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India-EU collaboration on clean technologies

Mr. Dibyendu Sengupta, Transport Sector Specialist, EBTC

EU-India Collaboration in Clean Technologies

Busworld India 2015

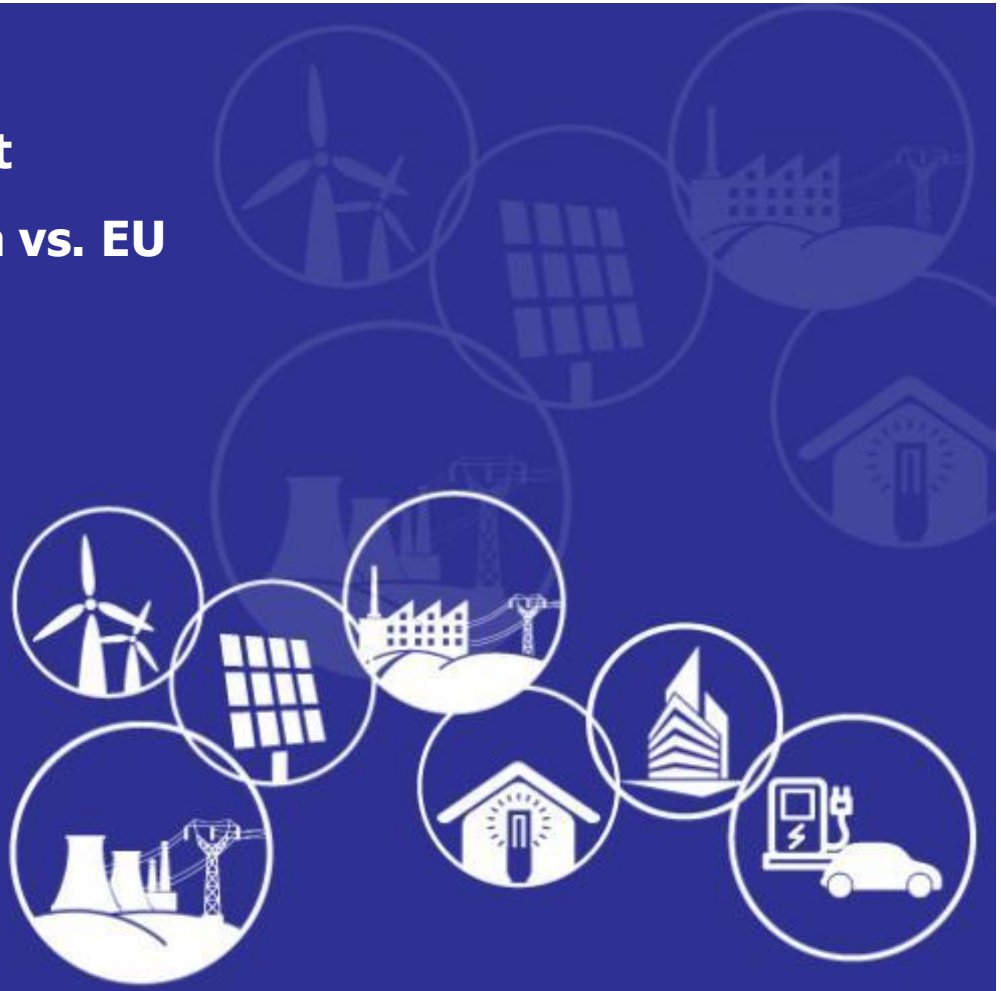
Dibyendu Sengupta

New Delhi, India 18th December 2014

www.ebtc.eu

EBTC is a programme co-funded by the European Union and coordinated by EUROCHAMBRES, the Association of European Chambers of Commerce and Industry

