gratitude for the support of Government of Telangana and CODATU in organising this joint conference. He further added that the theme of the conference on 'Intelligent, Inclusive and Sustainable Mobility' directly address the most important problems of urban transport.

Address by Honourable Minister of State (I/C) for Housing and Urban Affairs



6. He mentioned that rapid growth in urban areas has put immense pressure on infrastructure and it calls for a shift towards sustainable urban transport. The need of the hour is to develop infrastructure for NMT, cyclists and pedestrians as the absence of these facilities adversely affect smooth mobility in cities. With the size of cities increasing, traffic jams are common across the country. All this calls for safe, seamless and affordable public transport with first and last mile connectivity. Protected cycle lanes with the provision of dedicated vendor space and safety provisions - particularly for women - should be provided in all such cities.

Audience in the Inaugural Session

Release of Publication by the Chief Guest

7. He stated that The Ministry of Housing and Urban Affairs has taken several initiatives, such as: the formulation of Green Mobility Scheme covering 163 cities; legislation on Unified Metropolitan Transport Authority; Travel Demand Management; Urban Street Vendor Policy; Urban Transport Fund; Policy for Integration of Master Plan with Transport Plan; Transit

Oriented Development Policy; Public Transport System associated with Feeder Services and Last Mile Connectivity, and value capture financing which would be helpful in the development of sustainable mobility solutions.

8. Before delivering the inaugural address, the chief guest Hon'ble Vice President of India released the IUT publication on "City Bus Sector Assessment - India ".

9. Inaugurating the 10th UMI Conference, Hon'ble Vice President of India conveyed that this conference plays a significant role in the brainstorming of ideas for peer learning and sharing with experts across the world. This annual event is a useful platform to learn from each other's experiences. The major highlights of his speech are as follows:

a. Rapid & unplanned urbanisation led to the urban sprawl and thus generated higher demand for motorised travel

b. Increased motorisation in the cities has caused an ever-increasing trend of congestion, pollution and longer travel time, thus producing negative externalities.

c. Lack of affordable and accessible public transport systems has led to the proliferation of informal operators, such as private minibus and microbus services. In some cities, informal carriers are the only forms of public transport available.

Address by Honourable Vice president of India

d. While private motorisation cannot be wished away completely, providing an affordable, comfortable, reliable and safe public transport service could reduce the demand of private motorised vehicles.

e. It is important to provide easy access to the mass transit systems through feeder services of buses or other intermediate public transport modes.

A view of Audience in the Inaugural session

f. Promoting Non-Motorised Transport Infrastructure for walking and cycling as a last mile connectivity for a well-established public transport system.

g. Integration between various modes of transport will provide seamless connectivity for the commuters.

h. Exploring the possibility of

innovative means of financing and the Public Private Partnership (PPP) model for development and implementation of urban transport projects.

Chief Guest interacting with distinguished guests

i. The need to initiate a shift to clean fuels, retiring old polluting vehicles, strengthening mass transportation and promoting use of electric vehicles, ensuring parking spaces before registering a car, at least in large metro cities.

j. In order to become more sustainable, cities should be more compact, encourage mixed land use and prioritise sustainable modes of mobility.

10. He further said that it is heartening to note that India has made huge strides in the provision of public transport systems in many cities. He was glad to note that Ministry of Housing and Urban Affairs has formulated the National Transit Oriented Development Policy which can be used to create a city specific TOD policy. The Land Value Capture Policy recently issued by the Government of India can be adopted by various agencies with help and facilitation by the respective city and state governments. He was happy to note that MOHUA has formulated a new Metro Rail Policy, 2017, which enables greater private participation, as well as fostering a comprehensive approach towards implementation of metro rail projects in a sustainable manner.

11. For the foreign delegates, he mentioned that India is on the move and the goal envisaged by the Prime Minister is Reform, Perform and Transform. He complimented MOHUA, the Government of Telangana and CODATU joining together in this event. He conveyed his best wishes for the successful conduct and conclusion of the event.

Delegates in the Inaugural Session

12. In the end, Shri Manoj Kumar, Additional Secretary, MoHUA, Government of India proposed a vote of thanks. He thanked the Hon'ble Vice President of India, Minister of State (I/C) for Housing and Urban Affairs, Dy. Chief Minister, Government of Telangana, President CODATU, Ambassador of France to India, Secretary, Housing and Urban Affairs, all other dignitaries, delegates and participants as well as the members of the Organising Committee. (Composition of Organising committee is at Annexure-II).

Vote of Thanks by the Addl. Secretary, MoHUA

Glimpses of Inaugural session

SPECIAL SESSIONS

As part of the Conference structure, two Special Sessions were organised for the Mayors, Commissioners and Chief Executives of the Municipal Corporation of Southern States like Telangana, Andhra Pradesh, Karnataka, Tamil Nadu and Kerala. The details are as follows:

SPECIAL SESSION 1- INTELLIGENT MOBILITY

The context of urban mobility has changed over the years. With the objective of easy access there is an imminent need for intelligent solutions which not only provide the best option for people to reach their destination, but at the same time augments asset utilization and network enhancement, apart from providing positive externalities like reduced pollution, reduced accidents, congestion and travel time. Intelligent transport systems have succeeded in easing and facilitating mobility and have aided in achieving "commuters' delight" in many cities of the world. A well-planned intelligent mobility system which is an end-user and outcome-focused approach used to connect people, places and services across all transport modes, is the need of the hour.

In this session, an attempt was made to provide the information on how to transform peoples' journeys and their movement, whilst increasing the efficiency, sustainability and safety of transport systems through intelligent mobility in Indian cities.

- **Welcome Address –** Shri Manoj Kumar, Additional Secretary (D & C), MoHUA
- **Opening Remarks –** Sri Navin Mittal, Secretary, Govt of Telangana
- **Presenters**
  - Intelligent Mobility: Convergence of Disruptive Technologies Delivering Innovative Solutions that Support
  - Smart, Connected and Liveable Cities, Prof Shivanand Swamy, CEPT
  - Intelligent Mobility, Shri Ravi Peri, Principal Transport Specialist, Asian Development Bank (ADB)
  - Urbanization Scenario and Intelligent Mobility, Shri Shivanand Nimbargi, MD, L & T Metro, Hyderabad.
- Vote of Thanks - Shri Janardhan Reddy, Commissioner, Greater Hyderabad Municipal Corporation (GHMC)

Panellists on the Dais

Highlights

Delegates in the special session

❑ Welcoming the participants, Chairman Shri Manoj Kumar, Additional Secretary (D & C), Ministry of Housing and Urban Affairs, mentioned that cities play a vital role in generating economic growth and prosperity. The sustainable development of these urban settings mainly rests on physical, social and institutional infrastructure. Among these, transport infrastructure is paramount as good urban mobility is the basic requirement for sound economic growth. But, today the cities suffer from declining urban mobility due to rising congestion which has worsened the situation. A well planned intelligent mobility system will improve the travel environment and will reduce the personal automobile dependency leading towards sustainable transport for a better quality of life. The intelligent mobility structure needs to be properly coordinated with existing transport infrastructure and services. He said that the presentations by the experts will set the tone for discussions followed by interactions with the elected representative and participants.

Presentation by Expert

❑ In his remarks, Shri Navin Mittal said that Indian cities are witnessing rapid growth in size and population. The urbanisation level of 32% is anticipated to increase to 40% by 2031. In addition,, motorization is growing at a fast pace in the country, which has worsened the urban transport situation in terms of reduction of travel speeds and increase in travel time; increase in air and noise pollution levels; lack of effective road space; deficiency of parking space and increasing use of fossil fuel. To solve the impending problems of urban transport, Hyderabad has adopted many smart and innovative solutions to improve the mobility in the city such as the launch of the Smart Mobility and Transportation Cluster in Hyderabad. This initiative will work towards enhancing mobility while reducing congestion, air pollution and road traffic incidents.

❑ Presentations in the session highlighted the importance of the subject and its application in the specific case studies which are as follows:

➢ Transport problems are becoming more complex with the growth of cities, due to rapid change in the mobility needs and travel patterns of people.

Galaxy of Participants

- In many cities, transport infrastructure, be it roads, buses, metro systems or BRTS, are not keeping pace with the ever-increasing demand for urban mobility and has worsened the situation in terms of reduction in travel speeds; increase in air and noise pollution levels; lack of effective road space, deficiency of parking space and increasing use of fossil fuels.
- Intelligent mobility is an end-user and outcome-focused approach to connecting people, places, land and services – reimagining infrastructure across all transport modes, enabled by data, technology and innovative ideas.

Delegate Posing a Question

- It will transform people's journeys and their movement, whilst increasing the efficiency, sustainability and safety of our transport systems and cities in India.
- MOHUA is in the throes of the implementation of two flagship schemes, 'Smart Cities & AMRUT', which provide assistance to the cities to promote intelligent mobility, focused on Smart Parking and Intelligent Traffic Management for efficient urban mobility and public transport. The Ministry has also proposed the "Green Mobility Scheme" which would focus on the use of cleaner technologies for public transport such as electric / hybrid vehicles, a shift to non-fossil fuels, and land performance efficiency of public transport.
- Surat Municipal Corporation has used ITS for integrated city mobility and an intelligent transit

Honouring the Expert with Memento

management system. It has a common incident management platform similar to 9/11 in the USA.

- ➢ Key features of the AVLS system are operation billing, travel speed as inputs to schedule, service monitoring in terms of speed, schedule, missed stops, unauthorised stoppage and routes, among others.
- ➢ A complete journey from origin to destination in terms of distance, time and mode is monitored through ITS.
- ➢ Intelligent mobility based on high tech city level connectivity, the use of data analytics, information and communication technology is used to create and extract efficiencies and economisation in transport systems. Most cities do not have the luxury of holistic initial planning and need to retrofit the system into existing solutions.

Outcome

- ❑ Imminent need for intelligent solutions which not only provide the best option for the people to reach their destination but at the same time enhance asset utilization, network enhancement, apart from providing the positive externalities like reduced pollution, reduced accidents, congestion and travel time
- ❑ Intelligent mobility implies high tech infrastructure such as Hyperloop, taxis, intelligent people movers, linked multimodal transit including last mile connectivity. It also implies individual data connectivity in terms of Apps for individual information and communication.
- ❑ It should aim at connected services, seamless multimodal journey, Interoperability, Management of a shared network for data exchange, Journey Planning & ease of transaction, Integration of management systems and dynamic management of boundaries. Personalised service, Internet of everything in the transport operation and management system.

SPECIAL SESSION 2 – INCLUSIVE AND SUSTAINABLE MOBILITY

Mobility is required to ensure access to basic goods, services and activities and is therefore essential to social equity as well. Therefore, elements of affordability, gender sensitive design and services, universal access, safety and security, pedestalization and reduction in accidents have to be the essential components of policy, design and implementation.

Sustainable mobility requires clear and innovative thinking about city futures in terms of the reality (what is already there), desirability (what we would like to see), and the role that transport can (and should) play in achieving sustainable cities. This balances the requirements along the physical dimensions (urban structure and traffic) against the social dimensions (people and proximity). As most of the Indian cities are comparatively in the initial stages of urbanization, there is the opportunity of leapfrogging towards well planned urbanization strategies to provide an inclusive and sustainable habitat.

The objective of this session was to provide the solutions to the problems faced by Mayors / Municipal Commissioners/ CEOs in the process of development of Inclusive and Sustainable Mobility emphasizing on meeting the needs of all sections of society to move freely including the people who experience difficulty in mobility.

- ❏ Welcome Address - Shri D.S Mishra, Secretary, MoHUA
- ❏ Presenters
  - ➢ Dr. O.P. Agarwal, CEO, World Resource Institute (WRI)
  - ➢ Shri N.V.S. Reddy, MD, Hyderabad Metro Rail Corporation Ltd
  - ➢ Shri Vivek Aggarwal, Commissioner, Urban Administration and Development Department (UADD), Madhya Pradesh
- • Vote of Thanks – Ms Sonia Arora, Urban Transport Expert, Institute of Urban Transport (India)

Highlights

❏ The Session was chaired by Shri D.S. Mishra, Secretary, Ministry of Housing and Urban Affairs. He welcomed the Mayors and Senior Officers from the Municipal Corporations, expert panellists, delegates and other participants in the session. In his

Panellist making Presentation

Opening Remarks by Chairman

opening remarks, he highlighted that the Inclusive and Sustainable Mobility meets the needs of all sections of society to move freely. This called for providing seamless mobility and enhanced accessibility, including universal accessibility for the elderly, children and differently abled persons. He emphasised that we would have to build cities of hope that are smart, liveable, clean, energy efficient and sustainable; but, this demands creative and innovative approaches to urban renewal and planning.

Chairman Interacting with Participants

- Presentations in the session highlighted the importance of the subject and its application in the specific case studies which are as follows:
  - Government is sensitive to the plight of the differently abled people in the country. The Rights of Persons with Disabilities Act, 2016 has been passed by Parliament which envisages non- discrimination of people on the basis of their disability. The Act also envisages for inclusive mobility by making the public transport barrier free.
  - In the face of the existing scenario, there are some myths which need to be understood in the correct perspective.
    - It is assumed that we are building a metro, so congestion will go away. Merely building a metro is not enough, it has to be integrated with other systems. It should be conceived as an urban transformation initiative and not just a rail transport project. In this regard, the recent Metro Policy is the right approach.
    - By building a flyover and overpasses we will get rid of congestion. In fact, this does not happen; rather, it attracts more vehicles on the road. Emphasis should be more on travel demand management.
    - Buses are only for poor people. It is observed that in most of the large cities, more people use buses than the metro. Buses also help to increase ridership on the metro. The

Presentation by Panellist

If blood stops flowing a person is dead – if the transport system stops moving the city is dead

need is to improve the quality of buses and its service to make them attractive for the rich also.

- ➢ Some studies show that 30% growth in motorised travel will come from cities with populations below 1 million and another 30% will be from cities with populations of between 1-5 million. There is a need to give more attention to the smaller cities.
- ➢ Over 50% of the trips in most of the cities in India are done by walking and cycling. There is a need to provide safe walking and cycling infrastructure for easy and convenient movement in the cities. Singapore and Seoul are some of the best examples in the world which have excellent walking environments along with an efficient public transport system.

❑ To make Hyderabad metro inclusive and sustainable, many steps have been taken. This includes segregation of main carriageways and service roads; seamless integration with PT and IPT; guided pedestrian facilities; access for differently abled; NMT facilities; street furniture and landscaping; facilities for park and ride; integration of bus, car and auto; and the provision for electric vehicles with charging facilities.

Delegates in the Session

❑ In Madhya Pradesh, the urban public transport system is organised in a systematic manner in many cities such as Indore, Bhopal, Jabalpur and Ujjain. It includes Public Private Partnership policy and infrastructure support to implement complete multimodal transport system in the entire state. The state has also developed a hubs and spokes model for intra and intercity bus services with 20 special purpose vehicles for hubs. The state has prepared a draft state TOD Policy and Model TOD Regulation to mobilise finances for extension of transit services.

OUTCOME

For improving inclusive and sustainable mobility, the following issues need to be addressed in perspective:

- ❑ An integrated approach to mobility planning – not individual projects.
- ❑ Integrated governance.
- ❑ Plan for moving people – not vehicles.
- ❑ High quality public transport and safe walking and cycling facilities.
- ❑ Reduce travel distances – compact cities with mixed use planning.
- ❑ Restrain use of personal motor vehicles.
- ❑ Focus on capacity building.

Audience in the session

PLENARY SESSIONS

The 10th edition of UMI hosted three plenary sessions to initiate and provide a platform for discussion on mobility needs of urban India. The first session on new paradigms of mobility underlined the fact that mitigating urban mobility problems is through three key aspects: "Avoid, Shift and Improve". The other two sessions on smart city and mobility and Metro Rail provided an open forum to the august gathering for sharing the information and key excerpts from the best practices across the world in the field of mobility. These plenary sessions concentrated on the future of mobility taking into consideration the perspectives in the developing worlds. The speakers through their interactive discussions apprised the audience with the concept of smart mobility along with parallels from across the globe.

PLENERY SESSION 1: NEW PARADIGMS OF MOBILITY (JOINT SESSION OF IUT & CODATU)

Mobility plays a central role in cities for ensuring prosperity and social cohesion, yet mobility is also a source of major problems for urban areas. In highly motorised and car-dependent cities especially, congestion, air pollution, noise and other externalities associated with moving people and goods are considerable.

The main policy approaches to mitigating urban mobility problems are summarised in the triad "Avoid, Shift, Improve". "Avoid" policies generally focus on aspects of urban planning and land-use regulations which encourage high density and functionally diversified development that can make car trips redundant by reducing the distances between workplaces, homes, shopping and leisure activities, for example TOD. The "Shift" policies were traditionally aimed at encouraging transition from motorised urban travel towards public transport, walking and cycling, however, with the changing scenario, it is more attuned towards shared mobility. Under the "Improve" policies, the new technology of vehicles, in particular the electric vehicles, are being encouraged and adopted rapidly across the globe and are having a significant impact also on the environment.

The objective of the session was to provide a vision for the future, in line with the change of paradigms from private vehicles to public transport and walkable cities. Also, a special focus was given in two promising areas: the shift from user financing to beneficiary financing and the shift to Electric Mobility.

- Chairperson: Shri P.K. Bansal, M.D., Chennai Metro Rail Limited
- Co-chair: M. Yoshi Hayashi, President of WCTRS

Chairpersons and panellist on Dias

- Presenters
  - Future of Mobility - Dr O.P. Agarwal, CEO, WRI
  - Retrospective of 20 Years of Mobility - Mr. Ali HUZAYYIN, CODATU
  - Perspectives in the Developing World - Mr. Michel LARAMEE, CODATU and Mr. Xavier Crepin, Ministry of Foreign Affairs
- **Rapporteur:** Shri Ambuj Bajpai, Under Secretary, Ministry of Housing and Urban Affairs

HIGHLIGHTS

- The Session proposed to step back and have a look at the last 20 years of mobility planning, to better comprehend the situation in the years to come.
- Nowadays, instead of limited choices, people have a much wider variety of mode choice in public transport. To travel is to own a ride rather than the car, with the growth of sharing economy and to avoid the hassles of driving.
- The focus is more on travel demand management resorting to mixed use planning; TOD; high parking fees; congestion charges; shared rides; integrated public transport system and pedestrian infrastructure.
- Emphasis is more on electric vehicles to save on fuel import bills and to reduce pollution.
- Public transport management system is shifting to PPP model.
- Transport system should not be a standalone system, but should be connected as multimodal integrated system.
- Emphasis is more on beneficiaries to pay than only the users to pay.

Presentation by Speaker

- Transport Planning should have an area wide approach than only to corridor promoting feeder buses, public bike sharing, parking facilities and walking.

OUTCOMES

- In a nutshell, the future of urban mobility will be in shared vehicles, electric vehicles and connected systems. In a city like Helsinki, plans are to make private car ownership obsolete by 2025.
- Mobility perspectives in the developing world revolve around three revolutions i.e. urban, energy and digital revolution.
- With regards to the energy revolution

Delegate posing a Question

efforts, it should be to have a global alliance that will leverage programs like Mobilize Your City.

- With the digital revolution, focus will be on digital application, autonomous vehicles, and electric mobility to change the fundamentals of urban mobility. It will help in optimising the operation of existing networks, the improvement in planning through big data and creating new practices and services. All cities can get the most out of the digital revolution to avoid potential negative impacts.

Rapporteur briefing the discussion

PLENARY SESSION 2: SMART CITY AND MOBILITY (ORGANISED BY CODATU)

Smart mobility is the planning and management of intelligent, seamless, and inclusive mass public transport systems and non-motorized transport along sustainable paths which support economic growth and enhance the quality of life in the city. This can be achieved through integrated multimodal transport systems, encouraging safe walking and cycling by creating segregated rights of way, use of information and communication technology (ICT), promoting development and commercialization of clean technology, sustainable and innovative financing, and ensuring inclusive mobility for all sections of society including people with different abilities, senior citizens, women, children, pregnant women, and families with small children.

The objective of the session was to identify the priorities of a smart-city in terms of people movement and the role of new technologies as a facilitator, with Operators, Elected Members and civil servants from France and India sharing their perspectives.

Panellist Sharing Views

- **Session Opening:** Prof. Rosario Macario
- **Chair & Key-note speaker:** Mr. Pedro Ortiz, Urban Planner, Multilateral and Government consultant
- **Presenters**
  - The conception of Smart mobility for the city of Strasbourg - Mr. Jean-Baptiste Gernet, Deputy Mayor of Strasbourg (France)
  - A New Dimension for Mobility: Metropolise - Mr. Pedro Ortiz, Urban Planner, Multilateral and Government consultant
  - Smart city and urban mobility – Shri Kunal Kumar, Municipal Commissioner, Pune
  - Mr. Frederic Baverez, CEO, KEOLIS
  - Shri Sajeesh Kumar, Director Smart Cities, Ministry of Housing and Urban Affairs

HIGHLIGHTS

- It is essential to avoid choosing wrong mobility options for different travel needs. It thus becomes a mandate to rebalance the modal share in favour of public transport and NMT.
- The city of Strasbourg has come up with an interactive map-based service to assist the natives to plan their daily trips thereby helping to choose the right modal option.
- To further ease the transfer between various modalities, the city uses a mobility pass, which serves as a one-point travel warrant for buses, trams, car sharing, bike sharing etc.

- To further reach out to the people, the city has developed mechanisms whereby the commuters can use their mobile phones to buy tickets for various transport modes.
- Rather than focussing on only shifting the modal needs of the commuters, the city has innovatively tried to promote new ways of using cars. Ingenuities such as YEA and innovative car designs have effectively helped to maximise the utilisation of the existing cars on the roads.
- Mr. Pedro B. Ortiz emphasized the important factor of metropolitan dimensions and the transport associated with it. He iterated that the size of any metropolitan area is the prime aspect for deciding on the treatment required for the area. Metropolitans of different sizes cannot be treated alike.
- The speaker shared the benchmark followed in Bordeaux-Lyon-Rennes for urban planning and transportation. The metropolis has been built around a large public transport network to tap into the benefits generated due to a well-defined transport network.

Presenter Sharing Views

Audience in the Session

- A total of 15,000 dwelling units along with 5,00,000m2 of office spaces, 1,40,000 m2 of commercial establishments and 2,00,000 m2 of public facilities were developed along the transport network as part of the Euratlantic project in the city.
- The city has followed the concept of diversification of living spaces and confined them towards the core centre of the city area.
- This enabled the authorities to follow a linear transport network, connecting all the production and attraction zones in the city. This called for a paradigm shift towards newer transport modes such as metro rail.
- By 2020, the city envisages to connect the whole of the metropolitan area with a well-defined metro network. It is proposed that the tramway system will also compliment this metro network to provide smooth and seamless travel.

Panellist receiving a memento

Panellist Sharing his Views

- With the spread in the area within the Hyderabad metropolitan area, the built-up area per person has declined by about 3.6%. Discussing the regional settlement pattern for the city area and the regional profiles of settlement, it was proposed that two major alternatives may be viable for the city.
- Transit Oriented development would be a major alternative to tackle the traffic issues and cater to demand management generated. The other option could be to build radial roads to connect the ORR presently around the city. This will provide easy access to all the commuters without bypassing the busy city centre.
- In Pune, transportation and mobility has emerged as a major concern for the city dwellers. The city faces major traffic challenges, resulting in a very low average speed for the commuters and higher travel and waiting times.
- Urgent need of a common integrated mobility plan for the city, otherwise the situation is set to further deteriorate.
- Steps to be taken towards the three pillars of improving mobility, i.e. implementation of sustainable policies, creating infrastructure and leveraging technology.
- Pune with a low public transport share of merely 20% and almost 50% of private vehicles is set to achieve a public transport modal share of almost 40%, followed by 50% walk trips. To achieve this, the city has come up with urban street design guidelines to be followed across the city, public parking policies, policies for pedestrian safety and comfort, bicycle plans, TOD policies and an integrated multimodal transport plan.
- These policies are equally supported through development of required infrastructure such as bicycle infrastructure, a BRT system, metro rail corridor, completion of missing links etc.
- PMPML has come up with a smart mobility card to allow for easy access for the commuters. The central command and control centre will be used to track about 2000 GPS enabled buses in the city.

Presentation of memento to the speaker

OUTCOME

- To optimise the modal mix in any city, it is essential to choose the right mode for different trips.
- To ease the travel needs, the right technology mix should be used to cater to the needs of the commuters to provide them with a comfortable riding experience.

- In Strasbourg metropole, technology is used to change mobility choices. The approach is to rebalance the modal share by providing the right transport mode for each distance which will ensure that people have the right combination.
- TOD should be considered as one of the major aspects while developing any new metropolitan city.
- Implementation of sustainable policies, creating infrastructure and leveraging technology should be the three major concerns for any city to provide a holistic transport system.

PLENARY SESSION 3: METRO RAIL (ORGANISED BY IUT)

Growing cities, growing populations and growing traffic has invariably called for a shift from private to public transport modes. Indian cities are witnessing tremendous urban growth which has resulted in a generation of high level travel demands. Therefore, there is a need to develop sustainable mass transit systems in cities. Rail based systems like metros are a huge success in cities like Delhi and Bengaluru and various metropolitan cities are planning to do the same. However, to provide adequate transit facilities and to operate and maintain the same, large scale investments are needed. With billions of dollars to be spent on metro rail projects in the country, it is necessary to use innovative financing mechanisms capturing the gains from property values along the transit corridor. It includes Transit-Oriented Development with land values captured, coupled with supportive land use regulations and development-based land value capture (LVC). This would not only promote and support TOD but also help in recovering the cost of transportation infrastructure and promote inclusive development by improving mobility and access for all, while reducing pollution and unsustainable land development. To cater to the demand of the transportation needs of cities and at the same time making metro rail systems viable, the GOI has recently come up with Metro Rail Policy 2017.

The session focused on various features of the Metro Rail Policy 2017 along with different financing methods for metro rails, such as land value capture and PPP for metro rail projects. The session also placed emphasize on ensuring last mile connectivity to be planned along with the metro systems in the cities.

