Agenda

- EBTC Introduction
- Issues in the Indian Transport Sector
- Overview of Clean Technologies in Transport
- Overview of ITS
- ITS Initiatives in India
- Policy Measures
- EU India Comparison
- EBTC Activities
EBTC in Short

- **4 sectors:** Biotech, Energy, Environment and Transport
- **4 offices:** New Delhi, Mumbai, Bengaluru and Kolkata
- **20 staff** including 4 sector experts & an IPR expert
- **35 partners,** based in Europe and India
- **29 cooperation agreements** between companies facilitated
- **300+ delegates** from 24 EU states, including via 12 Flagship missions and 9 Focus missions
- **100+ project briefs** on EBTC website

- EBTC works **complementarily** with existing EU efforts in India.
- EBTC provides **tailored services** ranging from market exploration to establishment in the Indian market.
- EBTC feeds into the **EU-India policy dialogue,** to the benefit of EU companies.
- EBTC is the **nodal point in India of the Enterprise Europe Network (EEN)**
Issues in India’s transport subsectors

- **Public Transport in India**
  - Inadequate and inefficient public transport infrastructure
  - Very few cities have organised public transport
  - Increasing rates of motorisation

- **Transport Emissions & Air Quality**
  - Transport one of the largest sources of greenhouse gas (GHG) emissions

- **Intelligent Transport Systems (ITS)**
  - Increasing opportunities in National Highway Development Programme (NHDP) in electronic toll collection (ETC), traffic monitoring
  - €1.6 Million allocated to ITS & Parking in the 12th Five Year Plan
  - Upcoming ITS projects

High potential, ample technologies
India’s Transport Sector – Present Scenario

- According to a 2010 McKinsey report
  - **Transport** and **Affordable Housing** – 2 most capital intensive sectors in India
  - By 2030, 7,400 kilometres of metros and subways need to be constructed – 20 times the capacity added in the past decade
  - Share of public transport in an average Indian city – 30%; well short of the minimum basic of 50%

(Source: McKinsey Global Institute)

**Current Scenario could lead to urban gridlock**
Planned Investments in Transport

- Planning Commission Planned Investments for 12th Five Year Plan (2012 – 2017)
  - Major investment in public transport
- In Public Transport
  - Major components – Metro, BRTS
- **ITS – € 1.3 Billion allocated**
- Capacity Building – € 770 Million allocated

<table>
<thead>
<tr>
<th>Component</th>
<th>Investment (€ Million)</th>
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<tbody>
<tr>
<td>New Roads Infra</td>
<td>15,563</td>
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<tr>
<td>Road Upgrade</td>
<td>10,163</td>
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<tr>
<td>ITS/Pkg</td>
<td>1,615</td>
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<tr>
<td>Misc</td>
<td>1,231</td>
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<tr>
<td>Public Transport</td>
<td></td>
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<tr>
<td>Buses</td>
<td>2,117</td>
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<tr>
<td>BRTS</td>
<td>4,554</td>
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<tr>
<td>Metro Rail</td>
<td>20,112</td>
</tr>
<tr>
<td>Commuter/Regional Rail</td>
<td>3,043</td>
</tr>
<tr>
<td>Bus Infrastructure</td>
<td>1,348</td>
</tr>
</tbody>
</table>

*Misc includes Bicycle Schemes, Capacity Bldg, Innovation, Pilot Projects
(Source: Working Group on Urban Transport, 12th Five Year Plan, Planning Commission)

**ITS has good chunk of planned investments**
Overview of Clean Technologies

- Clean technologies in transport
  - Intelligent Transport Systems (ITS)
  - Vehicle technologies
    - EV, Hybrids, Plug-in Hybrids
  - Fuel technologies
    - Bio-fuels, Ethanol, CNG
  - Vehicle + Fuel Technologies
    - Hydrogen, Fuel Cell
  - Others
    - Carpooling, Vanpooling, Non-motorised transport (NMT)

- Application of above technologies in all modes of transport
  - Roads
  - Public transport and Road Safety
  - Freight
  - Waterborne transport
  - Aviation
Overview of ITS Technologies

- Why ITS?
  - Efficiency, Safety, Environment

- Telecommunication systems
  - Public access mobile radio networks (GSM, UMTS, etc.)
  - Private mobile networks and network services dedicated to road transport operators (PMR/PAMR, DSRC, co-operative driving, vehicle-to-vehicle and vehicle-to-infrastructure technologies)

- Automatic Identification Systems (AIS)
  - Radio frequency identification (RFid); Smart cards; Video identification technology

- Automatic Vehicle Location Systems (AVLS)
  - GPS based; Cellular networks; Systems based on automatic identification devices, in case of fixed routes.