Contents



The European Business and Technology Centre

Gateway for EU to the Indian cleantech market

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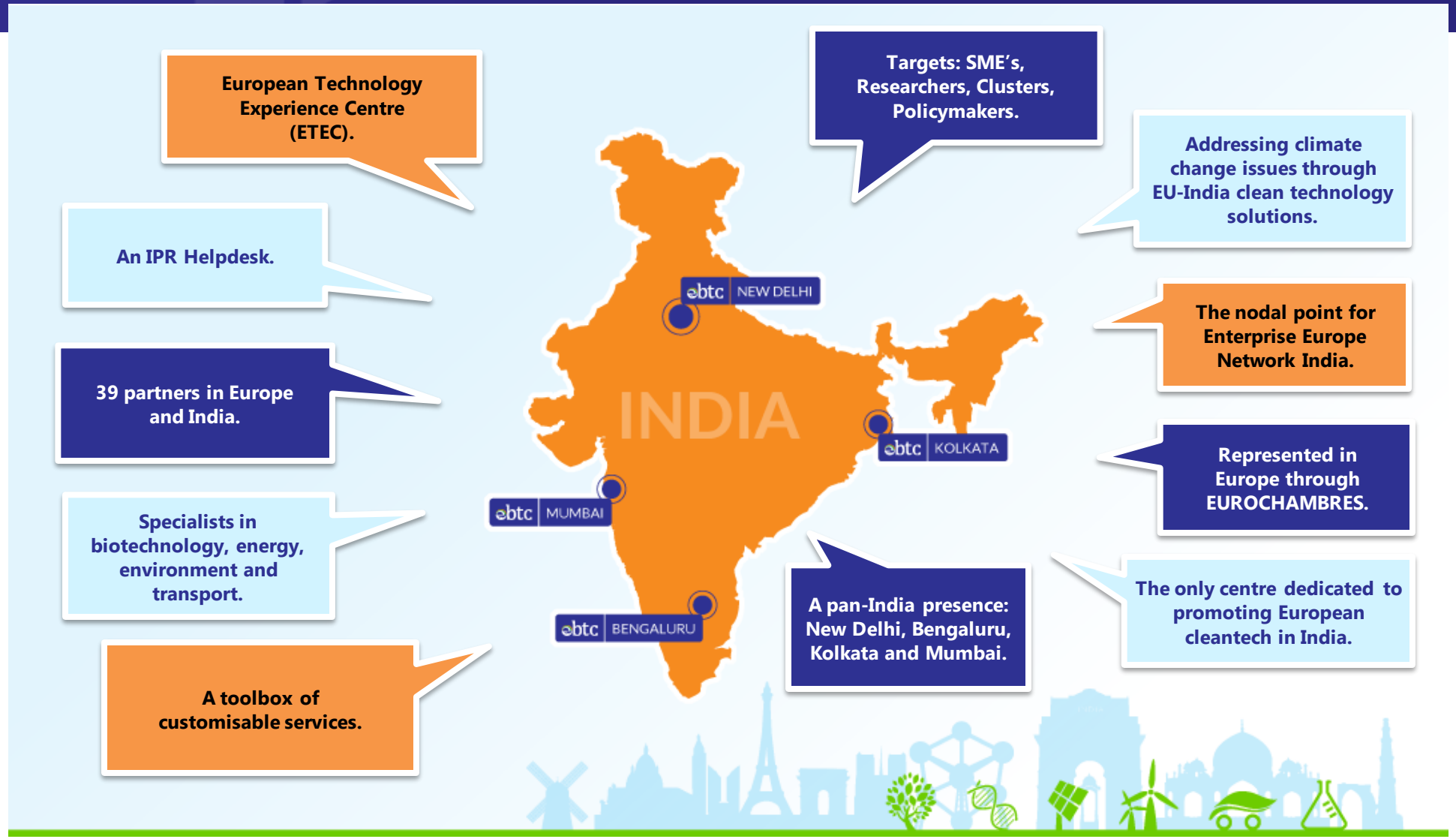