- **Chairperson:** Shri Durga Shanker Mishra, Secretary, Ministry of Housing and Urban Affairs, Government of India.
- **Presenters**
  - Taking the Metro to People's Doorstep – Dr O.P. Agarwal, CEO, WRI
  - Digital Project Management- Mr Salah Abdulatif Al Dilimi, Rail Infrastructure Maintenance, Rail Agency, Dubai
  - Non-Fare Box Revenue - Mr. Gregory Chow, Planning Expert, Systra
  - Role of PPP in Metro Operations – Shri P.K. Bansal, Managing Director, Chennai Metro Rail Ltd
  - Benefits of Digitalizing Metro Project from Concept to Commissioning, Shri Brijesh Dixit, Managing Director, Maha Metro

Chairman and Panellist sharing their views

- **Rapporteur:** Ms Rachna Kumar, Under Secretary, Ministry of Housing and Urban Affairs

HIGHLIGHTS

- The important set of measures would be to promote transit-oriented development for bringing people closer to mass transit. Similarly, providing appropriate feeder systems that will take mass transit closer to people.

- High density near metro stations; mixed land use; easy and convenient access to transits; safe, comfortable and pleasing walking environments would facilitate the success of TOD.
- Some of the best examples of implementation of TOD concepts in selected stretches are Arlington (Virginia) Rosslyn – Ballston stretch metro station in Singapore where offices, an hotel, apartments, shops, restaurants and parking are present in one building.
- In Bangalore, 73% of the city's population (2011) live within 5 kms of the metro corridor while 45% population live within 2.5 km; 8% population is within walking distance of 0.5 km which is considered as the captive population of city. This city metro is well connected to people's doorsteps by having a comprehensive and well-planned strategy and taking sustainable measures.
- Time and cost overruns in infrastructure projects are common due to delay in site handovers, regulatory approvals, contractual disputes, change in design and scope of work during implementation, lack of coordination within stakeholders, material price escalations beyond projections and location and connectivity of project sites.
- BIM enabled delivery activities include: capturing data through surveys; spatial planning and concept design; stakeholder engagement; design consideration and review; construction sequencing; cost planning and estimation and implementation and asset management.
- In Nagpur metro, BIM is comprised of design management, time and progress management, multiple contract management, cost and revenue management and integrated assets management. Nagpur metro is the first metro on 5D BIM integrated with ERP (Enterprise Resource Planning).
- It has a single source of information for design and drawing known as common data environment (CDE). It has benefits of design consistency and uniformity in models and drawings, online

Panellist making presentation

Delegate posing a Question

Panellist making a presentation

review and approval processes, automated CADQA checks, early detection of issues and detailed analysis using federated 3D models.

OUTCOME

Memento Presentation

- ❑ Steps required to take Metro Rail to people's doorsteps are as follows:
  - ➢ Comprehensive land use and mobility plan.
  - ➢ Estimating future property requirements, based on future vision.
  - ➢ Early planning for TOD and feeder systems at each station of mass transit proposals.
  - ➢ Notification of granular, and graded, FARs.
  - ➢ Identification of feeder routes and feeder systems at each station.
  - ➢ Preparation of a comprehensive TOD and feeder plan for each station.
- ❑ For implementation of TOD concept, metro companies, development authorities, Municipal Corporation and private sector have to work together.
- ❑ Public sector has to play an important role in land consolidation or land assembly, preparation of zoning and development control regulations, and augmentation of capacity of utility services.
- ❑ Revenue from commercial / property development at stations and on other urban land has to be used as a key instrument for maximising revenues in metro rail / railway systems in cities.
- ❑ Need to identify innovating financing to increase revenue.
- ❑ Key success factors of digital platform i.e. benchmark for other mega infra-projects are as follows:
  - ➢ Collaborative and user-friendly working environment.
  - ➢ 3D model-based analysis from concept till commissioning.
  - ➢ Design-drawing and document management system.
  - ➢ Effective project controlling and monitoring System.
  - ➢ Complete cost accounting system.
  - ➢ Asset information management system.

Rapporteur Reporting

TECHNICAL SESSIONS

A total of 18 technical sessions, including 5 joint sessions of IUT and CODATU covering a wide array of transport aspects were part of this year's UMI conference. The sessions provided a platform to the audience to get a first-hand experience of the different transport related issues across the globe. These technical sessions provided a knowledge sharing knowhow for the august gathering.

JOINT TECHNICAL SESSION 1: INCLUSIVE PLANNING, MOBILITY FOR ALL

Inclusive planning is an approach designed to engage traditionally under-served populations in planning and implementing program activities that recognize their needs and result in meaningful outcomes for all. For cities to operate in a functional and efficient manner, sustainable urban mobility demands symbiosis between transportation and urban planning. Sustainable mobility in cities is essential for improved quality of life, access to opportunity, reduction of environmental degradation and for creating inclusive environments accessible to all.

In most Indian cities the pedestrian mobility is hindered by various factors such as lack of safe infrastructure and road amenities and improper public transport. In this context the most affected are the children, senior citizens and physically challenged people. In order to enhance pedestrian mobility, we need to improve the accessibility and usability of public transport, non-motorised transport with seamless connectivity and supporting infrastructure.

This session highlighted the best practices in the world focusing on inclusive mobility, bringing out new initiatives promoting inclusivity in national, state and city level planning, sensitizing the authorities and road users about inclusiveness.

- **Chairperson:** Shri Brijesh Dixit, Managing Director, Maha Metro Rail Corporation Ltd.
- **Presenters**
  - Urban Poor and their Mobility Challenges – Dr Pawan Kumar, Associate TCP, Town and Country Planning Organization (TCPO), GoI
  - Bicycle Sharing Project, Mysore - Shri Darpan Jain, Commissioner, Directorate of Urban Land Transport (DULT) & Shri N. Murali Krishna, ITS, Special Officer, DULT
  - Inclusive mobility in RENNES - Mr. Laurent Senigout, MD, KEOLIS Rennes
  - Inclusive mobility – Mr. Jean-Baptiste Gernet, Deputy Mayor of Strasbourg, in charge of Mobilities

Panellist making the presentation

- ➢ Biking and active mobility in urban planning – Mr. Pierre Serne, Director of the Network of Cyclable Cities

❑ **Rapporteur:** Shri Naresh Bharadwaj, Under Secretary, Ministry of Housing and Urban Affairs

HIGHLIGHTS

- ❑ From the perspective of transport, urban poor are classified as: poor in income, poor in accessibility, poor in time, poor representation in policies and poor due to vulnerability
- ❑ One of the major challenges for this class is to maintain a balance between fare and the quality of service provided. Concern is more towards lower fare and lesser towards the quality.
- ❑ Urban poor are primarily characterized by no or limited transport access, as most of them dwell in low income residential area in urban fringes, which have insubstantial public transport access.
- ❑ To curb the issue of poor accessibility in the fringes, better route rationalization can be undertaken along with relocation of low-income residential pockets to improve accessibility links.
- ❑ Rennes metropolis is a sparsely populated area, where mobility solutions are adjusted to local characteristics and people's needs. It has a network of 2 metro lines, 1 BRT and a city bus system.
- ❑ Special attention is provided to people with disabilities. The city has provided fully accessible bus stops and metro stations with reserved places for people with wheelchairs.
- ❑ At peak time all cities in the metropolitan area are fed by the bus service with a frequency of 15 minutes. Further car sharing, carpooling and bike rental systems provide sustainable mobility to the city dwellers. In addendum, an express bike network is under construction for the ever increasing 2-wheeler traffic.

Speaker making a presentation

Panellist sharing his view

Presentation by Speaker

- A multimodal transport card – "KorriGo" provides citizens with access to multiple public facilities. It is primarily to be used for accessing transport services, although it can be used at places like libraries, restaurants, universities and swimming pools.
- The Mysuru Public Bike Sharing, India's first bicycle sharing system, provides easy last mile connectivity to almost 1/4th of the Mysuru area.
- The system is monitored with a microwave-based communication system, set up exclusively for the PBS system. A stored value card system is used with it. User information is updated in the smart card only.
- A software-based system monitors the system in real time and generates SLA reports. The most predominant users are in the age group of 20-30 years.
- Based on the user survey, 25% of the users have shifted from 2-wheeler to the PBS System.

  35% of the users feel that the PBS system is affordable and 25% of the users are using the system as last mile connectivity.

Presentation by Speaker

- Suggestions from users for improvement range from demand for more docking stations, providing GPS tracking system, extending time limits of operation and providing more number of cycles in peak hours, among others.
- In Strasbourg, 5-20% increase in bicycle Traffic has been observed in the city.
- As a mandate in the city, 1,000 children learning bikes at schools every year, including 300 adult people/year. PBS has served as a medication for the city dwellers.
- The bicycle network is not limited to the city centre. It is spread across the entire metropolitan area. The ancillary infrastructure required for the PBS has also been provided.
- Club des villes et territoires cyclables, a French network of cycling-friendly cities, is a group of more than 1700 local authorities. It brings together a network of stakeholders who discuss and share especially on how to promote cycling in urban planning.

Presentation by Speaker

- Active mobility refers to any form of human powered transportation including walking, cycling and skating. Active mobility promotes an alternative to cars, helps to meet new commitments on sustainable development and fight against climate change.
- The future of active mobility should include a kind of Sustainable Urban Mobility Plan (SUMP), which shall coordinate sectoral

policies on alternatives to cars, roads and parking by including cross-cutting challenges: protecting the environment, integrating urban policies with mobility policies, enhancing access to public transportation and improving travel safety.

- ❏ The French Plan de Déplacements Urbains (PDU) fosters partnership-based approaches. Various institutional and civil society stakeholders are involved throughout its development and assessment to take part in a mobility project meant for inhabitants and local activities.
- ❏ It calls for a separate master plan for active modes, including a combined pedestrian and bikes action plan, which shall serve as a planning tool to help local authorities to define their spatial planning policy and plan their investments.
- ❏ The key steps to be followed while implementing an active modes master plan include: Analysis (Assessing pedestrians and cyclists' characteristics and practices), Development (updating existing urban plans with the structure plan; Ensuring the structure plan and public transportation are fitting), Implementation and Assessment (Assessing in order to either confirm or review policies).

OUTCOME

- ❏ Equitable access to mobility is essential for integration with the community.
- ❏ Balance should be maintained between the quality and fare when providing public transport for the poor.
- ❏ Alternate and innovative public transport modes should be designed to suit the needs of such classes of people.
- ❏ Mobility planning should cater to the needs of all. Special attention should be paid for people with disabilities.

Audience in the session

- ❏ Common mobility cards and new technologies may boost people to use the public transport services effectively.
- ❏ For a PBS some of the major points such as site clearance, alternate site locations, network connectivity, redistribution of cycles and managing the high data of traffic flow shall be taken into consideration while designing and operating the system.
- ❏ A well-defined and well-distributed PBS system with all the necessary safety equipment's shall lead to a substantial modal shift from the motorised modes of traffic.
- ❏ Active mobility can be coordinated with

Panellist with mementos

larger public transport (car, buses, tramways, trains, metros) and included in new mobility practices (carpooling, car sharing, and bicycle sharing system).

- ❑ Stress should be laid to develop SUMP which will serve as a common platform for all sectoral policies to arrive at a common provision of inclusive mobility for all.

JOINT TECHNICAL SEESION 2: ELECTRIC MOBILITY

The transport sector is vital for enhancing economic growth and social connectivity, but it is also one of the fastest growing energy end-use sectors and is generating about 23% of global energy-related greenhouse gas emissions. The Urban Electric Mobility Vehicles Initiative (UEMI) of UN-Habitat plans to phase out conventionally fuelled vehicles and aims at increasing the share of electric vehicles in cities to at least 30% by 2030. However, the high uptake and adoption of electric vehicles depends on a number of factors, such as: advances in vehicle and battery technologies and reduction in costs of production; the availability of charging infrastructure, increased awareness of citizens, the enabling policy environment and incentives provided by the government (including city governments). In India an ambitious target of putting 5 million electric and hybrid vehicles per year on the road by 2020 has been set by the National Mission for Electric Mobility (NMEM). In addition to supporting the industry, NMEM seeks to create a significant positive impact on the health index of the country by promoting zero pollution electric vehicles and reducing dependence on fossil fuel. FAME India - Faster Adoption and Manufacturing of Hybrid and Electric vehicles in India - is a part of the National Mission for Electric Mobility. The scheme envisages providing financial support of Rs.795 crore in the first two fiscal years starting with the 2015 - 2016 financial year, to promote eco-friendly vehicles, offering incentives on electric and hybrid vehicles to the extent of Rs. 29,000 for bikes and Rs.1.38 lakh for cars. NUTP, 2006 also emphasised promoting the use of cleaner technologies and use of electric vehicles to reduce vehicular pollution.

The session deliberated on the need for electric vehicles, modes of electric transport like cable cars, buses, etc. and the future opportunities in the electric vehicle industry. The session elaborated on the new technology of electric vehicles and how it can be implemented in the cities, which would help in the reduction of pollutant levels.

- **Chairperson:** Dr. Sudhir Krishna, Former Secretary, Government of India
- **Presenters**
  - Smart and Connected Mobility for the Future - Mr Arun Vinayak, Chief Business Officer, Ather Energy
  - Electric Mobility for the City of Hyderabad - Subash Dhar, UNEP DTU
  - Electric Freight Transport – Mr. Jean-Michel Genestier, Deputy General Manager, SNCF Logistics

Opening Remarks by the Chairman of the session

- **Rapporteur:** Ms Mamta Batra, Under Secretary, Ministry of Housing & Urban Affairs

HIGHLIGHTS

- Smart vehicles will have the relevant controls built in. It will have the intelligence to optimise and limit the need for human interaction and improves efficiency, self-learning and built navigation.

- Electric vehicles can have a good start with strong enabling policies.
- The government is providing subsidies for electric vehicles infrastructure, investments and R&D under National Electric Mobility Mission Plan -2020.
- For vehicle fuel efficiency standards, labelling and penalties are in the process of implementation, including electric vehicles.
- Study was undertaken by UNED DPU to understand the existing supply chain for electric vehicles including support infrastructure, barriers, etc. which helps in identifying the likely improvement in EV demand.
- While purchasing EVs, the factors to be considered include availability of charging stations, initial purchase cost, driving range per full charge, top speed / acceleration / performance, maintenance cost / servicing costs, running cost, look and feel / styling, re-sale value, environmental benefits, vehicle variant and segment (Hatchback/ Sedan/SUV),

Presentation by Speaker

Chairman receiving memento

- Electric car, Hydrogen Car can make a boom with the support of incentives.
- Hyperloops are also being developed in the form of a capsule with passengers travelling at exceeding 1200 km/hour inside a vacuum tube. It uses power from renewable energy sources like solar energy, regenerative breaking and wind power.

OUTCOMES

- We must build a clean and connected smart mobility, clean in a design philosophy with over all resource utilisation. Connecting the designer to data from users can help achieve clean mobility.
- For Consumers:
  - Awareness about EVs and government schemes/policies related to EVs needs to be improved.
  - Reducing initial cost and offering

Rapporteur Briefing

financial incentives will nudge the consumers to take technical and operational risks associated with emerging technologies like EVs.

- Adequate public charging infrastructure (fast charging) would give confidence to consumers that they won't be stranded.

For Industry

- The component of EVs which is to be imported should be encouraged while pushing auto makers for technology transfer and development of local supply chain.
- Need for stable policy as is in Norway, China.

JOINT TECHNICAL SESSION 3: MULTIMODAL INTEGRATION: CASE STUDIES

India is a country with a diverse and varied culture, beliefs and faith, but the mobility needs of the people are common requiring integration of various modes spatially. Though there are various modes of transport systems from national to local levels, the inefficiency in integrating these modes makes it difficult for the commuters to use the public transport facilities. Also, the gap in first and last mile connectivity causes the commuters hassle and time loss in transit from origin to destination. The cause for this is the lack of sync in private and public transportation infrastructure and inadequacy of supporting facilities like parking, auto and taxi stands, bus bays, footpaths etc. A nodal agency like UMTA with full support of government is required to integrate these transit modes making commuting hassle-free.

The session discussed all such issues and approaches for integration of various modes from case cities all over the world. In today's world, the time factor is a major issue, so the different case studies from around the world would help the cities to understand the importance of multimodal integration.

- Chairperson: Dr. Mangu Singh, Managing Director, Delhi Metro Rail Corporation Ltd.
- Co-Chair: Mr. Pedro Ortiz, Urban Planner, Multilateral and Government Consultant.
- Presenters:
  - Setting-up a multimodal network - Ms. Annie Guillemot, Former President, SYTRAL and French Senator.
  - Multimodal integration: Case Study 'Rennes', Mr. Eric Diserbeau, Director Mobility and Transport at Rennes Metropolis (France).
  - Engaging Entrepreneurs to Provide Integrated Mobility Solution – Shri Amit Bhatt, WRI.
  - Access to stations and innovations in underground construction – Shri P.K. Bansal, MD, Chennai Metro Rail Limited.
  - Case study of KMRL- Shri. Praveen Goyal, Director (Systems), Kochi Metro Rail Limited.
- Rapporteur: Ms Rachna Kumar, Under Secretary, Ministry of Housing and Urban Affairs.

Presentation by Speaker

HIGHLIGHTS

- SYTRAL, an exclusive transport authority for Rhone county and Lyon area in France plays an important role in financing, supervising, controlling the transport system including service quality, standards, regularity, availability, cleanliness, safety and fare revision.

Presentation by Speaker

- The TCL (Transports en commune Lyonnais) urban transport system is the biggest multimodal system (excluding Paris) in terms of coverage and capacity. It has 1.7 million trips per day (2017), five tramlines (64 km), four metro lines (35 kms), 134 bus lines (1000 vehicles), eight trolleybus lines (131 vehicles), two funicular lines , six cars (1.2 km), four high bus lines (131 vehicles) and one ring and ride service for disabled persons.
- All metro, tramway and trolleybus stations are accessible to disabled people. In TCL network, three to four trips are operated by electric mode and 25% of urban travel represents only 3% of atmospheric pollution.
- PTA is responsible for multimodal network which includes long term urban mobility vision plan, integrated network, and single ticketing system.

Presenter sharing his view

- Rennes metropole (France) has two metro lines, Bus Rapid Transport and a bus network with 110,000 trips per day i.e. one third of total network traffic.
- In the outskirts of Rennes, buses run with a frequency of 10-30 minutes between the outlying towns and Rennes connecting to the metro. The "KorriGo" interoperable travel card is used throughout Brittany.
- At metro stations, there is a high demand for greater frequency and coverage of bus routes, better access to intermediate para-transit facilities at station areas, and better information systems for directions and trip planning.
- The key challenges in multimodal integration are innovation and investment, blurring lines between public and private decision makers at local and national level are struggling.
- The WRI study shows that Bengaluru has around 6.7 million vehicles, with every citizen spending on average 40 hours in traffic jams every year. About 5% of estimated GDP of the city is lost due to traffic congestion in Bengaluru. The Government is trying to tackle the problem through metros which are operating in a network of 42 km in Phase-I. It still needs, however, an effective mobility solution for first and last mile connectivity.
- BMRCL, TMF and WRI have launched the Station Access and Mobility Program (STAMP) last mile connectivity programme. The objective of STAMP is to leverage the city's technical and entrepreneurial abilities to infuse innovative ideas into the complex issues of access to public transit, and seamless urban mobility systems.

Audience in the session

- It is estimated that STAMP would attract 64% more passengers who could be metro riders and currently prefer alternative means of transport due to limited connectivity to the metro stations.
- Chennai metro rail network is connected with important transport hubs like Chennai airport, Chennai Central and Egmore Station, Chennai Mofussil Bus terminus, Suburban/MRTS network.
- CMRL initiatives towards better accessibility are Implementation of Multimodal Integration Strategy, Metro Feeder Services by City Bus Transport Operators, Formation of Chennai Central Square, Merger of MRTS with CMRL, Working Group of CUMTA, Introduction of Non-motorized Policy.
- CMRL stations are disabled friendly with the required facilities and features and have tied up with corporate big-wigs like OLA and UBER to enhance and promote last mile connectivity at several metro stations.
- Examples from global cities:

City	Institutional Framework	Multimodal Infrastructure Elements	Info-structure Elements	Integrated Payment Solutions
London	Transport for London (TFL)	Metro bus, light rail, trams, taxis	iBus: Web and mobile information systems IMAGEproject	Oyster smart card
Paris	STIF	Metro, tram, bus	Real-time traffic information	Navigo pass
Singapore	Land Transport Authority (LTA)	Metro (MRT), bus, light rail, taxis	Web-based and mobile (How2Go) information systems.	EZ-Link, NETS Flash Pay
Hong Kong	Transport Department, Govt. of Hong Kong	Metro, bus	Next train mobile app, passenger in formation display systems	Octopus smart card
New York	New York Metropolitan Transportation Authority	Metro, BRT (local) and Express Bus	MTA Bus time	Metro card

OUTCOMES

Presenter making Presentation

Speaker sharing his Views

- ❑ Ease of access to metro stations, other mass transit corridors and last-mile connectivity are the deciding factors for most in choosing it as their means of transport.
- ❑ Promote carpooling by allowing shared cars to use bus lanes and reserved parking, together with driver incentives.
- ❑ Integrating dynamic carpooling in a multimodal application that also includes the metro, bus, and bike networks.
- ❑ Staggering working hours and teleworking.
- ❑ Purpose of multimodal integration is to bring all the related aspects together i.e. infrastructure and operation, integrated payment, information structure and institutional framework.
- ❑ No single stakeholder can make a difference, and we need each one to be collaborative and work together to tackle the issues of urban mobility.
- ❑ Some of the key gaps which need improvements are bus connectivity and access, station facilities, auto-rickshaw/ taxi facilities, greater information for multi-modal transportation, convenient and affordable service offers like monthly passes for the metro, integrated ticketing systems across different modes of public transport, pedestrian infrastructure, private vehicle parking, etc.
- ❑ Need for optimization of existing parking inventory by aggregating parking spots, to increase accessibility to the metro.

JOINT TECHNICAL SESSION 4: GOVERNANCE, URBAN PLANNING AND MOBILITY

Institutional and governance frameworks are the structures through which political, technical and financial decisions are translated into resource allocations and priority setting for implementing urban mobility plans, programmes and projects. No matter how good the policy recommendations, their implementation is dependent upon how fit-for-purpose these institutional and governance frame works are to direct and manage resources and deliver them.

This session of Governance, Urban Planning and Mobility accentuated the importance of governance in urban planning and mobility, through parallels drawn from the City of Bordeaux. Representatives from the French Public Transport Authority and City Connect also presented their respective experiences on the theme of the session.

- **Chairperson:** Dr. M. Ramachandran, Former Secretary, Government of India.
- **Co-Chair:** Mr. Christian Curé, Director, CEREMA (Centre for Scientific Resources, expertise and Interdisciplinary techniques providing support for State Services and Local Authorities)
- **Presenters**
  - The Transformation of the City of Bordeaux, France – Ms. Anne Raimat, Bordeaux Metropolis
  - The Public Transport and the Role of Public Transport Authorities in France, Ms. Francoise Rossignol, elected member of GART (Association of French Public Transport Authorities)
  - How Roads built around Pedestrians Became a Reality: The case of Tender SURE in Bengaluru - Shri V. Ravichandar, City Connect
  - Sustainable Mobility Initiatives in Hyderabad Metropolitan Area, Shri C.S. R K. Prasad, Professor, NIT Warangal

Panellist sharing their Views

- **Rapporteur:** Shri Rupak Talukdar, Under Secretary, Ministry of Housing and Urban Affairs

HIGHLIGHTS

- Bordeaux Metropolis has 760,000 inhabitants and is the fifth largest conurbation in France. It has 28 municipalities. The city has 50% natural landscape in the form of green area and the remaining 50% is urban.
- The territory of Bordeaux is facing the challenge of urban sprawl and trying to prevent the consequences of population growth and urban sprawl with systematic mobility planning. The

aim of a digital centre located in the heart of urban complex is to develop -
identified sectors with growth potentials for e-marketing, smart motilities and green technologies.

Attentive Audience

- In Bengaluru, the Tender SURE model was used for road designing, construction and operation. The model drew on experiences of UTTIPEC and ITDP in India and globally, best case studies. It ensures the involvement of Government in the projects. The model has helped in making roads built around pedestrians.
- Sustainable mobility initiatives in Hyderabad Metropolitan area have been taken on the basis of provisions in various plans namely Metropolitan Development Plant –2031, Hyderabad Growth Corridor Ltd. – Outer Ring Road (ORR), Comprehensive Transportation study for HMA, ITS Master Plan for HMA, Highway Traffic Management System (HTMS) for ORR, and Contextual Refinement and Revalidation of CTS for HMA.

Remarks by Chairman

- To achieve 60% public transport share by 2041, Phase-wise (2015-21, 2021-31 and 2031-41) plans are proposed which includes proposed metro system, MMTS corridors, Regional Commuter Rail System, TOD and TOG Centres (Transit Oriented Growth Centres) along ORR.
- HMA has proposed ITS in three phases covering traffic signals, pedestrian signals, ATCC (Traffic Counters), CCTV, VMS, flood sensors, weather stations, pollution sensors and Proble car system.
- The urban mobility plan which helps in rebalancing mobility is mandatory by the LAURE law for the Urban Mobility Authority of more than 100000 inhabitants.

Presentation by Speaker

- GART is the public transport authorities in France which is a non-profit organization founded in 1980. Under this, 231 Public Transport Authorities (PTA) members, 181 Urban Mobility Transport Authorities (UMTA) members, 35 counties, 14 regions and Île-de-France mobilités (Syndicat des transports d'Île-de-France) are associated.

- The objective of GART is to promote public transport and sustainable mobility, and represent the Public Transport Authorities at national, European and international level.
- A law (MAPTAM, 2014) has transformed the Urban Transport Authority in Urban Mobility Authority with enlarged competencies such as car sharing, car-pooling, active modes (including bike rental services), organisation of urban goods delivery and urban logistics, to limit the congestion and pollution etc.

Speaker Sharing his Views

OUTCOMES

- Need to develop Urban Mobility Transport Authorities which should be responsible for urban public transport (bus, tramways, metros, transport on demand and people with reduced mobility).
- To promote sustainable mobility policies, the authority should represent the collective interests of the Public Transport Authorities (PTA) besides the national Government, the Parliament and the other institutions, to federate the actors in the transport sector.
- It should be the place of exchange of good practices to animate and stimulate the debate, to advise and evaluate projects, to propose legislative, regulatory, and technical evolutions.