- Traffic data collection and automatic classification systems
  - Video, microwave, magnetic detection

- Electronic Data Interchange (EDI)

- Cartographic databases and Geographic Information Systems (GIS).
Applications of ITS

- Traveller information
- Traffic management
- Demand management
- Road management
- Advance driving assistance
- Electronic Financial Transactions
- Commercial Vehicle Management
- Public Transport Management
- Incident and Hazard Response
ITS Initiatives in India

- Several ETC (Electronic Toll Collection) planned
  - Pilot project on Chandigarh-Parwanoo on NH-5
  - Ahmedabad-Mumbai Highway (RFID-based)

- ITS on BRT Corridors
  - Signal priority, Vehicle Tracking and Automatic Fare Collection in Indore BRT
  - Pimpri-Chinchwad (Pune) planned ITS implementations for BRT

- ITS in Parking—APMS (Advanced Parking Management Systems) in Delhi
  - Parking lot at Palika Bazar – Capacity to park 1050 cars and 500 two wheelers - Electronic Parking Guidance and VMS Smart Cards
  - Automated multi-level parking in Sarojini Nagar Market implemented; several issues in implementation
ITS Initiatives in India (cont’d)

- Citywide ITS
  - Implemented in Mysore (photos)
  - Planned in Naya Raipur

- ITS Master Plan for Hyderabad
  - implemented in in three phases spread over 10 years at a cost of Rs 1,180 crore
ITS Initiatives in India (cont’d)

- B-TRAC, Bangalore *
  - Initiated by Bangalore Traffic Police
  - Components of B-TRAC
    - Centrally controlled traffic signalling system
    - Camera enforcement
    - Speed Interceptors
    - Mobile enforcement, citations
    - Variable Message Signs
  - Improved traffic regulation
  - Reduction in road accidents

* (Source: Traffic Infra Tech, July 2013)

ITS Market Nascent; opportunities beginning to emerge
Policy Measures – ICT Implementation Plan

- Data Center
  - Helpdesk Pilot
- Enhanced Data Center
  - 24x7 helpdesk
- Metropolitan transport monitoring and control system

- Vehicle Tracking Systems
- Real Time Traffic Control & adaptive signals
- Real-Time PIS
- Fare Integration thru CMC
  - Integrated Information across Modes
  - Cashless Toll Collection
- Fare Integration thru UID
  - Intelligent Traffic Management Systems
  - Predictive Traffic Management
- Advanced vehicle safety systems
- Seamless Intelligent Transportation System
- High Level Analytics

- Management Efficiency
  - Better Asset utilization
  - Increase in PT usage
- Passenger Satisfaction
  - Better Management
  - Multi-Modal Transport
- Passenger Satisfaction
  - Reduced Congestions
- Predictability
  - Reduced Emissions and accidents

T - Date of Policy Approval

T +5 Years
T +10 Years
T +15 Years
T +20 Years

(Source: Final Report, Working Group on Urban Transport, NTDPC, MoUD March 2012)
Policy Measures (cont’d)

- NTDPC Report states “...policy also needs to make it mandatory for the Transport operators”
  - to establish a Central Command center to monitor and manage the system with 24x7 Help Desk;
  - Training to drivers on use of new technology;
  - GPS (or similar) devices, Speed Governors along with Driver Feedback systems;
  - Internet hotspots and kiosks at bus and train stations; Surveillance and security systems;
  - Contact less smart card system for payment and to provide service related updates thru electronic means.