The European Business and Technology Centre

Only Centre dedicated to promoting European clean technologies in India

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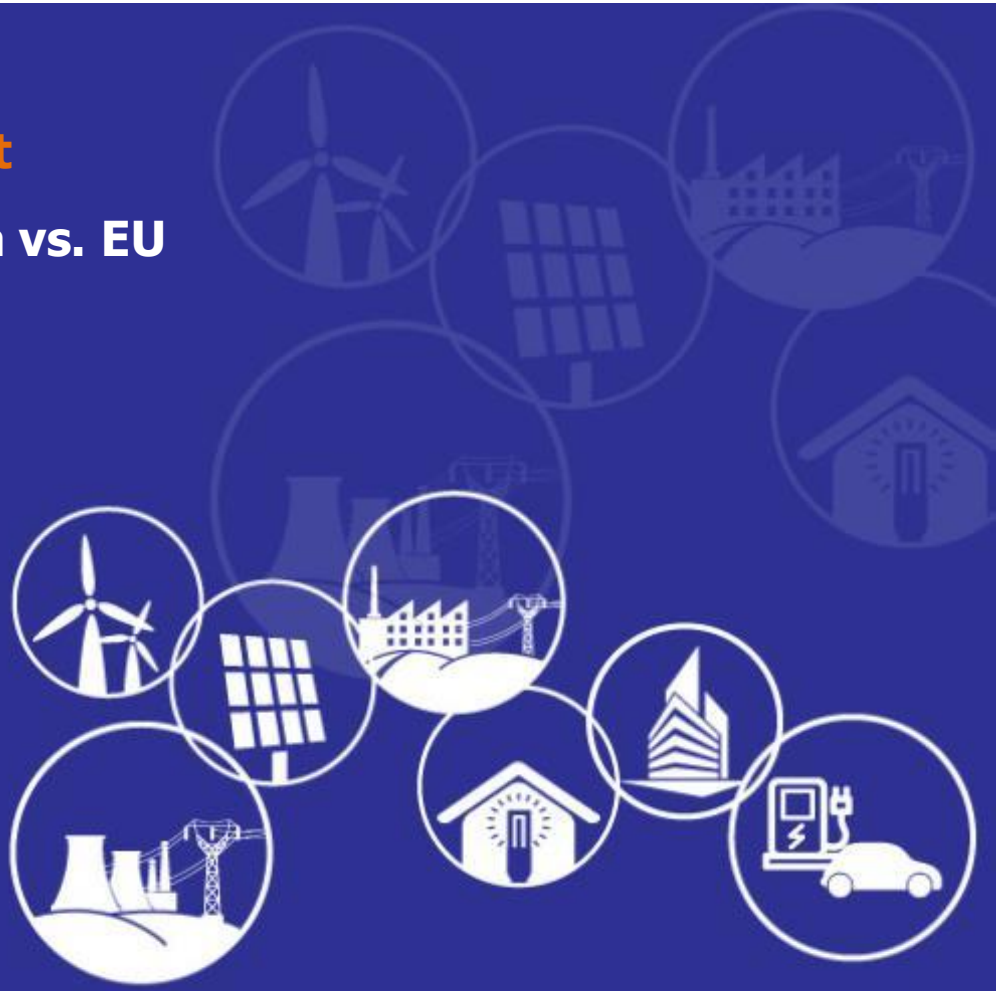
- EBTC works **complementarily** with existing EU efforts in India.
- EBTC provides **tailored services** ranging from market exploration to establishment in the Indian market. It provides, notably:
  - comprehensive market insight and advice on market entry strategy
  - identifying projects and partners and help in overcoming market access issues
  - business and technology incubation
- 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)**
- A **Toolbox** of Services for:

EBTC in brief:

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

SMEs | Researchers | Clusters | Policymakers

Contents



Clean Technologies in Transport

Intelligent Transport Systems (ITS)

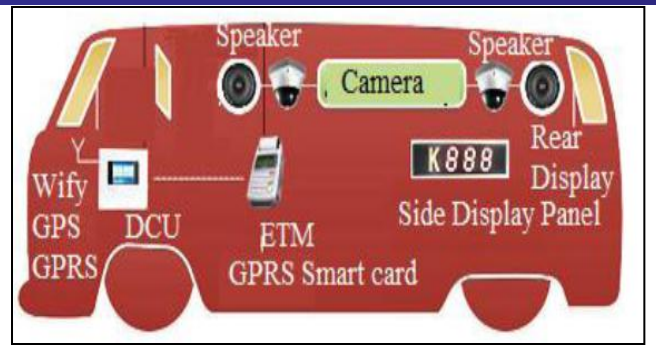
Automotive Components
- Light weight materials, Aerodynamics, Tire tech, Power train & Engine improvement, Advanced valve control