Memento being presented to Chairman

- Need to create a pool of experts who may provide solutions to the important issues of sustainable mobility.
- Need to think about mobility planning in a global way and integrate mobility in all public policies in favour of housing, urban planning, tourism, education.
- Road hierarchy should give very high priority to pedestrians followed by public transport and medium priority to cars and other motorised personal modes of transport.

TECHNICAL SESSION 5: PUBLIC TRANSPORT

The rapid growth of India's urban population has put enormous strain on all transport systems. Burgeoning travel demand far exceeds the limited supply of transport infrastructure and services. Public transport, in particular, has been completely overwhelmed. Most bus and train services are overcrowded, undependable, slow, inconvenient, uncoordinated, and lack safety measures. Moreover, the public ownership and operation of most public transport services has greatly reduced productivity and the operation costs are inflated. India's cities desperately need improved and expanded public transport services. Various initiatives have been taken by the central government to develop this sector by giving grants. However, the initiative only benefits a few cities. Therefore, there is a need to understand the gaps and the development required to promote the public transport sector in Indian cities on a proper footing.

This session focused on the need and upgradation of public transport through modernizing city bus services and introducing the latest technology such as metro rail / tramways / light rail towards efficient public transport. It also provided peer learning for other cities who are planning to improve public transport or are in the nascent stage of development.

- **Chairperson:** Shri I.P. Gautam, Managing Director, MEGA.
- **Presenters**
  - Urban Rail Transit for Achieving Sustainable Regional Development – Shri V.K. Singh, MD, NCRTC.
  - BRTS: Shaping Tomorrow's Public Transport - An International Experience – Shri Suresh Chettiar, Chief Operating Officer, Volvo Buses – South Asia.
  - Transforming City Bus Service, Noida - Shri Kartar Singh, Deputy General Manager, Empire Transport Service Limited Noida.
  - Providing Public Transit in Small and Medium Towns – Shri S. Satyanarayana, Chairperson, Telangana State Road Transport Corporation (TSRTC).
- **Rapporteur:** Ms Rachna Kumar, Under Secretary, Ministry of Housing and Urban Affairs.

HIGHLIGHTS

- Regional Rapid Transit System (RRTS) is a high speed, high capacity, integrated railway network connecting outer suburbs to central districts. It is significantly different from MRTS in terms of design, operations and average speed. It will travel at three times the average speed of Metro. It will help in reducing road congestion, energy consumption and pollution,
- London cross rails, Germany Regional Rail, Japan Commuter, South Korea HSR, Taiwan HSR, China Intercity, Spain Cercanias, Paris RER, Bay Area Rapid Transit (BART) (San Francisco Bay Area in California) are some of the notable examples of regional rails around the world.
- In view of the decennial growth rate of 50% due to migration, increasing congestion and shortage of civic amenities, planning of Delhi within its regional context required in NCR and RRTS, is a step forward in this direction. It will be the fastest, safest and most comfortable mode of travel in the National Capital Region (NCR).

- It will connect four States and UT namely Delhi, Uttar Pradesh, Haryana and Rajasthan. Out of eight planned RRTS corridors, three prioritised corridors are taken up in Phase-1 which are Delhi-Panipat, Delhi-Meerut and Alwar-Delhi.
- National Capital Region Transport Corporation (NCRTC) is responsible for implementation of the project and work would be taken up under the Metro Railway (Construction of Works) Act, 1978 and Metro Railways (Operation and Maintenance) Act, 2002 as amended through Metro Railways (Amendment) Act, 2009. Land acquisition and R&R required for the project will be undertaken by respective state governments.
- Delhi – Meerut RRTS has considered innovative financing instruments like land value capture through sale of additional FAR, additional stamp duty, development fee and TOD Cess.
- The Volvo group is one of the World's leading manufacturers of trucks, buses, and construction equipment, marine and industrial engines. Its vision is to become the world leader in sustainable transport solutions.
- For a competitive city and intercity traffic, it has hybrids, electric hybrids and full electric buses with focus on low life cycle cost and strong aftermarket support. It has developed fast, reliable, environment friendly, attractive and safe BRT buses.
- In India Volvo has 6000 buses connecting 100 locations across the country. As part of public transport, it has over 10 years in operation in 35 cities. Premium buses in urban transport can save up to 50% fuel consumed. One can have metro like experience in buses.
- Success story of transforming City Bus Service in NOIDA is a notable example.
- Prior to launch of City Bus Service in Noida, Blue Line of DMRC up to Noida City Centre and DTC AC/Non-AC Bus service were available. However, in Greater Noida, commuters were majorly left to commute on personal vehicles and private Buses / Shared Autos, etc. There was no feeder service for existing metro stations available and comfort and safety of passengers were compromised.
- Some of the major features of Noida City Bus includes ITMS, GPS enabled vehicle tracking systems, electronic ticketing machines, PIS, panic buttons, stop buttons, etc.
- TSRTC is running 10,638 buses with 94 lakhs trips / day. It has received awards and recognition of best fuel efficiency, lowest accident rate and best tyre performance.
- With the assistance of Government of India under JnNURM scheme, the State Government and TSRTC have procured and deployed 117 buses for three small and medium cities – Karimnagar, Mahabubnagar and Khammam in Telangana.
- Telangana Sate is adopting dual strategies to combat the issues related to rapid urbanization i.e. making the villages self-reliant and financially strong and developing small and medium cities to meet the demand of urbanisation by better planning and providing good infrastructure.

OUTCOMES

- The rate of growth of population in small and medium cities is more than, that of bigger cities. Therefore, it is recommended that, in order to achieve sustainable mobility in small and medium cities, the Central Govt. should extend the financial assistance in the form of procuring ROLLING STOCK to the local bodies or Transport Corporations and funding the viability gap.

- There is need to provide Financial Assistance to Local Bodies for creation of road network and public conveniences like Bus Shelters, Bus Terminals and Bus Stations etc.
- As the sector of regional rails is not mature, government support is necessary during construction and operations which will mitigate the demand risks during operations.
- Land Value Capture may not be fully tapped during construction phase but can very effectively be utilized during operations.
- Government not only has to play the role of a regulator and facilitator, but also as an enabler.

TECHNICAL SESSION 6: LAND VALUE CAPTURE & TOD

Cities in developing countries are growing at a rapid pace. However, with fast economic growth and rising real income, motorization is also increasing, and its negative externalities are visible in the form of low density sprawl, traffic congestion, air pollution, greenhouse gas emissions and lack of mobility for already marginalised populations. Studies have shown that TODs – typically supporting higher density, mixed used developments around a transit station – are some of the most effective means of addressing these negative externalities of rapid urbanisation. Transit infrastructure is extremely costly and thus difficult to prioritize in cities where there are many other competing demands for scarce resources.

Recently, the Government of India has issued a policy on TOD and a framework for Value Capture Financing. The TOD Policy focuses on Land Value capture to raise funds for future development of urban infrastructure, including transit infrastructure. Financing transit-oriented development with Land Value capture methods proposed the use of "development-based land value capture" mechanisms to help overcome this financial crunch. Coupled with supportive land use regulations, development-based land value capture (LVC) helps in capturing increases in property values due to transit investments.

The session focused on initiatives taken in this area in the country and the challenges faced by them in implementing TOD. This would be useful for all cities to develop mass transit system. It demonstrated some of the best examples to provide guidance on how the cities have overcome the challenges of TOD and progressed further.

- **Chairperson:** Shri Abhay Misra, CEO, Mumbai Metro (one) Pvt. Ltd.,
- **Presenters**
  - TOD Experience in Hyderabad - Sri T. Chiranjeevulu, Metropolitan Commissioner, Hyderabad Metropolitan Development Authority
  - Challenges in Implementing TOD in Indian Cities – Prof. Shivanand Swamy, Executive Director, CEPT University, Ahmedabad
  - Implementing TOD: An International Perspective –Ms Jaya Dhindaw, WRI
  - Land Value Capture for Station Development- Shri S.K. Lohia, MD, SDC
- **Rapporteur:** Ms. Parveen Khurana, Desk Officer, Ministry of Housing & Urban Affairs

Opening Remarks by Chairman

HIGHLIGHTS

- TOD Support Principles and Tools include Public Private Partnerships; safety and security; universal accessibility; high quality transport systems; technology integrations right size infrastructure, etc.

- Land value could be increased through development / sale of land, partnership between transit agencies and developer, air rights sale, land re-adjustment and land consolidation and urban redevelopment.
- Land value capture mechanism comprises tax and fees based and land pooling and development.
- Some of the broad benefits of land value capture are:
  - It facilitates negotiations among governments, planning agencies, transit companies, developers, landowners and local stakeholders for mutual interests and benefits.
  - Promotes and supports Transit oriented Development.
  - Creating and sharing land value.
  - Helps cover the cost of Transportation Infrastructure.
  - Business, products and services more closely located and accessible.
  - Promotes inclusive development by improving mobility and access for all
  - Reduces pollution and unsustainable land development.
- In Nagpur Metro, an additional stamp duty of 1% is to be levied for 25 years on all property transactions.
- In Kochi, FSI of 3.00 is permissible in TOD areas with mixed land use development, multimodal integration, NMT and place making.
- In Ahmedabad station level TOD, special tax "betterment charge "is imposed on properties within 250 m. of the transit corridor. There is an increased FSI along transit corridor i.e. 1.8 to 3.6/4. Additional 2.2. FSI to be purchased from ULB. Ten per cent reduction in parking and income from sale of FSI / concession to be part of transport fund.
- Land pooling model in Hyderabad Metropolitan Development Authority has

Panellists sharing their Views

Presentation by Speaker

Speaker interacting with participants

been very successful. In the Uppal Bhagath area land owners got developed plots of 1000 sq. yards for each acre of land with a land value of approximately 4-5 crores as against the original value of 50-70 lakh per acre. One kilometre on either side of Outer Rind Road (ORR) is declared as ORR growth corridor for which special development regulations are issued. Total potentiality of ORR growth corridor of 158 Kms. is Rs.7900 crores through land pooling model.

- Financing Model for Redevelopment of Indian railway stations are as follows:
  - Capital and running cost of the project is financed through The Project Revenues and Station Facility Revenues.
  - Revenue from Commercial Development on Sparable Land and Air Space.
  - Revenue from Station Development component – except train tickets, platform tickets and Rail Display Network.
  - The guiding principle for design of station development are City Center, Convergence, Convenience, Communication, Congestion Free, Conservation, and Cleanliness

Presentation by Speaker

- Based upon experience so far and feedbacks from various stakeholders, the following decisions have been taken for the redevelopment of railway stations
  - Single agency to redevelop the stations – IRSDC (Indian Railways Station Development Corporation)
  - Lease term of land is to be enhanced
  - Finance ministry has approved station redevelopment to be infrastructure project
  - Permitted multiple sub-leases and residential developments
  - Comprehensive development having offices, malls, markets, residential facilities
  - Timelines for approvals from railways

Participant posing a Question

- Some of the TOD practices in the world are as follows:-
  - In Bogota Trans Milano BRT, a transportation demand management technique is used to lessen traffic congestion connecting affordable housing: Metrovivienda It provides service land on which private development entities can construct affordable housing for low income groups on the areas near transit so that low income group can afford shelter and transport together.

Speaker making Presentation

- Hong Kong SAR adopted land value capture as a tool for mobilising finance through rail and property programme. Involvement in all property related activities produces 62% of total income (more than twice as much as fare).
- The Hong Kong Mass Transit Railway Corporation (MTRC) is operating without government subsidy and is highly profitable. Around 80% of the total income of MRTC comes from property business.
- In Tokyo there is an inclusive land value capture scheme while in Bogota Contribution de Valorisation is a form of betterment taxation.

Panellist receiving Memento

- In Curitiba (Brazil), the government mandated all medium and large scale urban development along BRT corridor. The concept of Trinary, three parallel roadways with compatible land use and building heights that tapers with distances from BRT corridor. The 1st two floors along the busway are not counted against FAR and are devoted to retail use. Above second floor, building must be setback at least 5 m from plot line to allow sun on busway.
- In North American Cities, TOD is used as an economic model to improve productivity. In European cities TOD as liveability and accessibility model is used to improve the quality of life. In South American cities TOD is used as a means to integrate land use and transport to improve connectivity. The Asian model of TOD is used as a co-development model to create funding for development.

OUTCOME

- TOD makes it possible to live a lower stress life without much dependence on private transport for mobility. It reduces dependence on driving and provides opportunity to the residents to live, work and play in the same area.
- It reduces the area's carbon footprints or negative impact on the environment, provides better access between urban and suburban areas, revitalise urban areas etc
- For successful implementation of TOD, lessons learned from international experience would be helpful. They are:
  - Political economy, leadership and vision for the city.

- ➢ Appropriate institutional structures and Intergovernmental & metropolitan collaboration.
- ➢ Community and PPP participation.
- ➢ Planning, Regulation, and Finance
- ➢ Leverage capital and Implementation
- ➢ Creation of democratic, transparent, and fair processes.
- ➢ Allowance for adjustments over long-term market cycle.

Presentation by Speaker

❑ Way forward for redevelopment of railway stations are as follows:

- ➢ Engage developer after "de-risking" the project from clearances
- ➢ Revise method of redevelopment – no Swiss challenge
- ➢ All non-fare revenue stream to go to developer
- ➢ Reorganize IRSDC and RLDA

TECHNICAL SESSION 7: DESIGN, FUNDING AND IMPLEMENTATION OF A TRAM SYSTEM – (SESSION ORGANIZED BY BORDEAUX METROPOLIS)

Tramways or light rail transit (LRT) is a medium capacity mode of mass rapid transport which straddles between the heavy capacity Metro rail and the low capacity bus services. It is a form of rail transit that utilizes equipment and infrastructure that is typically less massive than that used for heavy rail modes i.e. commuter/regional, and metro rail/subway. A few modes such as people movers and personal rapid transit could be considered as even "lighter". Tram is a mode as currently operating in Kolkata and possibly a few more cities around the world. However, most tram systems operating around the world are the upgraded version of tram and designated as LRT.

Modern LRT - even though not yet used in India (old trams operate in Kolkata) - deserves serious consideration for use as a mode of medium capacity mass rapid transport. Before going further, it will be useful to review the various other modern tram services existing around the globe.

This session provided an insight to the design, funding and implementation of a tram system, along with experience sharing by Indian counterparts from Hyderabad.

- **Chairperson:** Ms. Anne Raimat, Bordeaux Metropolis
- **Co-Chair:** Mr. Etienne Lhomet, Transport Expert, CODATU/DVDH
- **Presenters:**
  - Presentation of case studies from Bordeaux, Ms. Geraldine Di Matteo and New Delhi, Mr. Vincent Lichere, Suez Consulting
  - High capacity tramway, Experience sharing from Keolis and Egis Rail
  - Introduction of the Projects in Hyderabad, Shri Navin Mittal, Government of Telangana
  - Introduction of the Projects in Kochi, Shri G.P. Hari, KMRL

HIGHLIGHTS

- Bordeaux, the 7th largest conurbation in France, houses 740,000 inhabitants and is expected to increase to about 1 000,000 by 2030, which would account for about 1 million extra journey per day by 2030.

Panellist sharing Views

Audience in the Session

Speaker making Presentation

- The metropolis has evolved an integrated transport policy which acts on all modes of transit. This provided a holistic multimodal connectivity across the metropolis.
- Urban planning in the metropolis has been centred along the tramway, to provide a holistic upliftment of the city street-scape.
- It is important to understand whether only new infrastructure is important, or technology also plays a major role in providing the appropriate modal solutions. Transport plays a significant role in shaping the development of any city, and thus an integrated urban transport approach is the need of hour.
- It calls for a joint effort, whereby urban planning and transport planning should draw parallels to maximise the results and achieve the desired goals.
- Planning of mass transit lines like trams shall assist in decongesting the major streets, as it helps in rationalising the on-street traffic. This further encourages the car drivers to change their routes or transfer to the mass transit mode.
- Needless to say, the new tram system should amalgamate with the city aesthetics and should balance with the other street users.
- Keolis systems, discussed about the key success factors for a tram system in developing countries. One of the prime important features being integration within the built environment and urban environment.

Speaker sharing his View

- Articulation and integration with other elements of the transport system to provide the last mile connectivity or local transport systems is an important characteristic so as to make tram system the backbone of the transport system in the city.
- The demand and capacity requirement for a tram service is 5000 PPHPD OR 5000 pax/km of line per day in practice. The tram system should have a potential for capacity enhancement.
- The system should be attractive enough and should have a good frequency to provide continuous modal connectivity to the commuters.
- An equation of BRT shows that CAPEX in tram is four to 10 times more than BRT system. OPEX in tram is two to three times expensive than BRT.

- Egis consultants in their presentation highlighted some of the major challenges associated with a tram system at: stations and the overall traffic management.
- At stations it is essential to ascertain the stopping time, flow management, emergency evacuation, access control and urban deterrence.
- Tram services are more favourable in corridors which are wider than 15m and should rather be linear, should have single line with no overlapping and junction density shall be greater than 300 m.
- Egis (European leader in light rail engineering) has made a vital contribution in the revival and modernization of tramways.

OUTCOMES

Audience in the Session

- Tram provides at grade infrastructure, seamless urban integration with the existing infrastructure.
- Reduced cost compared to other mass transit options but has limited capacity compared to metro or BRT. Its capacity could however be increased by increasing rolling stock unit capacity, decreasing headways.
- Egis has launched a research program aimed at studying various aspects such as stations, systems, operations, energy, rolling stocks in order to reach a capacity of at least 12,000 persons per hour per direction.
- Issues for station to consider: stopping time, flow management, emergency evacuation, access control, fraud deterrence and urban footprints.

Memento being given to Panellist

- Emphasis should be segregating and alighting flows, no conflicts between passengers and reduced passenger boarding time.
- The concept of tramways will be more suitable in a wider corridor (>15m) rather than linear. There should be a single line and no overlapping of lines. The high capacity tram has better ability to integrate with dense urban areas.
- In the Indian context, suburban rail from 1928 in Mumbai, metro from 1984 in Kolkata and bus networks in various other metro cities are the notable examples of urban mass rapid transit. In large cities, LRT could be part of citywide MRT network as medium capacity feeder.

- Conditions in Indian cities are different from European cities because of higher levels of demand, congested roads and mixed traffic, limited ROW and practice of jay-walking. As such, a specific LRT system has to be designed in the Indian context.
- It may have elevated sections, robust rolling stocks, manned stations, priority for sustainable development, an inclusive transport etc.

Interaction among Delegates

TECHNICAL SESSION 8: CHALLENGES OF DEVELOPING MASS TRANSIT SYSTEMS IN DEVELOPING COUNTRIES

- **Presenters:**
  - Safe Acess Manual and Workshop, Shri Rajeev Malagi, WRI.
  - Case Study of Kochi and Presentation of the booklet on "The Experience of Kochi Metro project a Great Contribution to the History of Indian Metros", Mr. Mathieu Verdure, AFD and Ms. Marion Hoyez, CODATU. .

HIGHLIGHTS

- Kochi metro with a route length of 25.6 km and 22 elevated stations along a linear path goes right through the centre of the most congested road in Kochi.
- In Kochi metro, there is a successful partnership between Kochi Metro Rail Ltd. (KMRL), AFD – French Agency for Development, SYTRAL Transport Authority of the French city Lyon.
- In 2013, AFD provided financial support to KMRL through a loan accounting for 20% of the total amount of the Metro project.
- In 2015, KMRL started technical cooperation financed by AFD funds (800 K€) to work on implementation of urban pilot projects, definition of a strategy for maintenance and operation, reduction of operations costs and creation of a Unified Metropolitan Transport Authority.
- Design a seamless integrated public transport system, which is user oriented and not output oriented. It included all existing modes of public transport in the reflexion process of creating an accessible and integrated network for all citizens.
- KMRL project motto is implement one network, one fare, one timetable and to achieve this committed to create UMTA.

Panellist Sharing Views

Presentation by Speaker

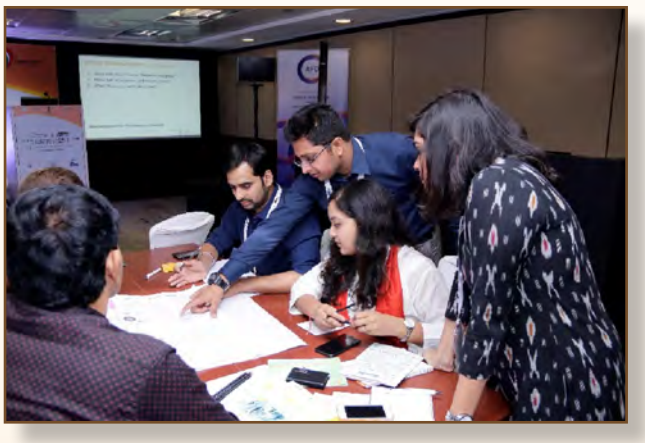
Interaction between Participants

- The project has been used as an opportunity to transform the city and its infrastructure to create a more inclusive and pedestrian friendly city having rethought on the use of public spaces.

OUTCOMES

- Institutional integration is essential to provide an efficient mobility service to the citizens, through the integration and interconnection of all modes of public transport in the city.
- Kochi EMV based smart card is a unique PPP model. It has agreement with AXIS Bank in this regard. Kochi One mobile App contains journey planner, generation of QR Code ticket for travel, payment of utility bills and information on lather city services and city life with the objective of getting the best out of the intelligent transport system.

Exchange of Ideas



- KMRL green initiative relies on societal and managerial innovations. It has an efficient communication strategy taking full advantage of professional compunctions.
- Public transport system should be user oriented and not output oriented. This shall entail more affinity towards public transit.

TECHNICAL SESSION 9: MAINTAINING EQUITY IN URBAN TRANSPORT IN DEVELOPING COUNTRIES - ISSUES AND CHALLENGES

Mobility flows have become a key dynamic in the rapid urbanisation process of Indian cities with urban transport infrastructure constituting the skeleton of the urban form. Despite the increasing levels of urban mobility in Indian cities, access to places, activities and services is becoming increasingly difficult in terms of convenience, cost and time. With over a quarter of India's urban population below the poverty line, the mobility problems of the poor are of special concern. The unaffordability of private transport or the lack of public transit options forces this segment of the urban population to walk or cycle increasingly long distances, and, consequently, suffer severe pollution. As Indian cities continue to spread outward, those residents too poor to afford motorised transport will be increasingly put at a disadvantage, and further cut off from employment, recreational, educational, medical and other activity sites they need to access in the city.

The focus of the session was to explore the important role of transport policies and planning in the maintenance and furtherance of social progress in rapidly developing economies such as China and India and also highlight the broader perspectives and debates on the social role of transport and the opportunities for further research.

Presenters

- Activity – Travel Behaviour of Non-Workers in Different Income Group Households: Case of Bangalore City, Dr. M. Manoj, IIT Delhi.
- Addressing Equity Issues associated with Roadway Pricing, Dr. Tarun Rambha, IISc Bangalore.
- Bicycling in developing countries – the role of gender, Dr. Rahul T.M., Amrita Univeristy, Coimbatore.
- Service gap analysis of Public buses in Bangalore with respect to Women Safety – Prof. Ashish Verma, IISc Bangalore.

HIGHLIGHTS

- With limited or no information available for non-worker travel patterns, the policies in this sector have limited scope for non-worker travellers.
- They generally have absence of temporal fixities and high level of mobility, especially for females, elders etc.

Presentation by Speaker

Panellist Sharing his Views

- In Bengaluru, 56% of the population accounts for non-working group and have 10.5% of the total daily trips.
- In a study on stop making behaviour by activity type and income in the city of Bengaluru, it was observed that, low income households group makes more visiting stops than their counterparts in the U.S. The same study further reflected that Low-income household in India spend more time on in-home maintenance activities than their counterparts in US.
- While framing policies for such income groups, it should be taken into consideration that the average walk trips is about 2.3 km and walk trips account for almost 80% of the total trips associated with them.
- Discussions highlighted on how to maintain an equity roadway pricing to deal with the issues of congestion. It was iterated that there may not be paths which are left for toll free, forcing everyone to pay.

Presentation by Speaker

- These issues can be resolved using minimum revenue models. The model should be such that it counters the general hypothesis that tolls are regressive i.e. it favours the rich over poor.
- Bloomberg's congestion pricing proposal in NYC predicted that Manhattan residents would make more trips and pay less compared to the other boroughs.
- It is critical to assess the way the collected tolls are redistributed to allow for an equitable congestion pricing framework. Some of the common options to redistribute revenues are: Lump sum rebates, Capacity improvements and increased public transport funding.
- Talking on the gender differences in transportation it was apprised that women have lesser tendency to take risks and prefer cycle friendly environment. Women generally prefer e-bikes over normal bikes.

Speaker making Presentation

- Some of the major challenges for women travellers for using bicycles include the dresses worn, higher environmental consciousness etc.
- Statistically 92% of the women feel insecure in all major economics centres in Indian cities, iterating the fact that there is a huge service gap in public buses in India.
- Not much research has been done to understand the perception of safety and issues faced by women while travelling in public

buses. The study undertaken shows, 76% of the women travellers feel unsafe at the bus stops, while 80% of the women travellers feel unsafe while boarding and de-boarding the bus.

- ❏ Infrastructure is one of the pivotal factors that influence how safe women feel while travelling. Properly lit bus stops, levelled footpaths and security alarms will improve the perception of safety in women's mind.

OUTCOMES

- ❏ Stress should be laid on understanding the travel patterns of non-workers, which contribute to substantial trips in any city.
- ❏ With higher walk trips attributed due to these income groups, policies should be framed according to the needs of the group.
- ❏ Equity in traffic calming measures such as road pricing should be maintained to allow for an equitable usage of resources by all sections of the society.
- ❏ Toll prices should be such that they should work on the minimum revenue models. A sense of equality for the rich as well as the poor shall be there.
- ❏ Redistribution of funds collected shall be done very diligently, on aspects such as lump sum rebates, Capacity improvements and increased public transport funding.
- ❏ Steps should be taken on the war footings to create a sense of security for women travellers in public transport buses; otherwise they will ultimately shift towards private modes of transit.
- ❏ Appropriate ancillary infrastructure should be provided to create a sense of security in the minds of women travellers.

Participant posing a Question

Interaction by the Participant

Participants Interaction

TECHNICAL SESSION 10: THE FRENCH EXPERIENCE OF SUSTAINABLE URBAN DEVELOPMENT

This session was centred around the experience of one city (Strasbourg), one manufacturer (Poma), one operator (RATP Dev Transdev Asia) and one engineering consultant (Artelia) and discussed the challenge of moving towards more sustainable urban development bringing out their failures and successes and sharing their vision of tomorrow's priorities.