- Focus on technologies
  - Enforcement – Speed cameras, red-light cameras
  - Vehicle inspection and maintenance – centralised operations, remote video surveillance,
## EU-India ITS Technologies

*(Source: EBTC Clean Tech Mapping)*

<table>
<thead>
<tr>
<th>ITS Area</th>
<th>Insights</th>
<th>Technology Deployed</th>
<th>Presence EU</th>
<th>Presence in India</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic Signal Control</td>
<td>Manage Traffic Speeds, Vehicle merging &amp; corridor crossings</td>
<td>Updated traffic signal control equipment used in conjunction with signal timing</td>
<td><img src="chart" alt="chart" /></td>
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<td>Adaptive signal systems (Sensors)</td>
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<tr>
<td>Ramp Metering</td>
<td>Safely space vehicles merging onto a highway, while minimizing speed disruption to existing flows</td>
<td>Ramp metering Signal &amp; Controller</td>
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<td>Check-In Detector</td>
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<td>Check-out Detector</td>
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<td>Merge Detector</td>
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<td>Queue Detector</td>
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<tr>
<td>Automated Speed Enforcement</td>
<td>Photographs of vehicles and/or drivers taken at the time of the violation, along with data from the radar device</td>
<td>Speed Detecting radar</td>
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<td>Light detection &amp; ranging (LIDAR) units with image capturing technologies</td>
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<tr>
<td>Incident Management</td>
<td>Addresses 3 key areas: traffic surveillance, clearance &amp; traveler information</td>
<td>Video Image Processing System</td>
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<tr>
<td>Electronic Toll Collection</td>
<td>Electronic payment of highway &amp; bridge tolls as vehicles pass through a toll station</td>
<td>Vehicle-to-roadside communication technologies include roadside antennas &amp; pocket-sized tags containing radio transponders</td>
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<tr>
<td>Traveler Information</td>
<td>Providing the public with information regarding available modes, optimal routes, and costs in real time either pre-trip or en-route via in-vehicle information</td>
<td>In-vehicle guidance, CMSs and PDAs to distribute user information</td>
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<tr>
<td>Bus Rapid Transit</td>
<td>Encompasses the use of a series of ITS technologies, resulting in increase in bus ridership</td>
<td>Route planning</td>
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<td>Rights-of-ways</td>
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<tr>
<td>Weigh-in-motion technologies</td>
<td>Enable the weighing and cataloging of trucks without causing vehicles to stop and queue in line</td>
<td>WIM scale imbedded in the pavement triggering the camera</td>
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<tr>
<td>Vehicle control technologies</td>
<td>Aim to improve vehicle safety, efficiency, and comfort</td>
<td>Intelligent cruise control</td>
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<td>Speed alert</td>
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<td>Anti-lock brakes</td>
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<td>Electronic system malfunction indicators</td>
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Legend:
- Zero Presence
- Insignificant Presence
- Partial Presence
- Significant Presence
- Full Presence
ITS Standards - India

- Development of ITS Standards in India – driven by socio-economic and environmental needs *
- Influenced by heterogeneous traffic and poor lane behaviour *

- Global Harmonized Standards Development and Adoption is need of the hour to address ITS Standards
  - Safety, Efficiency, Security, Accessibility and Consumer Satisfaction, Economies of scale etc
- Indian Stakeholders work closely with global standards development organizations such as ETSI, oneM2M partnership project for standards development and adoption
  - Address the local requirement

(Source: * ITS Synthesis, IIT-Chennai)
EBTC’s Recent Activities

- Clean Transport in Karnataka with partner CeiPiemonte:
  - A high-level strategic planning discussion and two proposals for the State.
  - Intelligent Transport Systems (ITS) and Dual-Fuel Hybridisation of Buses.
  - IISc-Bangalore nodal institution and provides expert consultation.

- Indian Market For Clean Transport - An Insight:
  - Report focussed on ITS and Alternative Vehicles (EVs, Hybrids).
  - Collaborative report of EBTC with Politecnico di Torino (Italy) and Fraunhofer Institute-IFF (Germany).
EBTC’s Upcoming Activities

- **Green Freight Initiative**
  - Consortium of EBTC, GIZ, and Clean Air Asia
  - Development of Methodology to calculate CO$_2$ emissions by freight operations
  - Pilot testing of the developed methodology
    - Partnership with Corporate organisations
    - Technology to be procured for monitoring of fuel usage and emissions

- **European Electric Vehicle Congress: Dec 2014**
  - Develop synergies in the field of e-Mobility (Battery, Hybrid and Fuel Cell)
  - Steering Committee at the conference
  - Shape an India Session; showcase Indian market
Thank you!

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