CLEAN TECHNOLOGIES

Vehicle technologies
- EV, Hybrids, Plug-in Hybrids

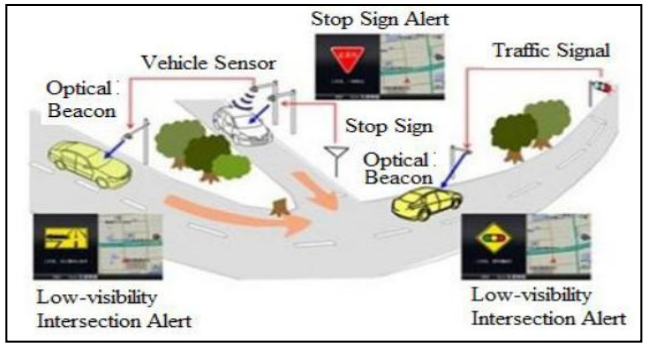
Fuel technologies
- Bio-fuels, Ethanol, CNG, Hydrogen, Fuel Cells

ITS Technology Taxonomy



Vehicle Level

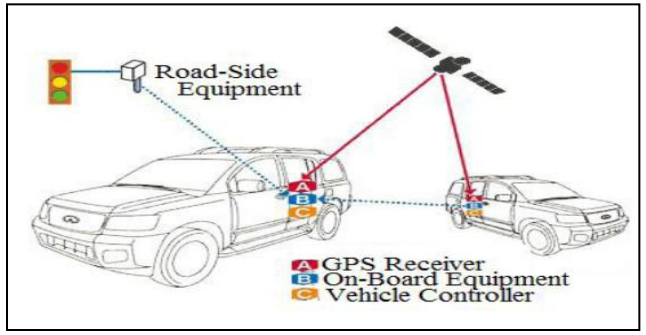
Technologies deployed within vehicles, including sensors, information processors and displays that provides information to the driver



Infrastructure Level

Sensors on and by the side of the roads collect important traffic data. Tools include

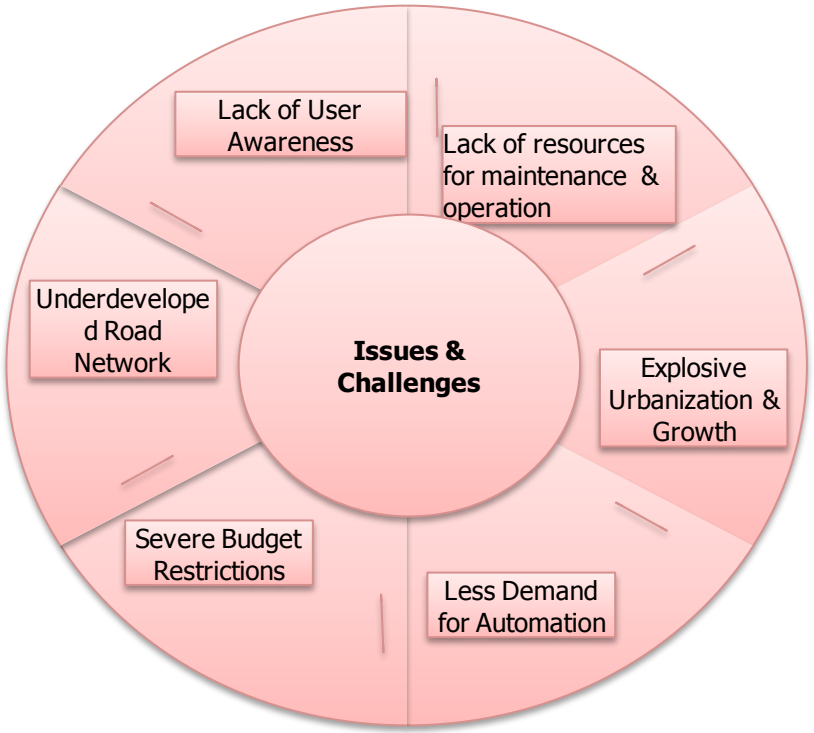
- Roadside messages
- GPS alerts
- Signals to direct traffic flow