- **Chairperson:** Mr. Guy Lebras, Director of GART (Association of Public Transport Authorities)
- **Presenters:**
  - The role of Trams in the City of Strasbourg - Mr. Jean-Baptiste Gernet, Deputy Mayor, Strasbourg
  - Case study of Medellin Metro Cable - Mr. Benjamin FAUCHIER-DELAVIGNE, POMA
  - Lessons learned from Mumbai Metro One - Mr. Paul Gardey de Soos, RATP Dev Transdev Asia
  - A 3D sustainable city simulator for Santiago - M. Timothee Mangeart, Artelia City & Transport

Opening Remarks by Chairman

HIGHLIGHTS

Presentation by Speaker

- Medellin City is built in a large valley between hills having the most successful urban cable cars with extensive operating hours; i.e. 20 hours per day with 99.8% availability. In the last 10 years it has an average time saving of 80 minutes per day for public transport users. Environmentally it reduced 1, 21, 00 tons of CO2 emission during 2010 – 16 under the UN CDM programme and the city received a grant of US $ 1.9 million for this period.
- The transport infrastructure investment to connect Central East part of the city (350 000hab) includes Tram line (TA) of 4,2km with 12 tram-trains, two Metro Cable lines (M & H) as feeder of TA and one 13,000m² of new public spaces, green area, bike paths, etc.
- In 2011, French Agency for Development (AFD) provided a grant of US$ 250M loan to Medellin city which included US$ 250M for loan financing, management and operation, implementation and infrastructure operation and maintenance to Metro de Medellin)

- In 2016, tram line and « H » Metro Cable line completed and open to public and recorded a ridership of 269,000,000 passengers/year.
- POMA Leituer has provided urban ropeways in Algeria, Brazil, Colombia, France, Georgia, Korea, Taiwan, Turkey etc.
- RDTA created in 2009 is the exclusive J-V for Asia between the RATP group (Aaris Metro) and Transdev. The group has been operating and maintaining landmark systems such as the Seoul Metro line 9, Mumbai Metro, HK Tramways, Manila, LRTI, bus operations in China.

Panellist Sharing his Views

- RDTA O&M sustainability vision is threefold: 1. Safety of the system: a must have 2. Operating and maintaining the system in an eco-friendly way 3. Helping the asset owners to make them more sustainable, ensuring that for all parties (operator, asset owners, society) that the business model is sustainable.
- Key challenges in operating & Maintaining the metro system in an eco-friendly mode are balance between trains' speed, escalator on/off or on-board temperature vs environment impact, waste sorting & collection and noise reduction
- Artelia company has set up a simulator, an analysis framework based on existing sustainable urban development framework for Santiago city which includes urban density, social equity, economy and jobs, urban connectivity, cultural identity, nature in the city, use of resources, quality of life, natural hazards and climate change, urban safety and sustainable mobility.

Delegates posing a Question

- The approach adopted by Artelia is divided into three phases which are scan, strategies and solutions. Scan allows everyone to understand the challenges currently facing cities, strategies visualise and understand the changes, and the solutions make a connection with the concrete innovative solutions for the city.
- The simulator is also an opportunity to bring together a large number of public

Audience in the session

decision-makers around a shared message and vision to guarantee a successful outcome for the sustainable urban development project. It is also an opportunity for discussions with influential players in the private sector.

- ❏ Strasbourg located on the river Rhine in France has a population of 5, 00,000. It is promoting sustainable urban development through mobility policy which promotes one mode of transport over others and in turn leads to city transformation. Car traffic is avoided in the city centre.
- ❏ For rebalancing the modal share, the motto of policy is to provide the right transport mode for each distance. It promotes new building techniques to save energy and new ways of living and moving.

OUTCOME

- ❏ The key success factor for running a mass transit system in a city is 'One single operator for One integrated network'.
- ❏ Designing and building a sustainable system is different than operating and maintaining it sustainably.
- ❏ To make the system more sustainable, best practices solutions around the world are local recruitments, LED PIDs or tube lights in stations, solar panels on the roof, paperless organisation, waste sorting in stations, motion-sensor light switches, smart ticketing solutions, electric utility vehicle fleet and Multimodal Transit Hubs.

Interaction by Panellist

To deliver the expected benefits to the society, Public Transport should ensure excellent customer experience and there is a need to protect financial equations for a sustainable business model.

TECHNICAL SESSION 11: SHARED MOBILITY

Though shared mobility options such as car sharing have been around for decades, it has been a niche phenomenon. Now the omnipresence of mobile digital devices brings together supply and demand in real time and on an unprecedented scale. This makes a market for shared mobility more visible and more relevant for policies that aim to shift mobility patterns.

India is witnessing rapid urbanization and motorization. While the urban population is growing at a rate of 3.16% per annum, motor vehicles are growing at a rate of 9%. Still very few Indian cities have organised and regulated shared mobility systems. The shared use of a vehicle, bicycle, or any other mode – is an innovative transportation strategy that enables users to gain short-term access to transportation modes on a needs-based basis. Shared mobility may range from car sharing, bike sharing, rider sharing (carpooling and vanpooling) to on-demand ride services. It can also include alternative transit services, such as paratransit, shuttles, and private transit services, called micro transit, which can supplement fixed-route bus and rail services. It would also extend the catchment area of public transit, potentially playing a pivotal role in bridging gaps in existing transportation networks and encouraging multi-modality by addressing the first-and-last mile issue due to irregular IPT systems related to public transit access.

The Session focused on the regulation and upgradation of existing intermediate Public Transport through best practices and use of technology in providing inclusive mobility for cities. This helped in understanding the requirements of shared mobility as an alternative mode of public transport in Indian cities.

- **Chairperson:** Shri Kumar Keshav, MD Lucknow Metro
- **Presenters**
  - Mobility Management in Mega Cities using Shared Mobility Options – Shri Shailesh Kumar, OLA
  - Bus Service: an Option of Shared Mobility – Shri Amit Singh, Co- founder, Shuttl
  - Regulating IPT – Ms Akshima Ghate, TERI
  - Collaborating Supply Chains in Urban Areas - Shri Anirudh Batwara, co-founder, UDAN Logisure
- **Rapporteur:** Ms Mamta Batra, Under Secretary, Ministry of Housing & Urban Affairs

HIGHLIGHTS

- In shared mobility, guarantee, efficiency and convenience are very important in terms of point to point share, route-based share, random share and share routing.
- OLA founded in 2011 is becoming India's most popular transportation app having a presence in more than 100 cities. It is used by over a million customers every day with a diversity of transport options. It saved 12 million kg of CO2 reduction, seven million liters fuel saved and reduced 84 million kms cab traffic.

- Mobility in a nutshell is a balance between demand and supply. If demand is more than supply fulfilment suffers and if supply is more than demand utilisation suffers.
- In the existing scenario large cities are still underserved by bus services and App based shuttle services are emerging as an option of shared mobility bus services.
- The experience of shuttle services shows a considerable reduction in congestion on roads where the service is being operated. 57% of users were using cars before shifting to shuttles. The existing shuttles can be moved to electric fleets if there is parity in cost ownership.
- The eco-system of the auto rickshaw sector comprises auto union, auto drivers / owners, traffic police, customers, manufacturers, service centres, financers, Transport Department, and competitors (OLA & UBER)
- There are various regulatory institutions for the auto rickshaw sector in India which are:
  - National Level: Ministry of Road Transport and Highways, the Central Motor Vehicle Act, 1988, the Central Motor Vehicle Rules, 1989, National Urban Transport Policy, 2006.
  - State Level: State Transport Department, State Motor Vehicles Taxation Act and Rules.
  - Local Levels: Regional Transport Authority, Police Department,
- Issues involved in the plying of auto rickshaws are as follows:
  - Should the auto-rickshaw system be restricted to contract carriage system or stage carriage system or should it be flexible contract carriage.
  - Permit issued be regulated by government or market and how to eliminate the role of mafia and black market.
  - Fare fixations should be based on formula for automatic fare revision or should be revised with revision in cost of fuel prices.
  - In terms of infrastructure, inadequate number of auto stands, and signage are the common problems in most of the cities.
  - Banks do provide loans with low interest rates.
  - Provision of GPS or panic button to ensure safety of passengers especially women and provisions for pollution check points are other critical issues.
  - Refusals to ply to given destination, overcharging, faulty / tampered meters, rude arrogant behaviour and harassment are common complaints of the customers.
- Case study done for Bangalore NAMMA autos shows that auto rickshaws have the potential to be the most user friendly, efficient, cost effective mode of transport.
- In the existing scenario of freight movement, there are many internal and external barriers within urban logistics which are:
  - No specific policy and involvement of multiple agencies like Traffic Police, Regional Transport Office, Urban Development Authorities, Municipal Corporations, Industrial Boards etc.
  - The sector is highly unorganised dominated by small service providers like agents, distributors, small transporters etc.
  - Non-existence of comprehensive, easy to use and cost-effective technology solutions.

- ➢ In the above background, delivery optimisation shared transportation (DOST) may provide solutions in the form of bridging the gap by removing barriers of collaboration and aligning their interests and connecting all stakeholders. It also provides a digital platform for shared urban transportation and connected supply chains.

OUTCOME

- ❑ Shared mobility and Public Transport system are becoming necessary in view of the traffic congestion, pollution and reducing average speed.
- ❑ A vision for the future of shared mobility is to optimize sharing by maximizing occupancy with reducing the number of cars on the road; maximizing the value of each ride and fleet and balance convenience with efficiency.
- ❑ The current scenario of transportation in India calls for the combined forces of all stakeholders to create a sustainable and strong mobility ecosystem.
- ❑ Shuttle service is cutting edge technology, making it the safest way to commute. By using the technology and data, demand driven dynamic routes can be designed to ensure occupancy.
- ❑ Auto rickshaws have the potential to be the most user-friendly, efficient, cost effective mode of transport. They can complement other modes of public transport.

TECHNICAL SESSION 12: FINANCIAL PLANNING FOR URBAN TRANSPORT PROJECTS

Indian cities are witnessing tremendous urban growth which has resulted in a generation of high level of travel demands. Therefore, in order to support such a high level of travel demand, there is a need to develop sustainable mass transit systems in cities. However, to provide adequate transit facilities and to operate and maintain the same, large scale investment is needed. With billions of dollars to be spent on various urban transit projects in the country, it is necessary to use innovative financing mechanisms capturing the gains from various ancillary infrastructures associated with it. The financial sustainability of these systems need to be studied in detail to opt for better and viable alternative. The trends in the past have been to rely on the budgetary support from Government organizations and loans from multilateral / financial institutions.

The session focussed on keeping a balance between bankability and affordability for urban transit projects. The session helped the listeners to understand the issues related to financing of urban rail and other land based urban transit projects such as BRTS and explore options such as PPP transit development.

- **Chairperson:** Shri P.S. Kharola, MD, Bangalore Metro.
- **Presenters**
  - Dr. Rohini Balasubramanium, Lotus Environment Consultants Inc.
  - Bangalore Metro Rail Corporation Limited
  - Non-fare box revenue initiatives by Maha-metro, S. Sivamathan, Director (Finance)
- **Rapporteur:** Shri Rupak Talukdar, Under Secretary, Ministry of Housing and Urban Affairs

Presentation by the Panellist

HIGHLIGHTS

- The session highlighted the relevance of carbon finance in financial planning of urban transport projects. Carbon finance provides significant influx in funds.
- Carbon finance can be sought for a time period of five to seven years and is applicable to all Government schemes such as FAME, Smart city, Green mobility etc. Carbon finance catalyses the carbon market and thereby carbon pricing.
- In Bangalore, most of the roads are over saturated, low speeds causing heavy pollution and huge loss of precious man hours and inability to increase the road space. These problems compelled authorities to target a mass transit system in the metro as the possible solution.
- Bangalore Metro is expected to save 50% to 75% of the commute time for the city dwellers.

Other social benefits such as reliability, reduction in accidents, reduced VOC, increased average speed is part of this.

- In the Namma Metro, regenerative brakes reduce 1/5th energy per passenger kms, in comparison to road transport. The system boasts 99% efficiency in terms of punctuality. The city has largely reduced the amount of CO2 production along with lesser noise and air pollution.
- BMTC is determined to integrate this new metro rail with the other existing modes of transit in the city, to provide a holistic service to the city.
- The metro rail had a surge of 58% in fare box revenue in the year 2015-16 from the year 2014-15. The revenue increased to 30% and the expenditure increased to 46% from the previous year.
- Consolidated project cost of Maha Metro is Rs. 8680 crores and expected project FIRR of 10.35% with non-fare box revenue. It has deciphered the following possible sources of non-fare box revenues:
  - Collection of additional taxes in the form of 1% additional surcharge on Stamp Duty.
  - Transit Oriented Development along the NMRC Corridor (TOD)
  - Property development along the NMRC Corridor.
  - Advertisement (including wrapping and station naming)
- Government of Maharashtra vide notification in the Gazette, allowed for recovery of 1% of additional surcharge on the stamp duty, and has resulted in non-fare box revenue of Rs. 60.05 Cr till date.
- An additional FSI has been permitted at four for plot size >2000 sq. m, three for plot sizes between 1000 and 2000 sq. m. and two for plot size less than 1000 sq. m. The organization has also allowed for various types of property development viz., property development spaces, property business spaces, advertisement spaces etc.

Speaker making Presentation

Audience in the session

Audience in the session

- As per the approved DPR of NMRP, it is expected that 35% of the Revenue to be accrued for Nagpur Metro Rail project shall be from non-fare box revenue.

OUTCOMES

Presentation by speaker

- Innovative methods of financing need to be adopted.
- Carbon finance has emerged as an alternate to the traditional funding criteria adopted for the Government run projects.
- Investing in large metro projects reaps huge benefits like significant travel time savings, environmental benefits, social benefits etc. as in the case of Bangalore metro rail.
- Many alternate sources for non-fare box revenue can be sought after by the metro projects which are large capital intensive.
- Cities like Nagpur has successfully implemented some of these non-fare box revenue options such as higher stamp duties, higher FSR and TOD.

TECHNICAL SESSION 13: HOW TO BOOST URBAN OR SOCIAL PROJECTS THROUGH TRANSPORT PROJECTS DYNAMICS?

The objective of the session was to discuss the "inclusive cities", beyond the strict domain of urban transport, and analyse how the definition of a mobility policy or the construction of new infrastructure can represent key opportunities to make cities more inclusive (better access to housing work, equipment and social communities).

The session focussed on four questions: How to foster local development and short distances? How to develop sub-centres around major transport hubs? How to take a transport project as an opportunity to develop public spaces? How to anticipate or solve the urban edges created by transport infrastructure?

Presenters

- Case studies from Lisbon and Lausanne – Mr. Julien Allaire, Director of International Affairs at Transitec
- Mobility planning in France – Mr. Thierry Gouin, Cities and territories, CEREMA
- Case studies from Ouagadougou (Burkina Faso) and Lyon (France) – Mr. Thibaut Descroux, Town Planning Agency of Lyon
- Case studies from Curitiba (Brazil) and Medellin (Colombia) – Mr. Pablo Salazar Ferro, CODATU
- Dialog with Shri GP Hari, Additional General Manager, KMRL

Esteemed Panellist for the session

HIGHLIGHTS

- In Lyon City (France), development of street networks or urban redevelopment or housing upgrading, walkability, pedestrian spaces, crossings, bicycle lanes, bus dedicated lanes, future tramways are being considered at the planning stage.
- The experience in French cities shows that all these re-developments take time to develop, be decided on and implemented. It requires a strong political will and integrated institutional mechanisms, social cohesion and inhabitants' involvement.
- Traffic calming measures on a smaller scale would reduce speed of vehicles, create parking places, increase the space dedicated

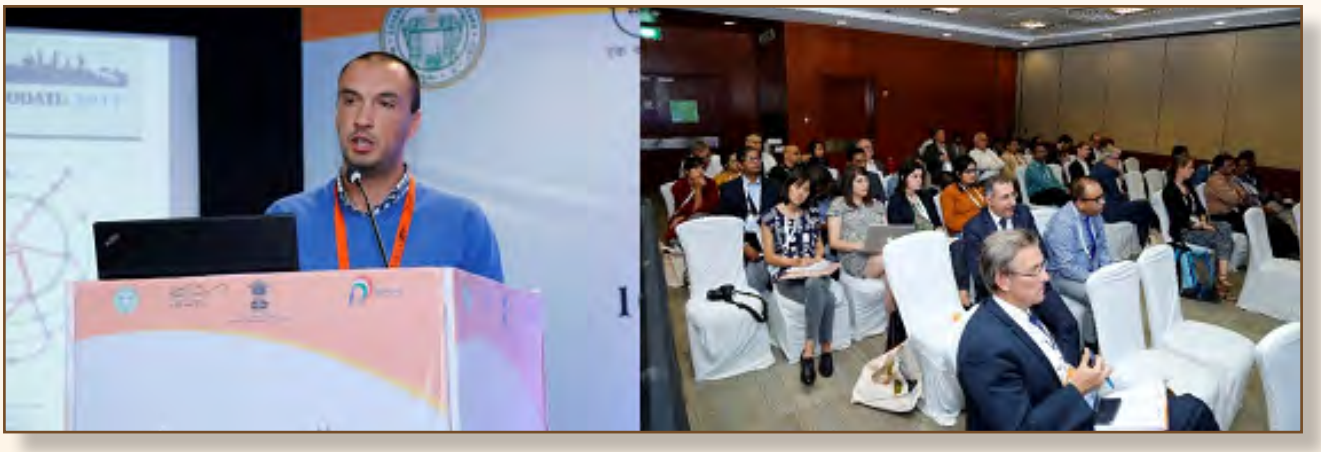
Audience during the session

to pedestrians and cyclists, facilitate the movement of non-motorised trips. It could be done with high investment (high quality pavement, etc.), but it could also be done with very simple painting and with participation of inhabitants.

OUTCOME

- ❏ In the urban renewal projects such as widening of roads, pedestrian accessibility parking and quality of public spaces are considered while adapting the road cross sections.
- ❏ Traffic calming measures improve the quality of life in neighbourhoods.

Speaker making presentation **Audience in the Session**



TECHNICAL SESSION 14: INTELLIGENT TRANSPORT SYSTEMS FOR URBAN MOBILITY

Information accuracy and the speed of decision-making are of paramount importance in managing today's mobility of goods and people inside the city. Intelligent Transport Systems (ITS) can provide road users with updated information and forecasts on both traffic and weather conditions. The result is higher efficiency in the use of resources and a better management of physical flows. ITS can provide authorities with city-wide visibility across the entire transportation network and the city services that depend on it to improve incident responses. When combined with analysis capabilities, it can evaluate traffic patterns and predict the arrival of public transits to help alleviate congestion and improve commuter satisfaction.

The session focussed on the role of ITS in improving urban mobility in cities and also how safety can be improved with the usage of these technologies. The session highlighted the importance of ITS and its importance in providing safer and efficient mobility.

- **Chairperson:** Shri R.K. Singh, Chief Engineer, Lucknow Metro
- **Presenters**
  - Mobility Demand Estimation in Smart Cities Using Mobile Phone Data, Dr. Rajesh Krishnan, CEO, ITS Planners and Engineers Ltd.
  - Role of ITS in Urban Mobility – Dr. K. Ramamurthy, Chief Mechanical Engineer, KSRTC
  - New Mobility: Good for Society and the Environment? – Ms. Jyot Chaddha, WRI
  - Open Loop Payment Systems – Shri Nalin Bansal, National Payment Corporation of India
- **Rapporteur:** Shri Ambuj Bajpai, Under Secretary, Ministry of Housing and Urban Affairs

HIGHLIGHTS

- Origin and Destination (OD) estimation for smart cities can be done in a better way through mobile phone data using calls, SMSs, E-mails, WhatsApp's etc. Anonymised Call Detail Records (CDR) and Location Based Service (LBS) data available from mobile operators contains subscribers' movement patterns.
- Advances in ICT enable processing of large data sets (a.k.a. big data and fast data tools).
- In a case study of Mumbai, between Colaba and Dadar, having an area of 67.7 sq. km and a population of 3.3 million, which was divided into 36 Traffic Analysis Zones (TAZ) and three external zones, the following was noted:
  - Geographic location of cell towers was used to generate Voronoi cells. Voronoi cells were merged to form TAZs, roughly mapping of localities.
  - Mobile Phone Data (CDR data) from roughly 15% of population supported by manual traffic survey for calibration. In this case accuracy evaluation was done.
  - Screen line count error was 9.6%.

- Data and reports generated through ITS can effectively be used by depot managers and traffic operation teams for analysis and continuous improvements.
- Application of ITS in Mysore city by KSRTC helped improvements in operation in the following aspects:
  - Reduction in average passenger wait times from 20 minutes in 2012 to 12 minutes in 2016.
  - Higher number of users in Mobile APP, SMS, portal.
  - Higher fleet and crew utilisation.
  - Improved modal share to KSRTC buses from 39.8 in 2012 to 46.3., in 2016 (est.).
  - Winner of National e-Governance Gold Award.
  - Reduction of staff in Central bus station.
  - Savings on lubricants and filters.
  - Benefitted Rs. 6 cr savings in 2015-16.
  - GoI showcased Mysore Intelligent Transport System through video during Hon'ble Prime Minister of India visit in UN Climate Change Conference, COP 21 in Paris held from 30th November to 11th December 2015.
- Based on the actual time required for trip operations, the time-table can be re-organised. It helps in reinventing ownership and delivery using data and connectivity in new ways.
- Global trends and practices in respect of on board ticketing are paper tickets, tap in, tap out and in off board ticketing. It is ticket media followed by validation.
- As per RBI, an Open Loop Instrument must have the following conditions:
  - Acquired by a bank.
  - Easy and convenient to use by consumers so as to enable deeper demographic penetration of the system among the masses.
  - Security features to ensure safety of data and money and should be PCI – DSS compliant.
  - Inter-operable across wide avenues of usage i.e. it should be accepted by all merchants.
- NPCI was entrusted by Ministry of Housing and Urban Affairs (MoHUA) to prepare the standards and specifications of the NCMC which is an interoperable, open-loop, EMV based contactless payment product. This advanced and secure card can be used for all payment applications including transport (Metro, bus etc.), toll plazas and shopping. For payments lower that INR 2,000 the customers can simply tap their card and the transactions are processed in a matter of seconds.
- It is already launched by Ahmedabad Municipal Corporation, Kochi Metro and BMTC Bangalore.
- Various challenges involved are as follows:
  - Huge CAPEX investment and/or pay out of royalty by FIs to PTOs.
  - Nonexistence of centralised agency to monitor the adoption of NCMC standards by PTOs.
  - Adoption of closed loop card model by some of the existing big transit operators to save time / cost thus dependency on single FI for issuance.

- Nonexistence of standard fare collection system for transit operators.
- International card schemes promoting and implementing proprietary standards for contactless payments leading to delay in adoption of NCMC.

OUTCOMES

- Major benefits of ITS include real time information on bus arrival and departure, real time tracking, next stop bus announcement and display within the bus, reduced waiting time at bus shelters, comfortable Trip planning, value added SMS and IVRS Services etc.
- There is a need to act Government as a regulator without curbing innovation e.g. flexible routes, as safeguard for setting standards for quality of service, as contractor to pilot new contracting models, and as provider of enabling infrastructure including physical and digital
- Cities must set a vision for what they want to achieve with technology, rather than letting technology set the agenda
- Need to adopt one bank card which may have multiple use like wider range of payment options, greater adoption, common standards, integrating / seamless travel, focus on core area of transit, third party revenue, reduced fraud and improved management system.
- Card based fare collection is the most prevalent technology with on-board ticketing and largely used for urban transport.

TECHNICAL SESSION 15: ALTERNATIVES TO MASS TRANSIT SYSTEMS

The last decade has witnessed the development of metro projects across the country. Currently metro is operational in 9 cities of the country and many more are under construction or in planning stage, primarily across the tier II cities. However, metro rail projects are highly capital intensive and require a significant contribution from the central and state exchequer. With more and more cities aspiring for mass transit systems, it is the need of the hour to start thinking of alternate solutions, which can be more technically and financially viable.

The aim of this session was to rethink the needs of our cities in terms of Mass Transit Systems, considering that a metro alone has never been the solution to the mobility requirements of a city. In some cases, a proper rationalisation of the existing bus network has been successful if serving the territory uniformly. Other cities have chosen to invest in light metro or LRT. This session urged to see beyond Metros and think in terms of adequacy for a particular territory

- **Chairperson:** Ms. Ashwini Bhide, MD, Mumbai Metro Rail Corporation
- **Presenters:**
  - The role of SOTRAL – Mr. Michael Tindano, MD, SOTRAL (Loné, Togo)
  - Restructuring the Bus Network – Ms. Michele Vullien, Counsellor to Lyon Metropolis, French Senator, Elected Member of SYTRAL
  - Cities need more than Metros – KfWs approach to Urban Mobility – Stephanie Rieger, Head of Urban Development and Mobility, KfW's South Asia
  - Light Metro in Urban Transport Sector – Shri S.D. Sharma, Director (Business Development), DMRC

Audience in the session

- **Rapporteur:** Shri Naresh Bharadwaj , Under Secretary, Ministry of Housing & Urban Affairs

Presentation by speaker

HIGHLIGHTS

- Rhone county (area: 2715km2) and Lyon area (533 km2) in France has a dense metro and tramway network providing connectivity to the dwellers of this area. The changing urban landscape and introduction of new modes along with new traffic flows, entailed restructuring of the existing network.

- SYTRAL serves as the exclusive transport authority of both the cities.
- The bus network plan was revised to ensure efficient connections between different modes, so that different modes do not compete but rather complement each other.
- UMTA, as in charge of developing and operating the entire transport network in the city was set up.
- With the new system in place, an increment of 80% ridership in trams, 19% in metro and 21% in buses was observed in Lyon, signalling a smooth merging of the different modes.
- KFW approach for well-designed urban transport system includes comprehensive planning having holistic approach to urban transport planning. It emphasises a layered network with a variety of public transit systems in one city but with seamless transfers and suitable institutional arrangements.

Presentation by speaker

- Frankfurt has nine metro lines, nine heavy LRT lines, across the length and breadth of the city. Along with these systems, the city is addended with bicycle and ancillary infrastructure such as footpaths to provide for holistic modality.
- Some of the key features of the LRT system includes: articulated vehicles, ability to easily operate in exclusive, partially segregated and mixed ROW modes. It was iterated that these systems should be in close integration with each other to provide seamless integration to the commuters.

