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(Growth, Profitability & Nation Building)
13-14th March 2014 • New Delhi, INDIA

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Intelligent Transport Systems in India

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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

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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)**

Intelligence

Advocacy **Services**

➡ **High growth market, dynamic sectors**

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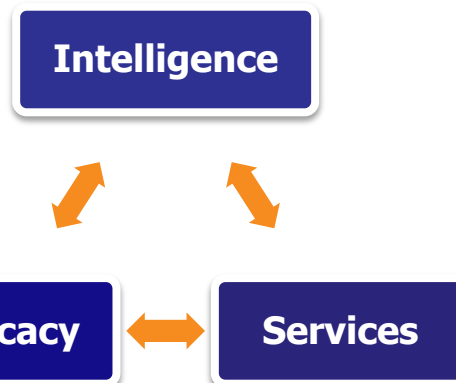
Issues in India's transport subsectors

- **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

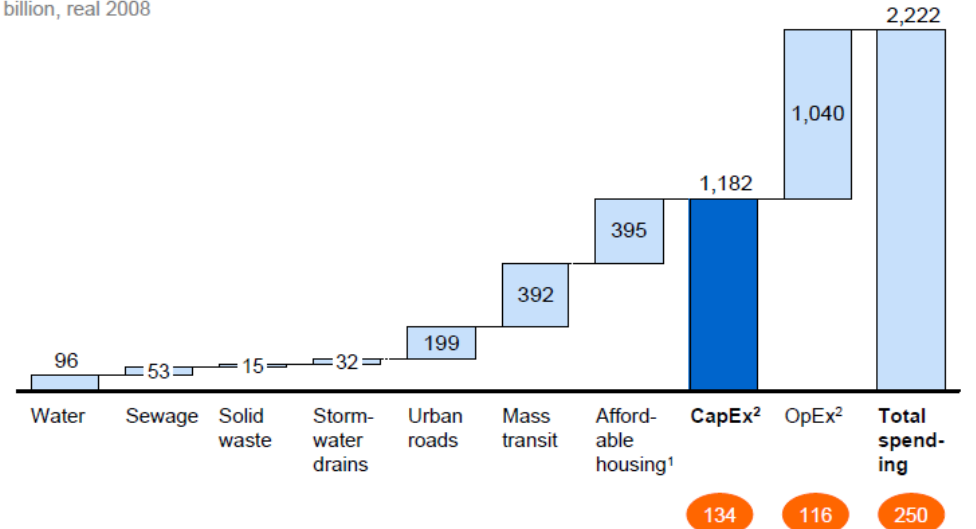➡ **High potential, ample technologies**

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%

Indian cities need capital expenditure of $1.2 trillion over the next 20 years, equivalent to $134 per capita per annum

Funding requirement for urban sectors, 2010–30
$ billion, real 2008

Ⓧ $ per capita per annum

Water	Sewage	Solid waste	Storm-water drains	Urban roads	Mass transit	Affordable housing[1]	CapEx[2]	OpEx[2]	Total spending
96	53	15	32	199	392	395	1,182	1,040	2,222
							134	116	250

1 Net of beneficiary contribution.
2 CapEx = capital expenditure; OpEx = operational expenditure.
SOURCE: India Urbanization Funding Model; Detailed Project Reports from the Jawaharlal Nehru National Urban Renewal Mission; McKinsey Global Institute analysis

(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

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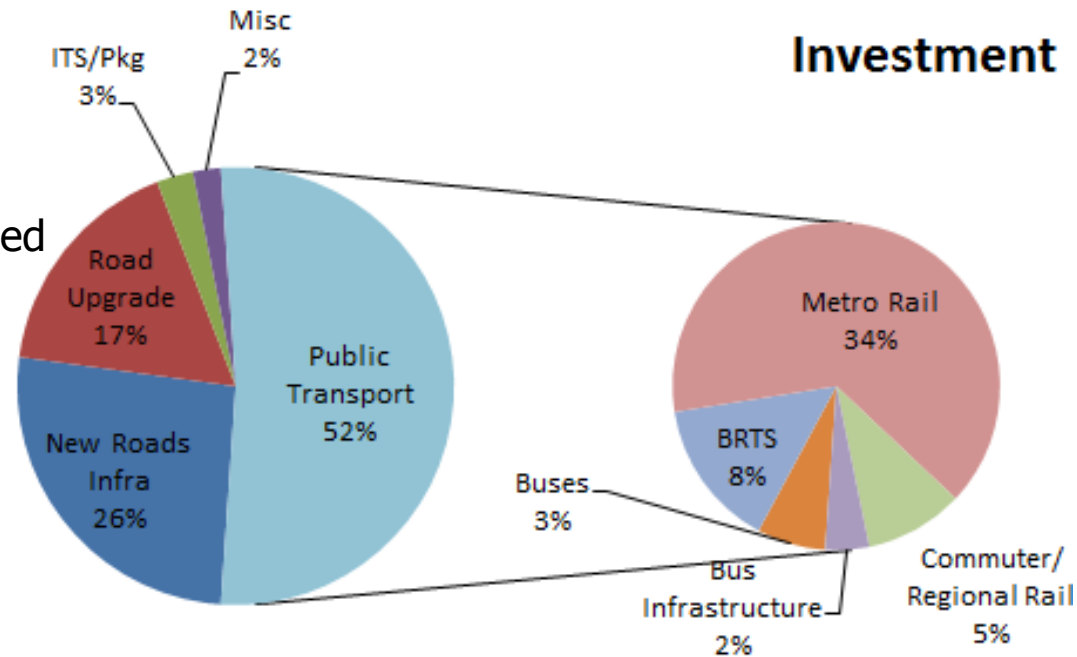
Investment