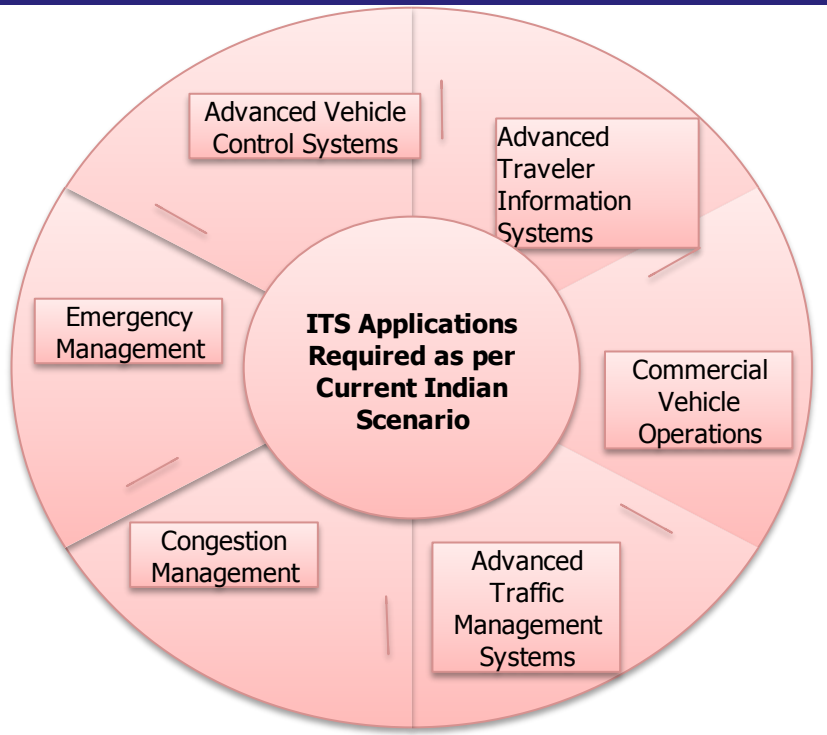


Cooperative Level

Communication between vehicles, and between infrastructure and vehicles involving a synergic combination of vehicle level and infrastructure level technologies

Issues & Challenges of ITS in India





- India's ITS can't be entirely modeled on the existing successful ITS implementations of other nations due to basic cultural, geographic & practical differences among the countries
- Technologies that require immediate attention are sensors, detectors and communication devices & application of global navigation satellite system

Applications of Clean Technologies in Public Transport

- ITS in Public Transport [1]
  - Operations Management
  - Driver Aids
  - Fare Collection
  - Traveller Information
  - Traffic Management
  - Security
  - Demand Responsive Transport
- ITS for Road Safety
  - Human Factors: Intelligent Speed Adaptation, Navigation, Automated enforcement, Fatigue Detection,
  - Vehicle/Equipment Factors: Adaptive Cruise Control, Collision Avoidance, Lane Departure warning, Road Traffic Information
  - Environment/Social/Economic Factors: Traffic Signal Control, Local Danger Warning, Incident Management, eCall