Panellist receiving Memento

- Different categorization was done by DMRC according to the PHPDT's of different mass transit modes as: heavy metro (>45000), medium metro rail (25,000 – 45,000), light metro (4000 – 25,000), light rail transit system (<10,000) and metro bus (<8000).
- DMRC has proposed LRT for Dehradun city where projected PHPDT is only 2200 in 2021 and 9000 in 2051.
- As per DMRC, permanent way for LRT should necessarily be rail based with train length varying up to 53m. Alignment of such a system may be elevated or underground, though at grade may not be desirable.
- Few limitations of LRT at grade in Indian cities include, narrow ROW in tier-II cities, narrow median allows for only elevated system. LRT at grade can only be considered for newly developed cities such as Greater Noida, Amravati etc.

OUTCOMES

- ❏ In two tier cities of India, LRTS may be a viable solution. However, these cities may not permit LRTS at grade because of the narrower width of urban roads.
- ❏ LRTS should be designed to have a sleek structure namely viaducts as well as stations so as to reduce the cost.
- ❏ Future demand to be kept in view while deciding the capacity.
- ❏ Cost of LRT should not be more than 60% of cost of heavy metro.
- ❏ Light / medium / heavy metro to be selected for a corridor only when LRTS and other modes are not considered adequate.

TECHNICAL SESSION 16: LINKING URBAN TRANSPORT AND THE ENVIRONMENT

The transport sector is vital for enhancing economic growth and social connectivity, but it is the second largest and one of the fastest growing energy end-user sectors, representing 23% of global energy related greenhouse gas emissions. The World Health Organisation estimates that 88% of the 3.7 million premature deaths due to air pollution occur in low and middle income countries, with the greatest burden falling on Asia, where most of the cities with dramatically rising motorisation rates are located. The transport sector in India is the second largest consumer of energy after industry and has the largest share in petroleum consumption. NUTP, 2006 and NTDPC reports also emphasized on promoting the use of cleaner technologies to reduce pollution. The avoid, shift and improve approach needs to be followed in urban transport planning through appropriate intervention to reduce reliance on personal vehicles, making them more fuel efficient and increasing the share of public transport and NMT.

The session focused on some of the climate resilient policies in urban transport and challenges in implementation and methods to achieve sustainable urban transport, low carbon cities and the economy in context of urban transport. The session elaborated on various policies towards improving the city's environment and moving towards cleaner and greener cities.

- **Chairperson:** Shri Ajai Mathur, Managing Director, Urban Mass Transit Company
- **Presenters**
  - Change Climate Mitigation/ Resilient Policies in Transport Sector – Ms. Usha Rao, UNDP
  - Challenges in implementing SDGs, Paris Climate Agreement – Ms. Tuhina Sinha, Faculty, School of Planning and Architecture, Hyderabad
  - Sustainable Urban Transport in Achieving Smart, Resilient and Low Carbon Cities – Ms. Anumita Roy Choudhary, CSE
- Rapporteur: Shri Ambuj Bajpai, Under Secretary, Ministry of Housing & Urban Affairs

HIGHLIGHTS

- Transport contributes to GHG emissions in a significant way i.e. 23% and 40% of energy related emissions from transport. Almost all (95%) of the world's transportation energy comes from petroleum-based fuels largely gasoline and diesel.
- In India, 98% of the total petrol stock is used up by vehicles; nearly 62% of diesel fuel used by vehicles. Transport energy demand has grown at 1.2 times the GDP growth rate.
- India is the only vehicle producing country without fuel economy standards.
- UNDP entails a vision towards a zero-carbon and climate resilient sustainable development path.
- The adoption of a new climate change agreement at the 21st Conference of Parties (COP 21) by 195 nations in Paris in December 2015 represented that all nations in the world take action against climate change in the post-2020 period. This was done by replacing the Millennium

Development Goals (MDGs) that were in place from 2000 to 2015 with the Sustainable Development Goals (SDG) adopted, with the aim of guiding the international community and national governments on a pathway towards sustainable development for the next fifteen years. A new set of 17 SDGs and 169 targets were adopted by world governments in 2015.

- Under SDG goals, transport contributes directly to five targets on road safety (Target 3.6); energy efficiency (Target 7.3); sustainable infrastructure (Target 9.1), urban access (Target 11.2), and fossil fuel subsidies (Target 12.c) emphasizing that sustainable transport is not needed solely for its own sake, but rather is essential to facilitate the achievement of a wide variety of SDGs. Transport also contributes indirectly to seven SDG targets on agricultural productivity (Target 2.3), air pollution (Target 3.9), access to safe drinking water (Target 6.1), sustainable cities (Target 11.6), reduction of food loss (Target 12.3), climate change adaptation (Target 13.1), and climate change mitigation (Target 13.2).
- Among 160 NDCs representing 187 countries submitted as of August 1, 2016, more than three quarters explicitly identified the transport sector as a mitigation source, and more than 63% of INDCs proposed transport sector mitigation measures.
- Transport mitigation strategies include mainly bus improvement services (BRT), decarbonising fuels, e-mobility, metro rail, vehicle restriction, green freight measures, road improvement, improving fuel and vehicle standards, mobility plan, intelligent transport system, urban form, parking reforms etc.
- Four per cent of the countries identified transport specific adaptation strategies which focus mainly on vulnerability assessment and infrastructure resilience planning.
- Goal 11 of SDGs envisages making cities and human settlements inclusive, safe, resilient and sustainable. In order to achieve this goal, India will require a sum of INR 131 lakh crores (USD 2067 billion). This includes housing for all, development and planning of cities, efficient transport system, public spaces and other components of urban infrastructure costs.
- Car travel consumed nearly twice as much energy on average than urban bus travel. By 2030-31 on an average Indians will travel thrice as many kilometres as they travelled during 2000-01.
- Shift of freight from railways to trucks will also add to the energy stress (railway share less than 30%).

OUTCOMES

- Mobility crisis in our cities: an increasing share of daily trips are being made by cars that occupy more road space, carry fewer people, pollute more and guzzle more fuel. They edge out pedestrians, bicycles, cycle rickshaws and buses.
- India could potentially save 6.2 million hectares of potentially arable land through effective planning for land use in the next 20 years.
- Ensure dense and compact cities to reduce travel distances. Bring people and jobs closer to public transport systems.
- Improve walking, cycling, and public transport access. Discourage car centric infrastructure (flyover, signal free roads, foot over bridges, etc) that impede walking, cycling and use of public transport.

- ❏ Design cities to enhance safety.
- ❏ Need car restraint policies.
- ❏ Parking as a travel demand management measure.
- ❏ Fiscal policies to influence travel choices.
- ❏ Vehicle taxation policy, congestion and road pricing etc.
- ❏ Tighten fuel economy norms for cars, trucks, buses and commercial vehicles.
- ❏ Need integrated plan for freight and passenger movement – promote fuel efficient freight modes. Improve modal share of railways and waterways.

TECHNICAL SESSION 17: ROAD SAFETY

Mobility is a matter of great importance in daily life: However, it also causes costs and involves accident risks. Globally India witnesses the highest number of deaths due to road accidents. About 1 lakh lives are lost due to road fatalities. The fatalities have been increasing at the rate of 8.9% every year. In 2011, the number of deaths due to road accidents recorded was 1.4 lakh. The issue of security for women, children, the old and physically disabled need special attention in this regard.

To make mobility safer and reduce accident risks, a scientifically based road safety management is needed. Within such a safety management system, a concert of adequate and efficient strategies, tools and measures ought to be developed and implemented to provide safe transit to commuters.

This session dealt with various aspects of road safety including elements such as signage on the roads, the road geometry, cognitive aspects for the road user as well as the effect of road rules enforced and the reality of what happens actually. This session tackled the issue of road safety under different angles and perspectives: transport planners, metro operators and government organisations. Examples from various European, Indian and Middle East countries were presented, with the objective of identifying and adapting the measures that had proved successful.

- **Chairperson:** Shri R.K. Singh, Chief Engineer, Lucknow Metro
- **Presenters**
  - Road Safety: Scenario and initiatives, Shri R.K. Singh, Chief Engineer, Lucknow Metro
  - Various Road Safety Aspects in Indian Metropolitan Cities: A case study of Hyderabad – Prof. Kumar Molugaram, Professor Civil Engineering, University College of Engineering, Osmania University, Hyderabad
  - Traffic Management – Mr. Julien Allaire (Transitec).
  - Road Safety Management in a Developing Country: The case of Lebanon – Mr. Ramzi Salame, Executive Director, National Road Safety Council Lebanon
- **Rapporteur:** Shri Deen Dayal, Under Secretary, Ministry of Housing and Urban Affairs

Panellist expressing his views

HIGHLIGHTS

- The motor vehicle registration in India has seen a surge of about 10% from 2001 to 2015 as against the population growth of 3% only. This creates vulnerability for road users with the ever-increasing vehicular population.
- In India, road accidents have increased by 2.5% from 2014 to 2015. The road fatalities per 100, 000 motor vehicles in India is 130.1 compared to Europe having 19 and America 33 in 2013.

- Major reasons for these accidents
  - Reference documents for road safety evolved approximately, 10-20 years back. Standards on design of urban roads were written 30 years back, when the roads and road transport was neglected and was allotted very meager funds.
  - Transport infrastructure improvement including road expansion, road widening, grade separated junctions and signal free corridors / junctions resulted in reducing access to pedestrians and crossing of roads becoming more difficult.
  - Public transport users have longer distances for changing bus routes due to the increase of distances between transport modes.
  - Pedestrian footbridges increase crossing distances for pedestrians.

Presentation by speaker

- To minimise accidents, four separate working groups were formed, namely; Education, Enforcement, Engineering and Emergency Care system. It is thus essential to work on these four key initiatives to minimise the road accidents and promote public transport travel.
- Hyderabad being a metro city is prone to accidents like any other Indian urban area. The severity of accidents reported in Hyderabad is around 15 annually whereas this figure is around 32 annually in Cyberabad.
- In Hyderabad crash patterns are due to improper shoulders and deteriorated road conditions, pedestrians walking on national highways, vehicles parked along highways and poor sign visibility.
- Measures at micro level and policy measures at macro level can be used to reduce the road accidents in HMA (Hyderabad Metropolitan Area). Broadly the following actions are needed:
  - Detailed studies to be undertaken for micro analysis of accidents in Hyderabad and Cyberabad areas.

Presentation by Speaker

Speaker receiving Memento

- ➢ Enforcement drive of wearing helmets by two-wheeler riders and seatbelts by the occupants of cars.
- ➢ Drive against drunken driving.
- ➢ Investigation of accident prone spots to identify the black spots and the reasons for the accident at those spots.

- ❑ To reduce road accidents, Hyderabad tried the methods such as severity approach, clustering technique, sampling methods, and empirical Bayesian approach.
- ❑ In Lomé, many people die because of inadequate road networks and bad traffic management. Some specific street designs (like in Casablanca) could allow road safety in urban areas but strategies for traffic management is needed with a multimodal approach.
- ❑ In Lebanon, the factors conducive to road traffic crashes are speeding, distractions and driving under the influence (DUI) of alcohol. To reduce the accidents, the following steps have been taken by city authorities:
  - ➢ All motor vehicles should be registered and bear an identification plate with electronic recognition device.
  - ➢ Periodic mechanical inspection compulsory for all vehicles older than 3 years.
  - ➢ Body injuries insurance compulsory for all motor vehicles.
- ❑ Traffic management centre covering greater Beirut area use technology i.e. radar to detect speed violations and install variable message sign at key entry points to the capital city.

Speaker receiving Memento

- ❑ Apex Body 'National Road Safety Council (NRSC)' chaired by Minister (RT & H) for Road Safety was established under Section 215 of Motor Vehicles Act, 1988. The members of this body are State Road Transport Ministers, DG (Police) of States, Representatives of Ministries, such as Home Affairs, HRD, Railways, P & NG, Env. & Forests, Health & Family Welfare, etc. and 25 non-official members.
- ❑ The National Road Safety Council, the National Road Safety Committee and the National Secretariat for Road Safety are the lead agencies for the management of road safety. These agencies are mainly responsible for road safety policy making, improving traffic law and road safety rules and regulations, R & D on road safety etc.

OUTCOMES

- ❑ Detailed studies for micro analysis of accidents in Hyderabad and Cyberabad areas need to be undertaken.
- ❑ Provision of pedestrian facilities in the city, enforcement drive for wearing helmets by two-wheeler riders and seatbelts by the occupants in cars and buses are required on an urgent basis.

- Identification of black spots and the reasons for accidents at these spots.
- Emphasis on properly planned, designed and implemented traffic management measures such as junction design and control, speed monitoring and management measures, pedestrian facilities, cycle tracks and public transport provisions, which are the need of the hour.
- Strengthening of institutional mechanisms and implementation of the national observatory for mobility and road safety are the major action areas. The substantive action would be drafting a first national strategy for road safety and expanding local actions in partnership with municipalities, schools and NGOs. Action is also being taken for expanding knowledge base for the improvement of crash data system.

Audiences in the Session

TECHNICAL SESSION 18: INNOVATIVE FUNDING FOR URBAN MOBILITY

To improve urban mobility, there is a need to innovate and embrace some of the many secondary funding tools successfully used in cities, states and countries around the world. Alternative revenue raising tools such as value capture, transit-oriented developments, congestion charging, payroll, sales and fuel taxes and superannuation funds have been providing dedicated funding sources for transport operations and expansions around the globe for years, some since the early 1900's. To capitalize on the broad benefits public transport provides and continue improving India's public transport systems, sustainable, long term funding that allows planned improvements to service offerings and the expansion of existing infrastructure is vital.

This session focussed on a study conducted by CODATU, AFD and CEREMA on the various tools and options chosen across the world to fund urban transport: "Who Pays What in Urban Transport". Also, concrete experiences have been shared, based on examples of bus fleet renewal and implementation of a real fleet purchasing policy.

- **Chairperson:** Mr. M. Bernard Rivalta, Vice-President, CODATU
- **Presenters**
  - Renewal of bus fleet: Case studies from Dakar (Senegal) – M. Amadou Saidou Ba, President of CETUD- presentation in French
  - Who Pays what in Urban Transport – M. Julien Allaire, CODATU
  - Regardless of the actor (Operator or Transport Authority), innovative solutions must be continuously implemented to fund public transport development – Mr. Thibault De Lambert, RATP Dev Transdev Asia
  - Enhancing financial requirements through a real fleet purchasing policy in developing countries: from the requirement definition to the shared procurement – Mr. Marc Delayer, President of CATP (Public Transport Group purchasing organization) - presentation in French

Chairman's opening remarks

HIGHLIGHTS

- In the city of Paris, over 60% of the trips are by public transport. However, cars are more common from suburb to suburb around Paris and accounts for about 80% of trips.
- In Paris, mobility is managed by Île-de-France Mobility Transport Authority.
- Since 2006, the current annual budget, excluding development investments, increased by € 1 billion (INR 75 billion) to reach the sum of € 9 billion (INR 675 billion) in 2016 out of which 47% of income is provided by special tax paid by companies (tax on gross salary).

- RATP Group created in 1949 is a leading multimodal operator in Île-de-France and has an experience in all fields of transport service i.e. metro, buses, trams, trains and cable cars with an expertise in designing, operating, upgrading and deploying.
- Revenue from non-transport sources is part of the RATP business model. Financial risk is borne by the operator. In Île-de-France revenue from non-transport sources is high but not significant. It is only 2% of the total revenue.
- Similarly, digital, advertising and other additional non-transport sources must contribute to finance the public transport system. For this updated and adequate data on mobility is essential.
- Public authorities place pressure on operators so that they give free access to their data.
- Four major French operating companies (KEOLIS, RATP, TRANSDEV, SNCR) decided to gather their data in a common database for developing special apps for mobility users.

Panellist sharing their views

Audience in the session

OUTCOME

- Innovative solutions have to be continuously implemented to finance public transport in an integrated, sustainable, and attractive local transport system. It takes into consideration:
  - Global financial needs of the mobility system.
  - Local constraints: legal, political, social, physical, economics.
  - All components of mobility to have a global vision at the highest level of areas.
  - Includes all economics actors who are concerned directly and indirectly by the mobility system.
  - Business Model has to be built by the PTA, who is financially autonomous.

Speaker making presentation

- ❏ Development of innovative mobility solutions that reduce the kilometre cost and makes mobility more integrated.
- ❏ Developing digital solutions that give new revenue sources to PTA.
- ❏ Real estate revenues of buildings belonging to the operator or PTA.

Speaker making presentation

RESEARCH SYMPOSIUM

Coordinator research symposium sharing her views

The Research Symposium on Urban Transport was held on 5th and 6th November 2017 at the 10th Urban Mobility India Conference 2017 and XVII CODATU Conference. This provided a platform to highlight the current research carried out by academia and research institutes in urban transport especially by young researchers pursuing post graduate and Ph. D programs or those who recently completed their Ph. D in the last two years (not earlier than May 2016). These researchers working in the area of urban transport were invited to submit abstracts based on the work carried out by them as part of their academic/research work. The objectives of the research symposium are following:

- ❏ Encourage young researchers working in various facets of urban transport to present their research work and provide them an opportunity for networking with fellow researchers and professionals.
- ❏ Enhance capacity building of young researchers in the field of urban transport.
- ❏ Contribute towards building up of research data base, its dissemination and identification of thrust areas for research in the country.

CALL FOR PAPERS AND SELECTION CRITERIA

Extended abstracts of about 500 words for the research symposium were invited online. After receiving the abstracts, the same were sent for peer review to the members of the Peer Review Committee of Research Symposium. The symposium was co-ordinated by IIT – Delhi. The themes selected were as follows:

- ❏ Land use, Travel Behaviour and Transport Planning.
- ❏ Travel Demand Management and Transport Policy
- ❏ Public Transport
- ❏ Non-motorised Transport
- ❏ Traffic Operations and Traffic Safety
- ❏ Logistics and Freight Transportations

Each abstract was submitted for peer review to three reviewers / members of committees not affiliated to the author's institution and were requested to evaluate them on a scale of 1 to 10. The scores assigned were based on a weighted average method and a final score was arrived at for selection.

In all, 96 abstracts were received till due date of 5th August 2017 from various institutions across the country of which 70 abstracts were shortlisted for submission of full paper by September 30, 2017. The selected authors were requested to submit the presentation for review by 15th October 2017.

Speaker making presentation

These 70 full papers were evaluated by the reviewers / members of the Committee for selecting the final papers that would be presented at the Conference. On the basis of evaluation of full papers by the Review Committee, a selected 30 authors were asked to make presentations at the Research Symposium of the UMI Conference. In addition, 18 papers were selected for poster presentations. Nine papers from the pool of 30 papers recommended for presentation were included in list for award. These 9 papers were evaluated by the jury headed by Prof. Geetam Tiwari, IIT, Delhi during the presentation and a weighted score based on review grades and the jury's marks. The papers were then rank ordered and the top three were considered for awards.

The various research papers presented in the conference were as follows:

Research Symposium		
Chairperson: Prof. Shivanand Swamy, Executive Director, CEPT University		
	Author / Presenter	**Paper Title**
Research Symposium 1 - Land use and Travel Behaviour	Shri Pydisetti Dinesh Kumar and Ms. Kanta Naga Rajesh	Performance Evaluation of Intermediate Public Transport by benchmarking Approach: A case study
	Ms. Samikchhya Bhusal	Land Use planning and road infrastructure Policy in India: The role of spatial data in decision making
	Ms. Visakha K A and Ms. Anupama Warrier	Land use Transport Integration through User Behavioural Perspective: A case study of Greater Cochin
	Shri Nishant Singh	Understanding Patterns of Work Travel in India using the Census Data
	Rapporteur: Shri Naresh Bhardwaj, Under Secretary, Ministry of Housing and Urban Affairs	
Chairperson: Shri. Manoj M., IIT Delhi		
	Author / Presenter	**Paper Title**
Research Symposium 2- Mode Choice	Shri Keval Mistry, Ms. Vaishali Rathod and Ms. Vidhya Raghvan	Creating Alternative Mobility Options for Private mode to Public transport mode: A case of Gandhinagar
	Ms. Suman Mitra and Dr. Pradeep Sarkar	Use of soft computing for mode choice analysis and comparison with Traditional Multimodal Logit model
	Shri Vinod Rathod and Prof. H.M. Shivanand Swamy	Analysis of Metro Rail Project Selection Bias with Principal Agent Model: A case of Delhi, Bangalore, Mumbai, Jaipur and Chennai
	Shri Dennis Jose and Ms. Angel Joseph	Understanding Patterns of Work Travel in India using the Census Data
	Ms. Madhuri Jawale and Shri Paulose Kuriakose	Parking supply Management as strategy to Reduce Congestion and Improving Mobility in core area: Case study of Bhopal City
	Rapporteur: Shri Deen Dayal, Under Secretary, Ministry of Housing & Urban Affairs	

Chairperson: Prof. Geetam Tiwari, IIT Delhi		
	Author / Presenter	**Paper Title**
Research Symposium 3 - Public Transport	Shri Akhilesh Chepuri, Shri Raunak K, Shri Shriniwas Arkatkar, Prof. Gaurang Joshi and Shri Dewal Mishra	Travel time Variability Modelling of selected Bus routes in India
	Ms. Anna Mariya Lukose	Planning the transit interchange zones
	Shri Pintu Saini and Dr. Pradip Kumar Sarkar	Feasibility of Electric bus operations in Urban areas – Case study Delhi
	Shri Banshi Sharma	Role of Informal Public transport: A case of Kanpur, Aligarh and Hathras, UP (India)
	Rapporteur: Shri Lohri Kapani, Under Secretary, Ministry of Housing and Urban Affairs	
Chairperson: Shri. Manoj M., IIT Delhi		
	Author / Presenter	**Paper Title**
Research Symposium 4 - Pedestrian Models	Mr. Adinarayana Badeeti and Dr. Mohammad Shafi Mir	Development of Pedestrian Safety Index Models for safety of Pedestrian flow on Urban Roads under mixed traffic
	Ms. Shivani Palepu	Analyzing the travel behaviour and Mobility patterns of the visually impaired: A case of Ahmedabad
	Mr. Haresh Kumar Golakiya, Mr. Manish Patkar and Mr. Ashish Dhamaniya	Vehicle class vise speed prediction models under the influence of crossing pedestrian at Urban Mid-block sections
	Mr. Samir Patel, Mr. Chetan Patel, Prof. Gaurang Joshi and Mr. Rajesh Pandya	Public Bike Sharing: An approach towards Sustainable Transportation, A case study of CBD in Indian context
	Rapporteur: Ms. Mamta Batra, Under Secretary, Ministry of Housing & Urban Affairs	
Chairperson: Shri. Nezamuddin, IIT Delhi		
	Author / Presenter	**Paper Title**
Research Symposium 5 - Urban Traffic Operations	Mr. Suvin PV and Mr. Malikarjuna Chunchu	On-Road Parking: A new Approach to Quantify the Side Friction Regarding Road width Reduction
	Shri Bharathiraja Muthurajan, Shri Rushikesh Amrutsamanvar & Ms. Lelitha Devi Vanajakshi	A semi-Automated Image Processing Solution for Extracting Microscopic Traffic data
	Rapporteur: Shri Lohri Kapani, Under Secretary, Ministry of Housing & Urban Affairs	
Chairperson: Dr. Geetam Tiwari, Professor, IIT Delhi		
	Author / Presenter	**Paper Title**
Research Symposium 6 - Safety and Traffic Operations	Mr. Ashwini Bokey and Ms. Shalini SInha	User behaviour towards Traffic Violation
	Mr. Shubham Bannore, Ms. Ashlesha Ithape, Prof. Manish Ingale, Dr. Sanjay Patil and Prof. Kiran Wani	Journey Risk Management for PMPML buses in Pune City
	Ms. Devunuri Sai Praneeth, Ms. Lelitha Vanajakshi and Ms. Chilukuri Bhargava Rama	Image Processing Techniques for traffic data extraction from Aerial Imagery
	Ms. Ruchika Agarwal & Shri Vinod Vasudevan	Relationship between Mobility and Pedestrian Safety: A region wide level study
	Rapporteur: Shri Rupak Talukdar, Under Secretary, Ministry of Housing & Urban Affairs	

AWARDS

All the sessions were well received and interactive. The presentations were judged by a jury and the following papers were adjudged First, Second and Third. The awards were given away by Shri K.T. Rama Rao, Hon'ble Minister for Information Technology, Municipal Administration and Urban Development, Industries and Commerce, Mines and Geology, Public Enterprises and NRI Affairs, Government of Telangana at the valedictory session of the Conference to the following researchers:

- 1st Prize – Bharathiraja Muthurajan, Rushikesh Amrutsamanvar and Lelitha Devi Vanajakshi (A Semi – Automated Image Processing Solution for Extracting Microscopic Traffic Data).
- 2nd Prize – Anu Sachan and Tom V Mathew (Feeder Network System Design for Mass Transit System).
- 3rd Prize – Suvin P V and Mallikarjuna Chunchu (On-Road Parking: A New Approach To Quantify the Side Friction Regarding Road Width Reduction).

Awardees of research symposium

In addition, poster presentations were made which were also judged by the jury. The following three posters were adjudged First, Second and Third by the Jury:

- 1st Prize – Darshna Othayoth and K.V. Krishna Rao (Modeling User Perceived Level of Service of Signalized Intersection Using Fuzzy Logic).
- 2nd Prize – Anuja Kothawala and Abhijit Lokre (A Critical Evaluation of National Urban Transport Policy).
- 3rd Prize – Bhupati Dutta and Vinod Vasudevan (Lateral Gap Behaviour in Presence of Static Obstacle – A Naturalistic Driving Approach).

Awardees of research symposium

EFFICIENT AND SUSTAINABLE CITY BUS SERVICES PROJECT - KNOWLEDGE EXCHANGE WORKSHOP ON INTELLIGENT TRANSPORT SYSTEM (ITS) - CONDUCTED BY SUTP

The Efficient and Sustainable City Bus Services Project of India has an objective to improve the efficiency and attractiveness of city bus transport and reduce greenhouse gas emissions in the demonstration cities. The project comprises (i) a national capacity building component to be implemented by MoHUA and (ii) city demonstration projects with select cities. As part of component one, policy, regulatory and fiscal constraints will be reviewed at national, state and city levels to promote efficient and high-quality city bus services and policy notes developed for discussion and debate among key stakeholders on areas of reform. Component two shall support physical improvements targeted at modernizing the city bus services in demonstration cities including (i) modern depot equipment for improved maintenance and life of buses, (ii) modern Intelligent Transport Systems (ITS) and Management Information Systems (MIS) - to make the services more user friendly and for improved planning and management of operations to enable optimal use of resource.