* 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
    - Automatic Traffic Counter-cum-Classifiers (ATCC), CCTVs, Variable Messaging System, Traffic Signals, Pedestrian Signals, Flood Sensors, Weather Stations, Pollution Sensors

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
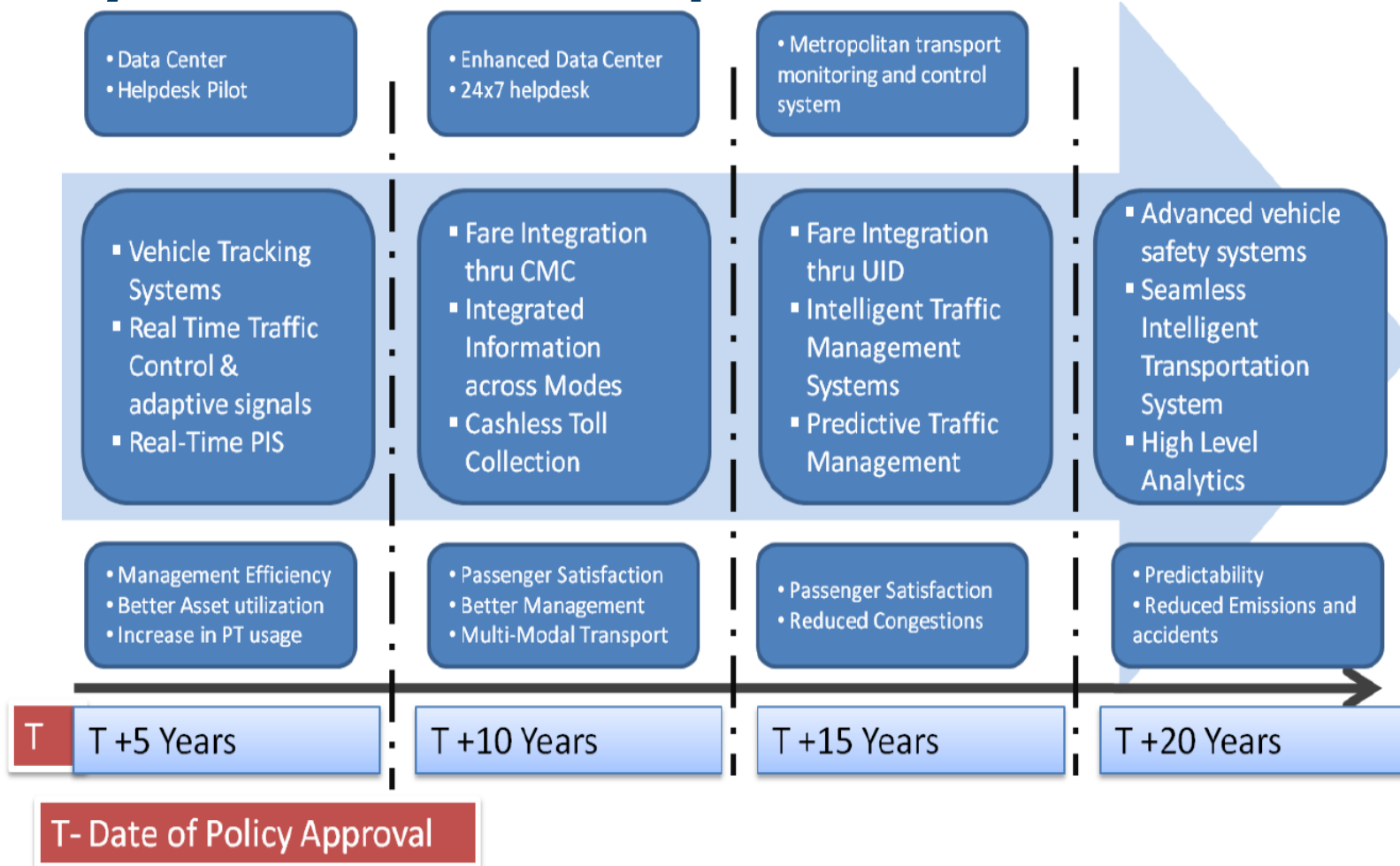 - Improved traffic regulation
  - Reduction in road accidents

* (Source: Traffic Infra Tech, July 2013)

ITS Market Nascent; opportunities beginning to emerge

Policy Measures – ICT Implementation Plan

T +5 Years	T +10 Years	T +15 Years	T +20 Years
• 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 — T +5 Years — T +10 Years — T +15 Years — T +20 Years

T- Date of Policy Approval

(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)

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

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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