SUTP has coordinated three technical sessions on an efficient and sustainable city bus service project as a knowledge exchange workshop on an Intelligent Transport System. The first session discussed the implementation models for adopting ITS in public transport, the second session dealt with increasing productivity through ITS implementation and the third session was confined to smart transport ticketing in India. The list of presenters of each session are given in the table below:

Session 1	Session 2	Session 3
Shri G.P. Hari, AGM, Kochi Metro	Dr. Aneesh Chinnubbai, Chief Technology Officer, Infinium Solution Pvt. Ltd.	Shri Nalin Bansal, Vice President & Head NPCI
Shri Sudipto Roy, GM & Business Head, ICICI	Shri Anil Kumar Saini, COO Railway System, L&T Metro Rail, Hyderabad	Shri Ajesh Kapoor, Director, India Region Sales, NXP Semiconductors Pvt. Ltd.
Shri Rakesh Shankar, IAS, Deputy Municipal Commissioner, Ahmedabad	Shri Tanmoy Chakraborty, Vice – President and Global Head, Government Solution Unit (ISU), TCS	Shri Praveen Sachwani, Director, Engineering Verifone
Shri Sujit Nair, Director, Paycraft Solutions	Shri D.K. Sinha, CGM / S&T, DMRC	

HIGHLIGHTS

- ❏ Kochi Metro is integrated as one network, one timetable and one fare. All the multi modes comprising metro trains, city buses, auto rickshaws, boat services, feeder buses, city taxis, walkways and cycling tracks are integrated to make the transportation system seamless in Kochi.
- ❏ In line with the objectives of the National Urban Transport Policy, multimodal integration is done at four levels viz. institutional, by creating the Metropolitan Transport Authority Kochi, physical, including MRTS, passenger / logistic hubs, interchange points, NMT information covering ITS, mobile Apps, journey planners, display units, kiosks, OCC, adaptive signalling, AFC and fare

comprising smart card ticketing, telescopic fare structures and automatic fare revision mechanisms.

- The business model adopted in Kochi benefitted the passengers in terms of informed transit, interactive screens, better transit experiences, smart card ticketing and seamless journeys. For the bus companies it benefitted in higher footfall and revenue from advertisement.
- Ahmedabad Municipal Corporation has a population of six million and is running a city transport service. The city is identified as a smart city under Smart City Mission. Smart transit focusing on integrated transit management platform and common card payment systems are some of the components of the Smart City Plan.
- AMTS network is 3808km with 850 BRT buses operating in 198 routes with a ridership of more than 6 lakh passengers per day.
- Because of the fast-growing number of vehicles, intelligent transport management system (ITMS) and automated fare collection system (AFCS) came up in the city. An open loop card "JANMITRA" card is proposed for transit and availing various municipal services.
- The broad components of an ITMS include Automatic Vehicle Location System, Passenger Information System, Vehicle Planning and Scheduling System, Incident Management etc.
- PMPRL has a fleet of 2000 buses. Issues sorted out through ITMS solutions are as under: -
  - ➢ Manual rostering to auto rostering (VPSD).
  - ➢ Paper based pass to inter-operable Mi-card.
  - ➢ Incident management manually to incident management system based (IMS)
- The application of ITS in Mysore in bus operation has resulted in reduction of average passenger wait time, higher number of users in Mobile App, SMS, portals, higher fleet and crew utilization, improving model share and got national e-governance Gold award.

Audience in the session

Presentation by speaker

Speaker making presentation

- ITS in Hyderabad Metro rail is being used for communication-based train control, asset management system, open loop payment system, data intelligence, mobile application for user convenience and integration with city infrastructure.
- ITS in Delhi metro has been continuously resorted to for addressing the challenges regarding optimum utilisation of existing infrastructure, meeting the potential growth and integration with other modes of transport.
- Some of the major drivers for introducing Smart Card Ticketing include being more cost effective, improved management information, reduced fraud, third party revenues, better control of customer throughput, integration/seamless travel etc.
- Fare media may be a cost-effective solution for the commuter. It must have all necessary security features to ensure safety of data and money.

Participant posing a question

- It must be inter-operable across Wide avenues of usage – vision of single fare media for use across multiple modes of transit, parking, tolling as well as retail purchases.

OUTCOMES

Presentation by speaker

- ITS improves quality & convenience of public transport, promote use of sustainable transport modes, enable commuters to make informed choices on travel modes, reduce passenger wait times and to optimize operations, improve fleet utilization, schedules, and vehicle availability with accurate information.
- ITS has many benefits for commuters, management and operators of buses as well as to the society. Data and report generated through ITS can effectively be used by depot managers and traffic operations team for analysis and continuous improvement.
- Card based fare collection is the most prevalent technology with on board ticketing. Most leading implementations model closed loop / semi closed loop model as it allows customers to manage these payments through a single balance.
- Sensors on the bus provide data that may be helpful to monitor road conditions based on jerks, vibration etc.
- A good data generated through the use of ITS, should be relevant, complete, accurate, current and economical.

CODATU INTERNATIONAL SCIENTIFIC COMMITTEE (ISC)

The CODATU International Scientific Committee was held on 5th and 6th November 2017 at the 10th Urban Mobility India Conference 2017 and XVII CODATU Conference comprising of research works from across the globe. The theme of this committee was 'Transport for Inclusive Urban Societies'.

Call For Papers and Selection Criteria

Extended abstracts of about 500 words for the ISC were invited online. After receiving the abstracts, the same were sent for peer review to the members of the Committee of ISC. The sub-themes selected were as follows:

- ❏ A: Transport exclusion
- ❏ B: Environmental concerns
- ❏ C: Urban freight
- ❏ D: Security and safety in urban transport
- ❏ E: Demand and supply management
- ❏ F: Smart cities: concept and policy practice

The various research papers selected by the International Scientific Committee presented in the conference are given below:

Panellist sharing views

S.No.	Author's Name	Paper Title
Public Transport and Citizens Preferences **Chairperson: Dr. O.P. Agarwal, CEO, WRI**		
1.	Dr. Sanjay K. Singh, IIM Lucknow, India	Assessment of passenger satisfaction with Public Bus Transport Services: A case study of Lucknow city (India)
2.	Dr. Shafiq-Ur Rahman, University of Jahangirnagar, Bangladesh	Pre-determined fare structures for Rickshaws when integration with BRT systems
3.	Prof. Shivanand Swamy, CEPT/Prof. Sanjay Gupta/Shri Rajesh Pradhan/Ms. Shravni Sharma	Role of taxis in Urban Mobility of Metropolitan Environment: Case of Delhi and Ahmedabad
Big Data for Transport Planning **Chairperson: Shri Vivek Ogra, Technology Solution Architect, VbSoft**		
1.	Mr. Thana Potanon, University of Nihon, Japan	Estimating Missing path on trajectories trip by using Bluetooth technology
2.	Prof. Marcela Munizaga, University of Chile	Can big data contribute to improve our quality of life in big, Congested cities?
Travel Management & Road Safety **Chairperson: Mr. Charles Rivasplata**		
1.	Mr. Yao Godefroy Konan, Ministry of transports, Ivory Coast	The road safety issues in agglomeration of Abidjan (Ivory Coast)

S.No.	Author's Name	Paper Title
2.	Mr. Mohamed Souleiman Ouannes, University of King Faisal, Saudi Arabia	Road Safety and wealth of a country: Which link? The example of Tunisia
3.	Mr. Tsutomu Tsuboi, Nagoya Electric Works Co. Ltd./ Noriaki Yoshikawa, Cyber Creative Institute Co. Ltd.	Traffic Flow analysis in emerging Country (India)
Public Transport Applications **Chairperson: Mr. Etienne Lhomet, Transport Expert, CODATU/DVDH**		
1.	Mr. Yao Konan, Ministry of Transport, Ivory Coast	Renewal of the vehicle fleet and sustainable development in Ivory Coast
2.	Shri Sharif Qamar, TERI, India	A life cycle Analysis of Urban Public Transport Systems in Indian cities
Transport and Energy **Chairperson: Ms. Akshima Tejas Ghate, TERI**		
1.	Prof. Atsushi Fukuda, University of Nihon, Japan	Development method to estimate fuel consumption using driving patterns from Probe data information
2.	Prof. Ali Huzayyin	Transport, fuel consumption and Emissions: Findings of previous and ongoing research in Cairo
Transport and Urban Planning **Chairperson: Shri V. Pathak**		
1.	Ms. Yulia Dewita, Dr. Matthew Burke, Dr. Barabara Yen, University of Griffith, Australia	The relationship between transport, housing and urban form: Affordability of transport and housing in Indonesia
2.	Prof. Rosario Macario	Impact of regulatory framework in urban mobility systems: the case of Brazil
3.	Dr. Charles Rivasplata	Transport and urban planning
Round Table: Boosting Transport research and education in developing countries **Co-chairs: Prof. Rosario Macario and Prof. Shivanand Swamy, CEPT University**		
1.	Prof. Rosario Macario, Prof. Shivanand Swamy, Prof. Ali Huzayyin and Dr. Charles Rivasplata	Roundtable: Boosting transport research and education in developing countries
Urban Freight Transport **Chair: Dr. P.K. Sikdar, Director ICT**		
1.	Ms. Leeza Malik, Prof. Geetam Tiwari, Shri Ashwani Kumar, IIT Delhi, India	Assessment of freight vehicle characteristics: the case of Delhi
2.	Ms. Nilanjana Bakshi, Prof. Geetam Tiwari, Prof. Nomesh Bolia, IIT Delhi	Influence of urban forms variables on urban freight trio generation models
Planning for Transport **Chairperson: Prof. Marcela Muni** **Co-chair: Mr. M. Mark Zuidgeest**		
1.	Ms. Deepty Jain, TERI University /Prof. Geetam Tiwari, IIT Delhi	Travel patterns in Indian districts: Does Population size matter?
2.	Mr. Sean Cooke, University of Cape town / Prof. Geetam Tiwari, TRIPP, IIT Delhi	Can a focus on NMT reconcile Transit Oriented Development, paratransit formalization and urban informality?

S.No.	Author's Name	Paper Title
Transport of Vulnerable Citizens **Chairperson: Prof. Rosario Macario**		
1.	Dr. Charles Rivasplata, San Jose State University / Dr. Marlene Le Roux, Artscape	The role of transport in providing access to disabled youth: The case of Cape Town
2.	Dr. Messan Vimenyo, University of Lome, Togo	SOTRAL: Which solution for persons with reduced mobility in Lome?
3.	Dr. Shafiq-Ur Rahman, Shri Noor Ali Shaha, Jahangirnagar University, Bangladesh	Mobility constraints of children in Bangladesh: A study on travel to school in Dhaka city
4.	Dr. Oliver Page, Independent Transportation Safety Specialist	Social Exclusion of disabled public transport users: Insights from Port 1 Moresby
Informal Transport **Chairperson: Mr. Pablo Salazar Ferro**		
1.	Mr. Pablo Salazar Ferro, Independent Consultant for CODATU	Gentrification in paratransit
2.	Ms. Suranjana Chaudhuri, Indian IIEST, India	User's perception of increasing Operations of Electric Rickshaw (Toto) service: Case of Uttarpara

HIGHLIGHTS

The sessions enlisted above carried out some useful deliberations on the theme of the various sessions. Some of the broad outcomes of these sessions are as mentioned below:

- ❏ Transport and housing costs are interrelated due to their substantial share in household budgets. Combining housing plus transport or location affordability would be a comprehensive measure.
- ❏ In urban transport, focus should be on external to internal freight transport, so as to prepare a freight trip attraction model. It is thus a necessary benchmark of freight characteristics.
- ❏ Customer satisfaction surveys should be undertaken to understand the quality of service desired by the public transport users.
- ❏ Principal Component Analysis shows that comfort and safety in buses, adequacy of the capacity of public transport services,

Audience in the session

Presentation by speaker

orderly and clean environment inside buses, elegant design of buses, bus stops and accessibility to public transport services are the major factors deciding customer satisfaction towards public transit.

- Bluetooth Technology (BT) is a futuristic technology and can prove to be a handy tool for modern transport planning. Bluetooth Technology in addition to BT capturing devices can be useful methods to collect traffic data.

Speaker making presentation

- A comparative analysis of the accuracy of the different available methods under BT technology shows that the shortest travel time methods hold the maximum accuracy for calculations among the other two options i.e. historical travel time and shortest distance methods.
- In large city transport networks like Transantiago, big data analysis provides an easy way to collate and collect the essential data related to public transport. Such big data helps in modelling the transport network across the city, so as to provide an integrated multimodal network to the commuters in the city.
- Full Life Cycle Analysis (LCA) is essential in the case of transport projects while taking policy decisions for establishing facilities.
- The scope of a life cycle analysis includes direct energy and material consumption for construction and other O & M's. It also involves indirect energy and material consumption for manufacturing of vehicles and energy consumed for production of mobility fuels.

LEADERS IN URBAN TRANSPORT PLANNING

As cities become the engines of economic growth, city officials and decision-makers face the challenging task of developing and maintaining efficient urban transport systems. These systems must address the problems of severe congestion, deteriorating air quality, energy sustainability, and increasing numbers of road accidents. However, urban transport planning and management is complex. The Leaders in Urban Transport Planning (LUTP) program helped participants to develop a structured way of decision-making that considers the complexities of urban transport. The program used a "hands on" learning approach that made extensive use of case studies, group exercises, and site visits to highlight the linkages among the different components of the urban transport system.

The centrepiece of the program was a seven-day workshop sponsored by the Ministry of Housing and Urban Affairs, Govt. of India and the World Bank and executed by local partnering institution (Institute of Urban Transport (India) and Centre for Environmental Planning and Technology). The workshop was preceded by a self-learning phase which involved about 24 hours of self-paced learning (about one hour of work each day over a period of five weeks), and covered topics ranging from land use and transport planning to environmental and social issues in urban transport planning.

Participants of Leaders forum

Speaker making presentation

Audience in the session

Presentation by participant

The LUTP program is designed for senior and mid-level transport professionals. The Ministry of Housing and Urban Affairs requested all the states to nominate officials to participate in the program, in order to provide the required training. Accordingly, policymakers and planners from national, state and city level governments who are responsible for "putting the pieces together" were selected. The project/ studies assigned to the selected officers were reviewed by the expert reviewers. The selected officers then made the presentations on the progress of the project in UMI as given below:

S.No.	Presenters	Topic
LEADERS FORUM - CEPT UNIVERSITY Group 1-A **(Reviewers: Shri Abhi Lokre, Shri Gautam Patel, Ms. Shalini Sinha and Shri A.S. Lakra)**		
1.	Ms. Lakshmi, Mr. T.P. Vinod Kumar and Mr. S.K. Madhavan	Enhancing Ridership for Chennai Metro
2.	Ms. N. Vewena	Public Bicycle Sharing (PBS) as a non-motorised transport to complement Public Transportation
3.	Mr. Vijaya Bhaskar and Mr. Saravanan	Development of Intermodal Transport Circle at Kathipara Junction Alandur
4.	Mr. Ajit Kawade and Dr. Praduya Kasar	Non-fare optimisation for Pune Metro
5.	Mr. Chetan Karnik	Route Rationalisation Plan for Bus Operations for Atal Indore City Transport Services Ltd. (AICTSL) Indore
Group 1-B **(Reviewers: Dr. M. Ramachandran, Shri Abhi Lokre, Ms. Shalini Sinha and Shri A.S. Lakra)**		
1.	Mr. Abhinav Agarwal	Draft Parking Policy for Raipur (Chhattisgarh)
2.	Ms. Usha Kiran	Public Transport Policy and Strategy for Gurugram
3.	Mr. Parijat Jain and Mr. Mohit Bundas	Fare Revision Mechanism for State of Madhya Pradesh
4.	Mr. Santosh Kumar and Mr. Mohammed Faiz	Performance assessment and Expansion strategy for Kalaburgi City Services
5.	Mr. Swayambhu Arya	Integrating DEMU and MEMU operation and Maintenance in Bangalore
Group 2-A **(Reviewers: Shri I.C. Sharma, Prof. Shivanand Swamy, Mr. Vivek Ogra, Ms. Nitika Bhakuni and Mr. Laghu Parashar)**		
1.	Mr. Naresh Bhardwaj	Review of Metro Policy, 2017
2.	Mr. Pradeep Wales	De-congesting Central core of Trivandrum Capital City
3.	Mr. Goraksha Jagtap, Mr. Raju Bhadke and Ms. Vijaya Laxmi	Integrated Ticketing system for Mumbai Metropolitan Region
4.	Mr. Ramchuana and Mr. R.L. Zindiga	Reduction of Traffic Problems in Aizawl
5.	Mr. Rahul Goswami, Ms. Nidhi Singh and Brij Bhushan Sharma	Strategies for Place Making through an Integrated approach towards Public mobility
Group 2-B **(Reviewers: Dr. Sudhir Krishna, Shri I.C. Sharma, Mr. Vivek Ogra, Ms. Nitika Bhakuni and Mr. Laghu Parashar)**		
1.	Mr. Rajneesh Kumar Shrivastva	Improvement in circulation area of Amritsar Station and its integration with BRTS station for better pedestrian access

S.No.	Presenters	Topic
2.	Mr. Sanjeev Rastogi and Mr. Pradeep Gupta	Equitable Road space: Case study of Vikas Marg, New Delhi
LEADERS FORUM – INSTITUTE OF URBAN TRANSPORT (India) Review - 1 **(Reviewers: Dr Rohini Balasubramaniam, Ms Sonia Arora and Shri. RamaKrishnan)**		
1.	Mr. Sandeep Laha and Mr. Parvez Bashir	Strategy for identifying and Mitigating Accidents in UPSRTC and Meerut City Transport Service Ltd. With special reference to Meerut: A case study
2.	Mr. A.K. Gupta, Dr. Alka Singh and Mr. Himanshu Chandra	Integrating Public Transport System and IPT with ABD area of Lucknow Smart City
3.	Mr. Rajeev Narayan Dwivedi, Mr. C. Thirukumaran and Mr. N.E. Vinod Kumar	Promotion of seamless integration in the Major hubs of Central Station and St. Thomas Mount Station Area of Chennai city
4.	Mr. P.K. Parthiban and Mr. K. Srinivasan	Study on last mile connectivity with Metro Rail Stations to improve metro rail patronage in CMRL
Review - 2 **(Reviewers: Dr. O.P. Agarwal, Shri R.K. Singh and Mr. M.L. Chotani)**		
1.	Mr. Rajiv Anand and Mr. P.K. Tiwari	Development of ITMS for City Transport, Varanasi
2.	Dr. Hemant Kagra and Mr. Prafulla V. Kohade	Unified ticketing system for different mode of transports in Ahmedabad city challenges and issues
3.	Mr. Ramanand Bhagat and Md. Manzrul Hasan	Implementation of Public Bicycle sharing system in New Delhi Municipal Area
Review - 3 **(Reviewers: Dr Geetam Tiwari, Ms Akshima T Ghate and Shri M.L. Chotani)**		
1.	Mr. Sanjay Kumar and Ms. Renuka Singh	A critical analysis of the existing provisions/proposals in various Development Plans in Haryana with reference to the Traffic and Transportation aspects
2.	Mr. Himanshu Shekhar, Mr. Anshoo Pandey and Mr. Krishna Shukla	Transport solutions for upcoming Kumbh Mela 2019 at Allahabad
3.	Mr. Zohmingthanga	Planning and Management of Parking in the Central Area of Aizawl city
Review - 4 **(Reviewers: Dr. M. Ramachandran and Shri Shivanand Swamy)**		
1.	Mr. Karia Parth, Mr. Yash Chaudhary and Mr. Shafeeq Ahmed	Land Value Capture – A tool for maximizing Non-Fare box revenue for metro systems
2.	Mr. Amit Gupta	Technical feasibility and financial viability for procurement of electric bus for Chandigarh city
3.	Mr. Tushar Singh and Mr. Rajeev Kumar Tiwari	Delhi – Meerut RRTS Corridor being implemented by NCRTS
4.	Mr. H. Vasanth	Analysis of Accidents causes and prevention in NEKRTC, Gulbarga
5.	Mr. Senthil A.K. Raj (reviewed on 15.12.2017 at IUT)	Developing a safe route to school programme
6.	Mr. Chandra Shekhar Dastimi (reviewed on 15.12.2017 at IUT)	Policy, Planning and Management of Parking in Vijayawada city

PTV TECHNICAL SESSIONS

The PTV group provides software and consulting services for transport, logistics and geo marketing. The group plans and optimises all the modes which move peoples and goods worldwide in terms of transport, routes on sale and structure or private transport. The range of products includes software and services data components, consulting and research services. The group organised three sessions in the current edition of Urban Mobility India. A brief overview, with the list of speakers is as below:

Presenters sharing their views

S.No.	Presenters	Topic
	PTV Session - 1	
1.	Dr. Thomas Schwerdtfeger, PTV Group	Welcome and Introductory Note
2.	Shri Prabhu TD, PTV Group & Ms. Marijana Matanovic, PTV Group	PTV Group Activities in India & What's new in PTV Software
	PTV Session - 2	
1.	Shri Trishul Palekar, Stantech	Innovative high capacity intersection layouts
2.	Shri Shiva Teja Thoyyeti, Dr. Anuradha Shukla	Environment consideration in assessing level of service of signalised intersections
3.	Ms. Boski Chauhan, SVNIT Surat	Traffic simulation in Vissim for signalised intersection of Vadodara city
4.	Ms. Marijana Matanovic, PTV Group	PTV Visum safety in smart city projects
	PTV Session - 3	
1.	Shri Srinivas Bandaru, CH2M	Innovative airside simulation using PTV Vissim
2.	Shri Pratap Singh Bhonsale, Global Traffic Solutions	Signal Optimization using PTV Vistro for a major BRTS corridor in Pimpri-Chinchwad, Maharashtra
3.	Shri Harshvardhan, Spectra Techno Consultants	Simulation of efficient junction designs in Hubbali-Dharwad
4.	Shri Rishi Ahuja, Sunovatech Group	Visual Reality techniques

Some of the salient discussions out of the above three PTV sessions are listed below:

- PTV BALANCE and PTV EPICS are used for vehicle actuated signal control, whereas PTV OPTIMA helps in fusion of a transport model capable of prediction with online real time data. It will provide information on existing conditions to create a relative prediction.
- Some of the key benefits of PTV VISION STAR PAGE multimodal application are:

Presentation by speaker

- ➢ Regional and national demand models.
- ➢ Modelling of long distance passenger demand.
- ➢ Modelling of long distance freight transport.
- ➢ Modelling of bicycle carriages.
- ➢ Display of P & R entire path from origin to destination.
- ➢ Display of tours; land paths from ABM models.
- ➢ Modelling and evaluation of vehicle sharing system.

- ❑ Underlining principle in continuous flow at intersections should be fewer phases and conflicts.
- ❑ PTV VISUM safety generates a heat map based on user accident data to focus road safety section programmes in the significant areas e.g. cyclists, PTV VISUM Safety also manages black spot data.
- ❑ In order to fulfil efficient measures for controlling and adapting vehicles emissions, it is mandatory to develop an integrated microscopic model which replicates the actual situation.
- ❑ VISSIM (Verkehr In Stadten – SIMulationsmodell) is a traffic flow modelling program used to simulate various traffic scenarios. VISSIM is a microscopic, behaviour-based simulation model in which operational collaboration parameters control the driver behaviour characteristics of individual vehicles in the simulation model.
- ❑ They play a large role in the capacity calibration of a model. The main categories of operational calibration parameters include car following behaviour, necessary lane changing behaviour and lateral distances.

Speakers for the session

Speaker making presentation

Speaker making presentation

Presentation of project work

EXHIBITION

The exhibition is a special feature of UMI to promulgate and showcase the latest development in urban transport technology and systems, implementation of best transport projects, propagation of innovative ideas, presentation of research in the topical areas of interests in urban transport and exchange of good urban transport initiatives and practices in the field.

In all, nine sponsors and exhibitors participated in the manifestation and unveiled their products, technology, projects and transport systems for wider dissemination. The list of Sponsor, Exhibitor, Knowledge Partner and Media Partner are attached at Annexure III, IV, and V respectively . The exhibition was inaugurated by Shri M. Venkaiah Naidu, Hon'ble Vice President of India on 4th of November 2017. The latest technology, particularly the modern transport system, NMT (bicycles) computer systems helping in traffic management, were of special interest to the esteemed guests. Exhibitors received many specific queries from the participants to solve urban transport problems in their respective cities.

Hon'ble Vice President of India Inaugurating the exhibition

Exhibitors

On the whole the expo was well received by both the participants and the visitors. Awards for best exhibitors was given to the following promoters:

Prize	Company
First Prize	Maharashtra Metro Rail Corporation (MAHA Metro)
Second Prize	AUM Infotech
Third Prize	Chennai Metro Rail Limited

Glimpses of the Expo

VALEDICTORY AND CLOSING SESSION

- *Welcome Address* by Shri Navin Mittal, Secretary (UD), Govt. of Telangana
- *Special Address* by Mr. Dominique Bussereau, President, CODATU
- *Special Address* by Mr. Amadou Ba, CETUD (Dakar)
- *Presentation of Awards for Excellence in Urban Transport and Urban Mobility Awards* by the Hon'ble Minister, GoI and Minister, Government of Telangana
- *Valedictory Address* by Shri K.T. Rama Rao, Hon'ble Minister for Information Technology (E&C), Municipal Administration and Urban Development, Industries and Commerce, Mines and Geology, Public Enterprises and NRI Affairs, Telangana, Government of Telangana
- *Outcomes of conference and Launch of UMI 2018* by Shri Durga Shanker Mishra, Secretary, Ministry of Housing and Urban Affairs
- *Vote of thanks by Sh. M.K. Sinha, OSD (UT) and Jt. Secretary MoHUA.*

Dignitaries sharing their views

Felicitation of Chief Guest

Shri Navin Mittal, Secretary, Urban Development, Govt. of Telangana expressing his views

Shri Navin Mittal, Secretary, Urban Development, Govt. of Telangana welcomed the dignitaries and participants to the valedictory session of the annual UMI Conference 2017. He postulated that the conference had been a prodigious effort where presentations made was highly propitious and in line with the theme of the conference. He thanked the Ministry of Housing and Urban Affairs, Govt. of India for holding this conference at Hyderabad. He accentuated that deliberations in the conference were intense, useful and fruitful with about 1000 delegates registering including more than 100 foreign delegates and the large delegation from CODATU, the co-associates of the conference. He belaboured on the ongoing initiatives in the field of housing and urban transport projects in the newly created State of Telangana. Various cities in Telangana have been participating in the national

mission programmes such as Housing for All, Smart City and the AMRUT programme. It has developed integrated metro rail corridors along with taking up urban rejuvenation, non-motorised transport and transit- oriented development projects across the state.

Hon'ble Minister, Government of Telangana

On this occasion, Mr. Amadon Ba CETUD (Dakar) shared his experiences in France and other countries on the improvement of urban transport systems particularly newer mobility concepts. Mr. Dominique Bussereau, President CODATU, also shared his views and expressed his gratitude to the organisers of the Conference for collaborating with CODATU.

Thereafter, Shri K.T. Rama Rao, Hon'ble Minister for Information Technology, Municipal Administration and Urban Development, Industries and Commerce, Mines and Geology, Enterprises and NRI Affairs, Govt. of Telangana, gave the awards for excellence in urban transport projects, planned and implemented by state and city authorities in the following categories:

S. No.	Category	Award Winner	Commendable Initiative
1	Best NMT Project	None	Mysuru Public Bicycle Sharing Public Bike Sharing System in Bhopal.
2	Best City Bus Service Project	Surat City Bus Service	NOIDA – Greater NOIDA city Bus Service Introduction of Ladies Special Bus Service – Andaman.
3	Best Urban Mass Transit Project	None	State-wide implementation of cluster based Bus Transit System as per Hub and Spoke Model in Madhya Pradesh under PPP Mode. Lucknow Metro Rail Project Phase 1A (North- South Corridor)
4	Best Intelligent Transport System Project.	ITMS for Pune	Hyderabad Traffic Integrated Management
5	Best Initiative for Improved Road Safety	None	SOFT, Thiruvananthapuram (An initiative for Road Safety)
6	Best City in Urban Transport Initiative	Seamless Transport for Kochi.	

UMI Awardees

UMI Awardees

Shri D.S. Mishra, Secretary, Ministry of Housing and Urban Affairs, expressed his happiness for the salubrious attendance of the conference, more so in the Valedictory session. Enunciating the grandeur of the event, he conveyed the participation had been from 23 countries, 20 states and Union Territories and 26 cities. There had been serious deliberation on all three days and the types of presentations made by the experts and interactions had by the participants, proved that the Urban Mobility India Conference is gaining momentum across the country.

Secretary, MoHUA presenting outcome of conference

The 10th UMI is more significant in the sense that CODATU, for the first time since conducting the VIIth conference in India at Delhi in 1997, revisited the country to jointly hold the XVIIth Conference at Hyderabad. Theme of the Conference - Intelligent, Inclusive and Sustainable Mobility has been canvassed in detail over the past three days to the benefit of the gathering by and large.

He stated that urban problems like sanitation, water etc. are serious threats to the future, but urban mobility would pose one of the biggest challenges to policy makers. An Annual Conference under the brand name of UMI is one of the initiatives as part of NUTP where national and international experts, policy makers, urban transport managers, people from academia and industry meet under one umbrella to share their views and experiences to overcome these challenges.

Compere at the session

The Conference threw up a near unanimous view on reorientation of urban transport planning, financing and execution to promote "Intelligent Inclusive and Sustainable Mobility". For effective mobility solutions, complementarity among different modes of transport need to be promoted in

place of the existing competition-oriented system. With new paradigms of urban mobility and user behaviour emerging, India is moving towards a new 'normal' in terms of urban transportation and this new 'normal' needs to be realized in the quickest possible timeframe to overcome present mobility constraints.

Emerging trends in mobility are such as transitions from owning a car to owning a ride; not only the user, but also the beneficiary paying for new transport projects and also moving towards electric vehicles. Adding to this, he suggested that the metro rail should no longer be treated as a project in isolation, but more as an urban transformation initiative. The Government of India's recent new Metro Rail Policy has been widely welcomed by the industry, researchers and the authorities, with emphasis on innovative financing and non-fare revenue options to be fully explored to finance metro systems.

Audience in the session

He was of the opinion that shared mobility options should be promoted for demand management both for passengers as well as freight services. A regulatory framework should be put in place to promote eco-friendly IPT modes in an enabling ecosystem. Along with this, pedestrian planning needs to be made mandatory under city planning which should take into its purview the pedestrian and cycling pathways, thereby ensuring the much desired first and last mile connectivity, besides reducing private vehicle trips for short distances. Urban transport planning should acknowledge the right of access to public spaces for the poor and the marginalized by providing an accessible and affordable urban transport to ordain an inclusive mobility.

Dignitaries on the Dias

Hyderabad conference effectively underscored inseparability of intelligent mobility, inclusive mobility and sustainable mobility and called for an integrated approach to address these issues. The international scientific community sessions introduced by CODATU for the first time at Hyderabad proved highly useful in identifying areas for further focussed research.

As discussed in UMI-2016, a two years M.Sc. programme in Urban Mobility will be started in the next session by CEPT University. Completing one semester, will get you a certificate in Urban Mobility and after completing two semesters, a Diploma in Urban Mobility. After completion of four semesters, one will get a Master's degree in Urban Mobility. This will be the first programme of its kind in Urban Mobility offered by CEPT.

Ministry has recently launched the Metro Rail Policy, 2017 which provides scope for many discussions on the Metro Rail Transport System, Light Rail Transport System and other similar systems. In view of the 25% CO2 caused by existing fuel-based transport systems, moving to electric mobility seems to be the futuristic approach.

He also stated that the capacity building being organised by the Ministry through IUT should be made use of by the states and cities by deputing large numbers of officers to develop a pool of trained personnel in urban transport. The need is to take up urban planning and mobility planning together and the states should create UMTA for coordinating all the efforts made in Urban Transport Planning and Development. He thanked all the officers of the M/o HUA particularly OSD Transport and his team, stakeholders, metro companies and CODATU delegation for making the event successful. He also announced that UMI-2018 will be held at Nagpur in the first week of November 2018 on the theme "Green Urban Mobility".

Honourable Minister, Telangana delivering Valedictory address

In his valedictory address Shri K.T. Rao, Hon'ble Minister of Urban Development; Govt. of Telangana complimented the team of Ministry of Housing and Urban Affairs, Govt. of India for organising the Conference in Hyderabad.

He said that fast growing cities in any country including India have become a challenge for the planners and managers. We have the second largest urban system after China. Telangana State with 42% urban population is one of the most highly urbanised states in the country. The urbanisation is both a challenge and an opportunity as well. The existing civic infrastructure in cities is cracking across the country. Urban planning and mobility are the key to success for India's development. Cities all over the world have made wider roads, flyovers which resulted in more vehicles on roads.

He mentioned to the gathering that the city has developed Hyderabad Metro which is one of the World's largest metro rails in PPP mode. It is a unique example of a commercial viability mode possible through property development

Dignitaries sharing their views

Audience in the session

in and around transit stations. We have a strong political initiative for development of a metro rail. Encroachments along roads / footpaths would be removed and urban rejuvenation projects taken up.

He said that the programme initiated by Hon'ble Union Minister of Highways to promote electric vehicles by 2030 is commendable.

Vote of Thanks by OSD (UT) & Ex-officio JS, MOHUA

The Govt. of Telangana has provided the enabling environment for ease of doing business. He concluded his address by thanking the Govt. of India, CODATU and other sponsors and stakeholders for making the event successful in this beautiful city of Hyderabad.

Shri M.K Sinha, OSD (UT) and E.O. Joint Secretary, Ministry of Housing and Urban Affairs and Acting DG (IUT) proposed a vote of thanks. He said that the UMI team is thankful to the honourable Vice-President Shri M. Venkaiah Naidu who had taken time out of his extremely busy schedule to inaugurate this conference and exhibition.

On behalf of the Ministry of Housing and Urban Affairs, he expressed gratitude to the Hon'ble Chief Minister of Telangana, Shri Chandrasekhar Rao for his time and support from Govt. of Telangana for organizing this international event at Hyderabad. He also expressed gratefulness to Md. Mehmood Ali, Deputy Chief Minister, Govt. of Telangana and Shri Hardeep Singh Puri, Hon'ble Minister of state (I/C) for Housing and Urban Affairs for being a constant source of inspiration and support for the mega event. He expressed his sincere thanks to Shri K.T. Rao, Hon'ble Minister of Urban Development Municipal Administration for chairing the concluding session and delivering the valedictory address. He expressed his thanks to Secretary UD Shri Durga Shankar Mishra for his guidance and support in all matters in preparations for the conference.

Annexure I

TECHNICAL PROGRAM

Pre-event 3rd November 2017 (1500 – 1800)
Registration

Day 1 – 4th November 2017 (09:30 – 13:20)	
Registration (0930 – 1130)	
Reception of Chief Guest (11:00 – 11:30)	
Inaugural of the Exhibition (1130 – 1200) (Hall 3)	
Inaugural Session (1200 – 1320) (Hall 4) • *National Anthem* • *Lighting of the Lamp* • *Welcome Address* by Shri Durga Shanker Mishra, Secretary, Ministry of Housing and Urban Affairs, Government of India • *Address* by Shri S.P. Singh, Chief Secretary, Government of Telangana • *Address* by Mr. Dominique Bussereau, President, CODATU & Mr Alexandre Ziegler, Ambassador of France to India • *Address* by Shri Hardeep Singh Puri, Hon'ble Minister for Housing and Urban Affairs, Government of India • *Address* by Shri Mohammad Mahmood Ali, Hon'ble Deputy Chief Minister, Government of Telangana • *Release of publication on Urban Transport* by Chief Guest • *Inaugural Address* by Chief Guest, Shri M. Venkaiah Naidu, Hon'ble Vice President of India • *Vote of Thanks* by Shri Manoj Kumar, Additional Secretary (D&C), Ministry of Housing and Urban Affairs, Government of India • *National Anthem*	
Inaugural Lunch (1320 – 1430) *(Hall 3)*	
Day 1 – 4th November 2017 (1430 - 1600)	
Special Session - Intelligent Mobility (GF - MR 5 & 6)	*Welcome Address* - Shri Manoj Kumar, Additional Secretary (D & C), Ministry of Housing and Urban Affairs *Opening Remarks* – Sri Navin Mittal, Secretary, Govt of Telangana • Intelligent Mobility: Convergence of disruptive technologies delivering innovative solutions that support smart, connected and liveable cities, Prof Shivanand Swamy, CEPT • Intelligent Mobility, Shri Ravi Peri, Principal Transport Specialist, Asian Development Bank (ADB) • Urbanization Scenario and Intelligent Mobility, Shri Shivanand Nimbargi, MD, L&T Metro, Hyderabad *Vote of Thanks* - Shri Janardhan Reddy, Commissioner, Greater Hyderabad Municipal Corporation (GHMC)
Inclusive Planning, Mobility for All (Hall 2) (interpretation)	*Chairperson*: Shri Brijesh Dixit, Managing Director, Maha Metro Rail Corporation Ltd. • *Urban Poor and their Mobility Challenges* – Dr Pawan Kumar, Associate TCP, Town and Country Planning Organization (TCPO), GoI • *Bicycle Sharing Project, Mysore* – Shri Darpan Jain, Commissioner, Directorate of Urban Land Transport (DULT) & Shri N. Murali Krishna, ITS, Special Officer, DULT • *Inclusive mobility in RENNES* – Mr. Laurent Senigout, MD, KEOLIS Rennes • *Inclusive mobility* – Mr. Jean-Baptiste Gernet, Deputy Mayor of Strasbourg, in charge of Mobilities • *Biking and active mobility in urban planning* – Mr. Pierre Serne, Director of the Network of Cyclable Cities

Electric Mobility (GF - MR 3 & 4) (interpretation)	*Chairperson*: Dr. Sudhir Krishna, Former Secretary, Government of India • *Smart and Connected Mobility for the Future* – Mr Arun Vinayak, Chief Business Officer, Ather Energy • *Electric Mobility for the City of Hyderabad* – Subash Dhar, UNEP DTU • *Electric Freight Transport* – Mr. Jean-Michel Genestier, Deputy General Manager, SNCF Logistics
Multimodal Integration: Case Studies from all Over the World (FF - MR 3 & 4) (interpretation)	*Chairperson*: Dr. Mangu Singh, Managing Director, Delhi Metro Rail Corporation Ltd. *Co-Chair*: Mr. Pedro Ortiz, Urban Planner, Multilateral and Government Consultant • *Setting-up a Multimodal Network* – Ms. Annie Guillemot, Former President, SYTRAL and French Senator • *Multimodal integration: Case Study 'Rennes'* – Mr. Eric Diserbeau, Director Mobility and Transport at Rennes Metropolis (France) • *Engaging Entrepreneurs to Provide Integrated Mobility Solution* – Shri Amit Bhatt, WRI • Access to Stations and Innovations in underground Construction – Shri P.K. Bansal, MD, Chennai Metro Rail Limited • Case study of KMRL– Shri. Praveen Goyal, Director (Systems), KMRL
Governance, Urban Planning and Mobility (FF - MR 5 & 6) *(interpretation)*	*Chairperson*: Dr. M. Ramachandran, Former Secretary, Government of India *Co-Chair*: Mr. Christian Curé, Director, CEREMA (Centre for Scientific Resources, expertise and Interdisciplinary techniques providing support for State Services and Local Authorities) • *The Transformation of the City of Bordeaux, France* – Ms. Anne Raimat, Bordeaux Metropolis • *The Public Transport and the Role of Public Transport Authorities in France* – Ms. Francoise Rossignol, elected member of GART (Association of French Public Transport Authorities) • *How Roads built around Pedestrians Became a Reality: The case of Tender SURE in Bengaluru* – Shri V. Ravichandar, City Connect • *Sustainable Mobility Initiatives in Hyderabad Metropolitan Area* – Shri C.S. R K. Prasad, Professor, NIT Warangal
LUTP Review – CEPT (Group 1A) (FF – MR 1)	*Reviewers:* Prof. Sanjay Gupta, Shri Abhijit Lokre, Shri Gautam Patel, Ms. Shalini Sinha, Shri A.S Lakhra • *Improve operational efficiency of CMRL* – Mrs. Lakshmi, Shri T.P Vinod Kumar and Shri S.K. Madhavan • *Public Bicycle Sharing (PBS) as a Non-Motorized Transport to Complement Public Transportation* – Ms N. Veena • *Development of Intermodal Transport Circle at Kathipara Junction Alandur* – Shri Vijaya Basker & Shri Saravanan • *Non-fare Optimisation for Pune Metro* – Shri Ajit Kawade and Dr. Pradnya Kasar • *Route Rationalisation of Public Transport Services in Indore* – Shri Chetan Karnik
LUTP Review – CEPT (Group 2A) (FF – MR 2)	*Reviewers*: *Mr. I.C. Sharma,* Prof Seva Ram, Shri Laghu Parashar, Shri Vivek Ogra, Ms. Nitika Bhakuni, • *New Metro Policy Review* – Mr. Naresh Bhardwaj • *Congestion Management at Trivandrum Railways Station Area* – Shri Pradeep Wales • *Integration of Transit services in Mumbai* – Shri Goraksha Jagtap, Shri Raju Bhadke and Ms Vijayalaxmi • *Reduction of Traffic Problems in Aizawl* – Shri Ramchuana & Shri R.L Zidinga • *Place Making and Integrating Feeder Services* – Shri Rahul Goswami, Ms Nidhi Singh and Shri Brij Bhushan Sharma
Tea Break and Transport Quiz (1600 – 1700) *(Hall 3)*	

Day 1 – 4th November 2017 (1700 - 1830)	
Plenary Session - New Paradigms of Mobility (Hall 2) (interpretation)	*Chairperson: Shri P.K. Bansal, M.D., Chennai Metro Rail Limited* Co-chair: M. Yoshi Hayashi, President of WCTRS • *Future of Mobility* – Dr O.P. Agarwal, CEO, WRI • *Retrospective of 20 Years of Mobility* – Mr. Ali HUZAYYIN, CODATU • *Perspectives in the Developing World* – Mr. Michel LARAMEE, CODATU and Mr. Xavier Crepin, Ministry of Foreign Affairs
LUTP Review – CEPT (Group 1B) (FF – MR 1)	*Reviewers*: Dr. M Ramachandran, Prof. Sanjay Gupta, Shri Abhijit Lokre, Shri Gautam Patel, Ms. Shalini Sinha, Shri A.S Lakhra • *Smart Parking for Raipur* – Shri Abhinav Agarwal • *Public Transport Policy and Strategy for Gurugram* - Ms Usha Kiran • *Fare Policy (Collection and Revision) for MP* – Shri Parijat Jain and Shri Mohit Bundas • *Performance Assessment and Expansion Strategy for Gulbarga City Services* – Shri Santosh Kumar and Shri Mohammed Faiz • Integrating DEMU and MEMU Operations and Maintenance in Bangalore – Shri Swayambhu Arya
LUTP Review – CEPT (Group 2B) (FF – MR 2)	*Reviewers*: Dr. Sudhir Krishna, Shri. I.C. Sharma, Prof Seva Ram, Shri Laghu Parashar, Shri Vivek Ogra, Ms. Nitika Bhakuni, Prof Shivanand Swamy • *Station Area Development Amritsar Station including Parking and Last Mile Connectivity* – Shri Rajneesh Kumar Shrivastava • *Equitable Road Design for Delhi Roads* – Shri Sanjeev Rastogi; Shri Pradeep Gupta • *Accident Management System for Dehradun* – Shri Sunil Kumar Meena • Leaders Forum Review Leaders 5 • *Transport Demand Management Tools for Metro Rail System- Strategy to ease congestion in DMRC* – Mr. Amit Kumar Jain & Ms. Priya Agrawal • *Zoning and Development Regulations for NPT in Transit Oriented Development – Southern Periphery Road, Gurgaon Manaser Urban Complex* - Shri Rajesh Kaushik • *J card - an RFID based automated public transport fare collection systems for the city of Jabalpur* – Mr. Sachin Vishwakarma & Ms. Ankita Gupta
Day 2 – 5th November 2017 (0930 - 1100)	
Plenary Session: Smart City and Mobility (Hall 2) (Interpretation)	*Session opening: Prof. Rosario Macario* *Chair and Key-note speaker*: Mr. Pedro Ortiz, Urban Planner, Multilateral and Government consultant • The conception of smart mobility for the city of Strasbourg - Mr. Jean-Baptiste Gernet, Deputy Mayor of Strasbourg (France) • Mr. Frederic Baverez, CEO, KEOLIS • Shri Sajeesh Kumar, Director Smart Cities, Ministry of Housing and Urban Affairs • Shri Kunal Kumar, Municipal Commissioner, Pune
Tea Break and Transport Quiz (1100 – 1130) (Hall 3)	
Day 2 – 5th November 2017 (1130 - 1300)	
Public Transport (GF- MR 3)	*Chairperson*: Shri I.P. Gautam, Managing Director, MEGA • *Urban Rail Transit for Achieving Sustainable Regional Development* – Shri V.K. Singh, MD, NCRTC. • *BRTS: Shaping Tomorrow's Public Transport - An International Experience* – Shri Suresh Chettiar, Chief Operating Officer, Volvo Buses – South Asia • *Transforming City Bus Service, Noida* – Shri Kartar Singh, Deputy General Manager, Empire Transport Service Limited Noida • *Providing Public Transit in Small and Medium Towns* – Shri S. Satyanarayana, Chairperson, Telangana State Road Transport Corporation (TSRTC)

Land Value Capture & TOD (GF- MR 4)	*Chairperson:* Shri Abhay Mishra, CEO, Mumbai Metro One Pvt. Ltd. (TBC) • *TOD Experience in Hyderabad* – Sri T. Chiranjeevulu, Metropolitan Commissioner, Hyderabad Metropolitan Development Authority • *Challenges in Implementing TOD in Indian Cities* – Prof. Shivanand Swamy, Executive Director, CEPT University, Ahmedabad • *Implementing TOD: An International Perspective* – Ms Jaya Dhindaw, WRI • *Land Value Capture for Station Development*- Shri S.K. Lohia, MD, SDC
Design, Funding and Implementation of a Tram System - Session organized by Bordeaux Metropolis (GF- MR 5) (interpretation)	*Chairperson:* Ms. Anne Raimat, Bordeaux Metropolis *Co-Chair:* Mr. Etienne Lhomet, Transport Expert, CODATU/DVDH • *Presentation of Case studies from Bordeaux* (Ms. Geraldine Di Matteo) *and New Delhi* (Mr. Vincent Lichere, Suez Consulting) • *Experience sharing* from Keolis and Egis Rail • *Introduction of the Projects in Hyderabad* (Shri Navin Mittal, Government of Telangana) *and Kochi* (Shri GP Hari, KMRL)
ISC Session 1: **Public Transport and Citizens Preferences** (GF- MR 6)	*Chairperson:* Dr. OP Agarwal, CEO, WRI • *Assessment of Passenger Satisfaction with Public Bus Transport Services: a Case Study of Lucknow City (India)* – Dr. Sanjay K. Singh, IIM, Lucknow, India • *Pre-determined Fare Structures for Rickshaws when Integrating with BRT systems* – Dr. Shafiq-Ur Rahman, University of Jahangirnagar, Bangladesh; • *Role of Taxis in Urban Mobility of Metropolitan Environment: Case of Delhi and Ahmedabad, India* – Prof. Shivanand Swamy, CEPT / Prof. Sanjay Gupta / Shri Rajesh Pradhan / Ms Shravani Sharma
Challenges of Developing Mass Transit Systems in Developing Countries (FF- MR 1)	• *Presentation of the Safe Access Manual and Workshop* - Shri Rajeev Malagi, WRI • *Case study of Kochi and Presentation of the booklet on "The Experience of Kochi Metro Project a Great Contribution to the History of Indian Metros"* - Mr. Mathieu Verdure, AFD and Ms. Marion Hoyez, CODATU
Maintaining Equity in Urban Transport in Developing Countries - Issues and Challenges (FF- MR- 2)	• Activity-Travel Behavior of Non-Workers in Different Income Group Households: Case of Bangalore City – Dr. M. Manoj, IIT Delhi • *Addressing Equity Issues Associated with Roadway Pricing* – Dr. Tarun Rambha, IISc Bangalore • *Bicycling in developing countries- the role of gender* – Dr. Rahul T. M., Amrita University, Coimbatore • *Service Gap Analysis of Public Buses in Bangalore With Respect to Women Safety* – Prof. Ashish Verma, IISc Bangalore
The French Experience of Sustainable Urban Development (FF- MR- 3) (interpretation)	*Chairperson*: Mr. Guy Lebras, Director of GART (Association of Public Transport Authorities) • *The Role of Trams in the City of Strasbourg* – Mr. Jean-Baptiste Gernet, Deputy Mayor, Strasbourg • *Case study of Medellin Metro Cable* – Mr. Benjamin FAUCHIER-DELAVIGNE, POMA • *Lessons learned from Mumbai Metro One* – Mr. Paul Gardey de Soos, RATP Dev Transdev Asia • *A 3D sustainable city simulator for Santiago* – M. Timothee Mangeart, Artelia City & Transport
PTV Session 1 (FF- MR 4)	• *Welcome and Introduction* – Dr. Thomas Schwerdtfeger, PTV Group • *PTV Group Activities in India & What's New in PTV Software* – Shri Prabhu TD, PTV Group and Ms. Marijana Matanovic, PTV Group
ESCBS-Knowledge Exchange Workshop on ITS-conducted by SUTP (FF- MR 5)	Session 1: Implementation Models for Adopting ITS in Public Transport • Shri G. P. Hari, AGM, Kochi Metro • Shri Sudipto Roy, GM & Business Head, ICICI • Shri Rakesh Shankar, IAS, Deputy Municipal Commissioner, Ahmedabad • Shri Sujit Nair, Director, Paycraft Solutions
Lunch (1300 - 1430) (Hall 3)	

Day 2 – 5th November 2017 (1430 - 1600)	
Shared Mobility (GF- MR 3)	*Chairperson:* Shri Kumar Keshav, MD Lucknow Metro • *Mobility Management in Mega Cities using Shared Mobility Options* – Shri Shailesh Kumar , OLA • *Bus Service: an Option of Shared Mobility* – Shri Amit Singh, Co- founder, Shuttl • *Regulating IPT* – Ms Akshima Ghate, TERI • *Collaborating Supply Chains in Urban Areas* – Shri Anirudh Batwara, co-founder, UDAN Logisure
Financial Planning for Urban Transport Projects (GF- MR 4)	*Chairperson*: Shri P.S. Kharola, MD, Bangalore Metro • *Dr Rohini Balasubramanium* • Bangalore Metro Rail Corporation Limited • Non-fare Box Revenue initiatives by Maha-Metro, S. Sivamathan, Director (Finance)
How to boost urban or social projects threw transport projects dynamics? (GF- MR 6)	*Chairperson*: (TBC) • *Case studies from Lisbon and Lausanne* – Mr. Julien Allaire, Director of International affairs at Transitec • *Mobility planning in France* – Mr. Thierry Gouin, Cities and territories, CEREMA • *Case studies from Ouagadougou (Burkina Faso) and Lyon (France)* - Mr. Thibaut Descroux, Town Planning Agency of Lyon • *Case studies from Curitiba (Brazil) and Medellin (Colombia)* – Mr. Pablo Salazar Ferro, CODATU • *Dialog* with Shri GP Hari, Additional General Manager, KMRL
ISC Session 3: **Big Data for Transport Planning** (FF- MR 1)	*Chairperson:* Shri. Vivek Ogra, Technology Solution Architect, VbSoft • *Estimating Missing Path on Trajectories Trip by using Bluetooth Technology* – Mr. Thana Potanon, University of Nihon, Japan; • *Can Big Data Contribute to Improve our Quality of Life in Big, Congested Cities?* – Prof. Marcela Munizaga, University of Chili
ISC Session 5: **Travel Management and Road Safety** [FR] (FF- MR 3) (interpretation)	*Chairperson* - Mr. Charles Rivasplata • *The Road Safety Issue in the Agglomeration of Abidjan (Ivory Coast)* - Mr. Yao Godefroy Konan, Ministry of Transports, Ivory Coast; • *Road Safety and Wealth of a Country: Which Link? The Example of Tunisia* – Mr. Mohamed Souleiman Ouannes, University of King Faisal, Saudi Arabia • *Traffic Flow Analysis in Emerging Country (India)* - Tsutomu Tsuboi, Nagoya Electric Works Co., Ltd / Noriaki Yoshikawa, Cyber Creative Institute Co., Ltd
PTV Session 2 (FF- MR 4)	• *Innovative High Capacity Intersection Layouts* – Shri Trishul Palekar, Stantec • *Environment Consideration in Assessing level of Service of Signalized Intersections* – Shri Shiva Teja Thoyyeti, Dr. Sewaram, Dr. Anuradha Shukla • *Traffic simulation in Vissim for signalized intersection of Vadodara city* – Ms Boski Chauhan, SVNIT Surat • *PTV Visum safety in smart city projects* – Ms. Marijana Matanovic, PTV Group • Q & A
ESCBS-Knowledge Exchange Workshop on ITS-conducted by SUTP (FF- MR 5)	Session 2: Increasing productivity through ITS implementation • Dr. Aneesh Chinubhai, Chief Technology Officer, Infinium Solutions Pvt Ltd • Shri Anil Kumar Saini, COO, Railway System, L & T Metro Rail, Hyderabad • Shri Tanmoy Chakrabarty, Vice President and Global Head-Government Solutions Unit (ISU), TCS • Shri D. K. Sinha, CGM/S & T, DMRC
Tea Break and Transport Quiz (1600 - 1630) (Hall 3)	

Day 2 – 5th November 2017 (1630 - 1800)	
Intelligent Transport Systems for Urban Mobility (GF- MR 3)	*Chairperson*: Shri R.K. Singh, Chief Engineer, Lucknow Metro • Dr Rajesh Krishnan, CEO, ITS Planners and Engineers Ltd • *Role of ITS in Urban Mobility* – Dr. K Ramamurthy, Chief Mechanical Engineer, KSRTC • *New Mobility: Good for society and the environment?* – Ms Jyot Chaddha, WRI • *Open Loop Payment Systems* – Shri Nalin Bansal, National Payment Corporation of India
Research Symposium 1 - **Land use and Travel Behavior** (GF- MR 4)	*Chairperson*: Prof. Shivanand Swamy, Executive Director, CEPT University • *Industrial Trip Generation Model for Himmatnagar Industrial Area of Gujarat* – Ms Bhargavi Patel, Shri Dipesh Kadiya and Shri Harishkumar Varia • *Performance Evaluation of Intermediate Public Transport by Benchmarking Approach: A Case Study* – Shri Pydisetti Dinesh Kumar And Ms Kanta Naga Rajesh. • *Land Use Planning and Road Infrastructure Policy in India: The Role of Spatial Data In Decision Making* – Ms Samikchhya Bhusal • *Land Use Transport Integration Through User Behavioral Perspective: A Case Study of Greater Cochin* – Ms Visakha K A & Ms Anupama Warrier • *Understanding Patterns of Work Travel in India Using the Census Data* – Shri Nishant Singh
ISC Session 6 - **Public Transport Applications** (GF- MR 5) (Interpretation)	*Chairperson* - Mr. Etienne Lhomet, Transport expert, CODATU/DVDH • *Renewal of the Vehicle Fleet and Sustainable Development in Ivory Coast* – Mr. Yao Konan, Ministry of Transport, Ivory coast • *A Life Cycle Analysis of Urban Public Transport Systems in Indian Cities* – Shri Sharif Qamar, TERI, India;
Research Symposium 2 - **Mode Choice** (GF- MR 6)	*Chairperson*: Shri Manoj M., IIT Delhi • *Creating Alternative Mobility Options for Private Mode to Public Transport Mode: A Case of Gandhinagar* – Shri Keval Mistry, Ms Vaishali Rathod & Ms Vidhya Raghvan • *Use of Soft Computing for Mode Choice Analysis and Comparison with Traditional Multinomial Logit Model* – Ms Sumana Mitra & Dr. Pradeep Sarkar • *Analysis of Metro Rail Project Selection Bias with Principal Agent Model: A Case of Delhi, Bangalore, Mumbai, Jaipur And Chennai* - Shri Vinod Rathod & Prof. H.M Shivanad Swamy • *Feasibility and Travel Demand Study on Mass Transit Modes* – Shri Dennis Jose & Ms Angel Joseph • *Parking Supply Management as Strategy to Reduce Congestion and Improving Mobility in Core Area: Case Study of Bhopal City* – Ms Madhuri Jawale & Shri Paulose Kuriakose.
Research Symposium 3 - **Public Transport** (FF- MR 1)	*Chairperson*: Ms Shalini Sinha, CEPT University • *Travel Time Variability Modelling of Selected Bus Routes in India* – Shri Akhilesh Chepuri, Shri Raunak K, Shri Shriniwas Arkatkar, Prof. Gaurang Joshi & Shri Dewal Mishra • *Planning the Transit Interchange Zones* – Ms Anna Mariya Lukose • *Feasibility of Electric Bus Operation in Urban Areas- Case Study Delhi* – Shri Pintu Saini and Dr. Pradip Kumar Sarkar • *Role of Informal Public Transport: A Case of Kanpur, Aligarh And Hathras, UP (India)* – Shri Banshi Sharma • *Feeder Network System Design for Mass Transit Systems* – Ms Anu Sachan & Shri Tom V Mathew

ISC Session 7: **Transport and Energy** (FF- MR 2)	*Chairperson*: Ms. Akshima Tejas Ghate, TERI • *Impacts of Fuel Consumption Reduction by Hybrid Car Promotion in Bangkok* - Prof. Atsushi Fukuda, University of Nihon, Japan • *Transport, Fuel Consumption and Emissions:* Findings of Previous and Ongoing Research in Cairo – Prof Ali Huzayyin
ISC Session 8: **Transport and Urban Planning** (FF- MR 3) (interpretation)	*Chairperson*: Shri V. Pathak • *The Relationship between Transport, Housing, and Urban Form: Affordability of Transport and Housing in Indonesia* - Ms. Yulia Dewita, Dr. Matthew Burke, Dr. Barbara Yen, University Griffith, Australia • *Impact of Regulatory Framework in Urban Mobility Systems*: the case of Brazil - Prof. Rosário Macário • *Transport and Urban Planning* – Dr. Charles Rivasplata
PTV Session 3 (FF- MR 4)	• *Innovative Airside Simulation using PTV Vissim* – Shri Srinivas Bandaru, CH2M • *Signal Optimization using PTV Vistro for a major BRTS Corridor in Pimpri-Chinchwad, Maharashtra* – Shri Pratap Singh Bhonsale, Global Traffic Solutions • *Simulation of efficient junction designs in Hubli-Dharwad* – Shri Harshavardhan, Spectrum Techno Consultants • *Visual Reality Techniques* – Shri Rishi Ahuja, Sunovatech Groups • Q & A • PTV Awards & Vote of Thanks
ESCBS-Knowledge Exchange Workshop on ITS-conducted by SUTP (FF- MR 5)	Session 3: Smart Transport Ticketing in India • Shri Nalin Bansal, Vice President & Head, NPCI • Shri Ajesh Kapoor, Director, India Region Sales, NXP Semiconductors India Pvt Ltd • Shri Praveen Sachwani, Director, Engineering Verifone

Day 3 – 6th November 2017 (0930 - 1100)	
Plenary Session: Metro Rail (Hall 2) Chairperson: Shri Durga Shanker Mishra, Secretary, Ministry of Housing and Urban Affairs, Government of India • *Taking the Metro to People's Doorstep* – Dr O.P. Agarwal, CEO, WRI • *Digital Project Management* – Mr Salah Abdulatif Al Dilimi, Rail Infrastructure Maintenance, Rail Agency, Dubai • *Non-Fare Box Revenue* – Mr. Gregory Chow, Planning Expert, Systra • *Role of PPP in Metro Operations* – Shri P.K. Bansal, Managing Director, Chennai Metro Rail Ltd. • *Benefits of Digitalizing Metro Project from Concept to Commissioning, Shri Brijesh Dixit, Managing Director, Maha Metro*	
Tea Break & Transport Quiz (1100 - 1130) (Hall 3)	
Day 3 – 6th November 2017 (1130 - 1300)	
Research Symposium 4 - **Pedestrian Models** (GF- MR 3)	*Chairperson*: Prof. C.S.R.K. Prasad, Professor, NIT Warangal • *Development of Pedestrian Safety Index Models for Safety of Pedestrian Flow on Urban Roads Under Mixed Traffic* - Shri Dinarayana Badveeti and Dr. Mohammad Shafi Mir • *Analyzing the Travel Behavior and Mobility Patterns of the Visually Impaired: A Case of Ahmedabad* – Ms Shivani Palepu • *Vehicle Class Wise Speed Prediction Models under the Influence of Crossing Pedestrian at Urban Mid-Block Sections* – Shri Hareshkumar Golakiya, Shri Manish Patkar and Shri Ashish Dhamaniya • *Public Bike Sharing: An Approach Towards Sustainable Transportation A Case Study of CBD In Indian Context* – Shri Samir Patel, Shri Chetan Patel, Prof. Gaurang Joshi & Shri Rajesh Pandya

Research Symposium 5 - **Urban Traffic Operations** (GF- MR 4)	*Chairperson*: Shri Nezamuddin, Assistant Professor, IIT Delhi • *On-Road Parking: A New Approach to Quantify the Side Friction Regarding Road Width Reduction* – Suvin P V and Shri Mallikarjuna Chunchu • *A Semi-Automated Image Processing Solution For Extracting Microscopic Traffic Data* – Shri Bharathiraja Muthurajan, Shri Rushikesh Amrutsamanvar and Ms Lelitha Devi Vanajakshi
Alternatives to Mass Transit Systems (GF- MR 5) (interpretation)	*Chairperson* - Ms Ashwini Bhide, MD, Mumbai Metro Rail Corporation • *The Role of SOTRAL* – Mr. Michel Tindano, Managing Director, SOTRAL (Lomé, Togo) • *Restructuring the Bus Network* – Ms. Michèle Vullien, Counsellor to Lyon Metropolis, French Senator, Elected member of SYTRAL • *Cities Need more than Metros* – KfWs approach to Urban Mobility - Stephanie Rieger, Head of Urban Development and Mobility, KfW's South Asia • *Light Metro in Urban Transport Sector* – Shri S.D. Sharma, Director (Business Development, DMRC
Research Symposium 6 - **Safety and Traffic Operations** (GF- MR 6)	*Chairperson*: Dr. Geetam Tiwari, Professor, IIT Delhi • *User Behaviour towards Traffic Violation* – Shri Ashwini Bokey And Ms Shalini Sinha • *Journey Risk Management for PMPML Buses in Pune City* – Shri Shubham Bannore, Ms Ashlesha Ithape, Prof. Manish Ingale, Dr. Sanjay Patil and Prof. Kiran Wani • *Image Processing Techniques for Traffic Data Extraction from Aerial Imagery* – Devunuri Sai Praneeth, Ms Lelitha Vanajakshi and Ms Chilukuri Bhargava Rama • *Relationship between Mobility and Pedestrian Safety: A Region-Wide Level Study* – Ms Ruchika Agarwala and Shri Vinod Vasudevan.
Session Organized by WCTRS (FF- MR 1)	• *Challenges of Climate Change Mitigation and Adaptation in Cities of Developing Countries* (SIG-H5 / Dr Ashish Verma, IISC, Bangalore)
ISC Session 9: **ROUND TABLE: Boosting Transport Research and Education in Developing Countries** (FF- MR 2)	*Co-Chairs*: Prof. Rosario Macario and Prof. Shivanand Swamy, CEPT University • *Roundtable: Boosting Transport Research and Education in Developing Countries* – Prof. Rosário Macário, Prof. Shivanand Swamy, Prof. Ali Huzayyin, Dr. Charles Rivasplata
ISC Session 10: **Urban Freight Transport** (FF- MR 3) (interpretation)	*Chairperson*: Dr. P.K. Sikdar, Director, ICT • *E-commerce and its Impact on Travel Behaviour of Shoppers in Two Metropolitan Cities of India* – Prof. Sanjay Gupta, SPA, India • *Assessment of Freight Vehicles Characteristics: the case of Delhi* – Ms. Leeza Malik, Prof. Geetam Tiwari, Shri Ashwani Kumar, IIT Delhi, India • *Influence of Urban Forms Variables on Urban Freight Trip Generation Models* – Ms Nilanjana Bakshi, Prof. Geetam Tiwari, Prof. Nomesh Bolia, IIT Delhi.
LUTP Review – IUT (FF- MR 4)	*Reviewers*: Dr Rohini Balasubramaniam, Ms Sonia Arora and Shri. RamaKrishnan • *Strategy for Identifying and Mitigating Accidents in UPSRTC and Meerut City Transport Service Ltd. with special reference to Meerut: A Case Study* – Shri Sandeep Laha and Shri Parvez Bashir • *Integrating Public Transport System and IPT with ABD area of Lucknow Smart City* - Shri A. K. Gupta, Dr. Alka Singh and Shri Himanshu Chandra • *Promotion of Seamless integration in the Major Hubs of Central Station and ST. Thomas Mount Station Areas of Chennai City* - Shri Rajeev Narayan Dwivedi, Shri C. Thirukukumaran and Shri N. E. Vinod Kumar • *Study on last mile connectivity with Metro Rail Stations to improve Metro Rail patronage in CMRL* - Shri P. K. Parthiban and Shri K. Srinivasan

LUTP Review – IUT (FF- MR 5)	Reviewers: Dr O.P. Agarwal, Shri R.K. Singh, Shri M.L. Chottani *Development of ITMS for City Transport Varanasi* – Shri Rajeev Anand and Shri P. K. Tiwari *Unified Ticketing System for Different Mode of Transports in Ahmedabad city – Challenges and Issues* - Dr. Hemant Kagra & Shri Prafulla V. Kohade *Implementation of Public Bike Sharing System in New Delhi Municipal Council Area* – Shri Ramanand Bhagat & Md. Manzarul Hasan
Lunch (1300 - 1430) (Hall 3)	
Day 3 – 6th November 2017 (1430 - 1600)	
Special Session – Inclusive and Sustainable Mobility (Hall 2)	*Welcome Address:* Shri D.S Mishra, Secretary, MoHUA • Dr. O.P. Agarwal, CEO, World Resource Institute (WRI) • Shri N.V.S. Reddy, MD, Hyderabad Metro Rail Corporation Ltd. • Shri Vivek Aggarwal, Commissioner, Urban Administration and Development Department (UADD), Madhya Pradesh • *Vote of Thanks:* Ms Sonia Arora, Urban Transport Expert, Institute of Urban Transport (India)
Linking Urban Transport and the Environment (GF- MR 3)	*Chairperson*: Mr Ajai Mathur, Managing Director, Urban Mass Transit Company • *Change Climate Mitigation/ Resilient Policies in Transport Sector* – Ms Usha Rao, UNDP • *Challenges in implementing SDGs, Paris Climate Agreement* – MS Tuhina Sinha, Faculty, School of Planning and Architecture, Hyderabad • *Sustainable Urban Transport in Achieving Smart, Resilient and Low Carbon Cities* – Ms Anumita Roy Choudhary, CSE
ISC Session 11: **Planning for Transport** (GF- MR 4)	*Chairperson:* Prof. Marcela Munizaga • *Co-chair:* M. Mark Zuidgeest • *Travel Patterns in Indian Districts: Does Population Size Matter?* – Ms. Deepty Jain, TERI University / Prof. Geetam Tiwari, IIT Delhi • *Can a focus on NMT Reconcile Transit Oriented Development, Paratransit Formalization and Urban Informality?* – Mr. Sean Cooke, University of Cape Town / Prof. Geetam Tiwari, TRIPP, IIT Delhi
ISC Session 12: **Transport of Vulnerable Citizens** (GF- MR 5) (interpretation)	*Chairperson:* Prof. Rosario Macario • *The role of Transport in Providing Access to Disabled Youth: The Case of Cape Town* – Dr. Charles Rivasplata. San Jose State University / Dr. Marlene Le Roux, Artscape • *SOTRAL: Which Solution for Persons with Reduced Mobility in Lomé?* – Dr. Messan Vimenyo, University of Lomé, Togo. • *Mobility Constraints of Children in Bangladesh: A Study on Travel to School in Dhaka city* – Dr. Shafiq-Ur Rahman, Shri Noor Ali Shaha, Jahangirnagar University, Bangladesh; • *Social Exclusion of Disabled Public Transport Users: Insights from Port 1 Moresby, Papua New Guinea* – Dr. Oliver Page, Independent Transportation Safety Specialist, USA.
Road Safety (GF- MR 6)	*Chairperson:* Shri R.K. Singh, Chief Engineer, Lucknow Metro • Shri R.K. Singh, Chief Engineer, Lucknow Metro • *Various Road Safety Aspects in Indian Metropolitan Cities: A case study of Hyderabad* – Prof. Kumar Molugaram, Professor of Civil Engineering, University College of Engineering, Osmania University, Hyd • *Traffic Management* – Mr. Julien Allaire (Transitec) • *Road Safety Management in a Developing Country: The Case of Lebanon* –- Mr. Ramzi Salame, Executive Director, National Road Safety Council, Lebanon

ISC Session13: **Informal Transport** (FF- MR 2)	*Chairperson:* Mr. Pablo Salazar Ferro • *Gentrification in Paratransit* – Mr. Pablo Salazar Ferro, Independent Consultant for CODATU; • *User's Perception of Increasing Operations of Electric Rickshaw (Toto) Service: Case of Uttarpara, India* – Ms. Suranjana Chaudhuri, Indian IIEST, India
ISC Session 14 - **Equity and exclusion (II)** (FF- MR 1) (Interpretation)	*Chairperson:* Mr. Pedro Ortiz • *Ring Railway: Excluding Passengers or Excluded Service?* – Ms. Arundhathi, Tata Institute of Social Sciences, India / Ms. Sarah Zia, Independent Scholar; • *Social Inclusion Toolkit for Urban Transportation* – Ms. Maitreyi Yellapragada, Independent Researcher in Urban Planning, USA / Prof. Subhi Sonal, University of Reva, India; • *Resilience of Excluded People: Resourcefulness, Social Strategies and Sustainable Mobilities at Rabat Sale (Morocco)* – Ms. Meryem Achraf, INAU, Morocco;
Innovative Funding for Urban Mobility- (FF- MR 3) (interpretation)	*Chairperson*: M. Bernard Rivalta, Vice-President, CODATU • *Renewal of the Bus Fleet: Case Studies from Dakar (Senegal)* – M. Amadou Saidou Ba, President of CETUD • *Who Pays What in Urban Transport* – Mr. Julien Allaire, CODATU • *Regardless of the actor (operator or Transport Authority), innovative solutions must be continuously implemented to fund public transport development* – Mr. Thibault De Lambert, RATP Dev Transdev Asia • Enhancing financing requirements through a real fleet purchasing policy in developing countries: from the requirement definition to the shared procurement – Mr. Marc Delayer, President of CATP (Public Transport Group purchasing organization.
LUTP Review – IUT (FF- MR 4)	*Reviewers:* Dr Geetam Tiwari, Ms Akshima T Ghate & Shri M.L. Chotani • *A Critical Analysis of the Existing Provisions / Proposals in Various Development Plans in Haryana with Reference to the Traffic and Transportation Aspects* – Shri Sanjay Kumar and Ms. Renuka Singh • *Transportation Solutions for upcoming Kumbh Mela 2019 at Allahabad* – Shri Himanshu Shekhar, Shri Anshoo Pandey and Shri Krishna Shukla • *Planning and Management of Parking in the Central area of Aizawl City* – Shri Zohmingthanga
LUTP Review – IUT (FF- MR 5)	*Reviewers:* Dr M. Ramachandran, Shri Shivanand Swamy • *Developing Framework for Maximizing non-fare box Revenue for Bhopal and Indore Metro Rail Projects through PPP* – Shri Karia Parth, Shri Yash Choudhary and Shri Shafeeq Ahmed • *Technical Feasibility and Financial Viability for procurement of Electric Buses for City Chandigarh* – Shri Amit Gupta • *Delhi – Meerut RRTS Corridor being implemented by NCRTC* – Shri Tushar Singh &Shri Rajeev Kumar Tiwari • *Analysis of Accident Causes and Prevention in NEKRTC, Gulbarga* – Shri H. Vasanth
Day 3 – 6th November 2017 (1600 - 1700)	
Valedictory Session (Hall 2) *Welcome Address* by Shri Navin Mittal, Secretary (UD), Telangana *Special Address* by Mr. Dominique Bussereau, President, CODATU *Special Address* by Mr. Amadou Ba, CETUD (Dakar) *Presentation of Awards for Excellence in Urban Transport and Urban Mobility Awards* by Hon'ble Minister for Ministry of Housing and Urban Affairs, GoI and Minister, Government of Telangana *Valedictory Address* by Shri K.T. Rama Rao, Hon'ble Minister for Information Technology (E&C), Municipal Administration & Urban Development, Industries & Commerce, Mines and Geology, Public Enterprises and NRI Affairs, Telangana, Government of Telangana *Vote of Thanks and Launch of UMI 2018* by Shri Durga Shanker Mishra, Secretary, Ministry of Housing and Urban Affairs	

Annexure II

ORGANIZING COMMITTEE MEMBERS

Name	Role
OSD (UT) and Ex-officio Joint Secretary, MoHUA and Acting Director General, IUT	Chairman
Deputy Secretary (MRTS), MoHUA	Member
Deputy Secretary (Finance), MoHUA	Member
Representative of Govt. of Telangana	Member
Representative from Hyderabad Metro Rail Corporation Limited	Member
Vice President, IUT	Member
Honorary Secretary, IUT	Member
National Project Manager, SUTP	Member
MoHUA Chair Professor for Transport Planning, IIT, Delhi	Member
Director General, SIAM	Member
Executive Secretary, IUT	Member
Urban Transport Expert, IUT	Member
Sr. Manager (A&C), IUT	Member
Manager (UMI), IUT	Convener

Annexure III

LIST OF SPONSORS

S. No	Name of Organization	Category
1	Maha Metro	Lead Sponsor
2	Chennai Metro Rail Ltd.	Lead Sponsor
3	Delhi Metro Rail Corporation	Lead Sponsor
4	Mumbai Metro Rail Corporation Limited	Diamond Sponsor
5	Metro Link Express for Gandhinagar and Ahmedabad (MEGA) Company Ltd.	Diamond Sponsor
6	Kochi Metro Rail Ltd.	Diamond Sponsor
7	Bangalore Metro Rail Corporation Ltd.	Diamond Sponsor
8	Hyderabad Metro Rail Corporation Limited	Diamond Sponsor
9	Hyderabad Metropolitan Development Authority	Diamond Sponsor
10	Atal Indore City Transport Service Limited (AICTSL)	Silver Sponsor
11	National Payments Corporation of India	Silver Sponsor
12	Empire	Silver Sponsor
13	Jaipur Development Authority	Silver Sponsor
14	Volvo India Private Limited	Other Sponsors
15	Lucknow Metro Rail Corporation	Other Sponsors
16	AFD	CODATU Sponsors
17	Auvergne-Rhône-Alpes	CODATU Sponsors
18	CATP	CODATU Sponsors
19	EGIS	CODATU Sponsors
20	Keolis	CODATU Sponsors
21	French Ministry of Foreign Affairs and International Development (MAEDI)	CODATU Sponsors
22	SNCF	CODATU Sponsors

Annexure IV

LIST OF EXHIBITORS

S. No	Name of Organization	Category
1	Maha Metro	Exhibitor
2	Chennai Metro Rail Ltd.	Exhibitor
3	Delhi Metro Rail Corporation	Exhibitor
4	Mumbai Metro Rail Corporation Limited	Exhibitor
5	Metro Link Express for Gandhinagar and Ahmedabad (MEGA) Company Ltd.	Exhibitor
6	Hyderabad Metro Rail Corporation Limited	Exhibitor
7	Hyderabad Metropolitan Development Authority	Exhibitor
8	Hyderabad Traffic Police	Exhibitor
9	Institute of Urban Transport (India)	Exhibitor
10	Aum Infotech Private limited	Exhibitor
11	PTV Group	Exhibitor
12	Hyderabad Tourism	Exhibitor

Annexure V

LIST OF KNOWLEDGE PARTNER AND MEDIA PARTNERS

S. No	Name of Organization	Category
1	PTV Group	Knowledge Partner
2	TrafficInfra Tech	Media Partner
3	Motiondiget.com	Media Partner
4	Rail Analysis	Media Partner

ABBREVIATIONS AND ACRONYMS

AMRUT	-	Atal Mission for Rejuvenation and Urban Transformation
BRT	-	Bus Rapid Transit
CEPT	-	Centre for Environment Planning and Technology (Ahmedabad)
CMP	-	Comprehensive Mobility Plan
CODATU	-	(French) Cooperation for urban mobility in the developing world
CPCB	-	Central Pollution Control Board
CSE	-	Centre for Science & Environment
DMRC	-	Delhi Metro Rail Corporation
GHG	-	Green House Gases
GOI	-	Government of India
IIT	-	Indian Institute of Technology
ITS	-	Intelligent Transport System
IUT	-	Institute of Urban Transport (India)
LRT	-	Light Road Transit
NMV	-	Non-Motorised Vehicle
MoHUA	-	Ministry of Housing and Urban Affairs
NCRTC	-	National Capital Region Transport Corporation
NEKRTC	-	North Eastern Karnataka Road Transport Corporation
NMT	-	Non-Motorized Transport
NUTP	-	National Urban Transport Policy
OSD and	-	Officer on Special Duty and Ex-Officio Joint Secretary
PBS	-	Public Bicycle Sharing
PPHPD	-	Passengers Per Hour per Direction
RRTS	-	Regional Rapid Transit System
SIAM	-	Society of Indian Automobile Manufactures
SPA	-	School of Planning and Architecture
SPVs	-	Special Purpose Vehicle
SUTP	-	Sustainable Urban Transport Project
TERI	-	The Energy and Resources Institute
TOD	-	Transit Oriented Development
UADD	-	Urban Administrative Development Department
UMI	-	Urban Mobility India

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