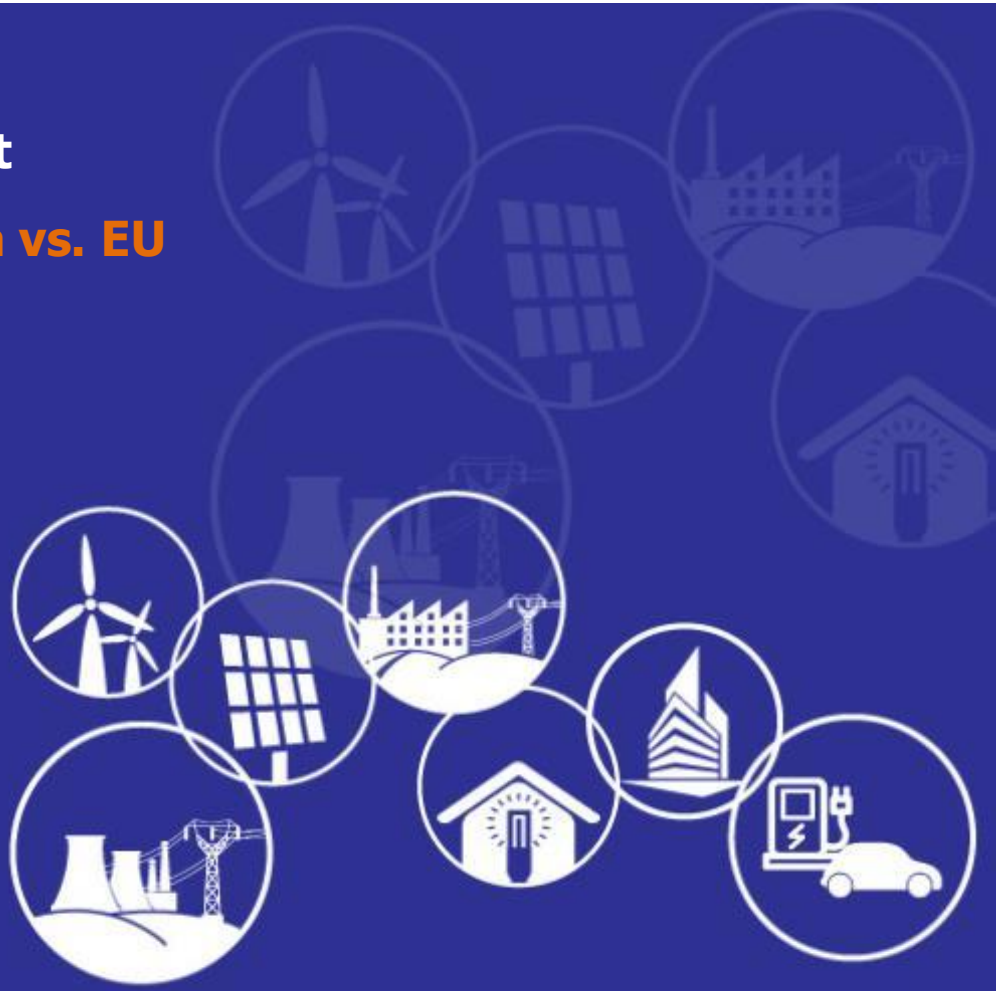
(Sources: World Bank, Piarc)

Applications of Clean Technologies in Freight/ Railways

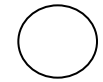
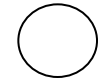
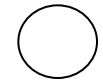
- Environmental design in Rail
  - Hybrid Trains
  - Hydrail

- ITS – two main subsystems
  - Applications for passengers
    - Passenger Information Systems, Reservation & Payment Systems, luggage management and management of connections between trains and with other modes of transport
  - Applications for freight
    - Real-time monitoring of trucks and trains (GPS), smart ticketing (reservation, payment and invoicing systems) and management of connections with other modes of transport (fleet and parking management)
  - Use of GSM for High-Speed Rail

Contents



ITS Technologies Comparison - EU and India

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)		
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		
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		
Incident Management	Addresses 3 key areas: traffic surveillance, clearance & traveler information	Video Image Processing System		
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		
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		
Bus Rapid Transit	Encompasses the use of a series of ITS technologies, resulting in increase in bus ridership	➢ Route planning ➢ Rights-of -ways		
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		
Vehicle control technologies	Aim to improve vehicle safety, efficiency, and comfort	➢ Intelligent cruise control ➢ Speed alert ➢ Anti-lock brakes ➢ Electronic system malfunction indicators		

 Zero Presence

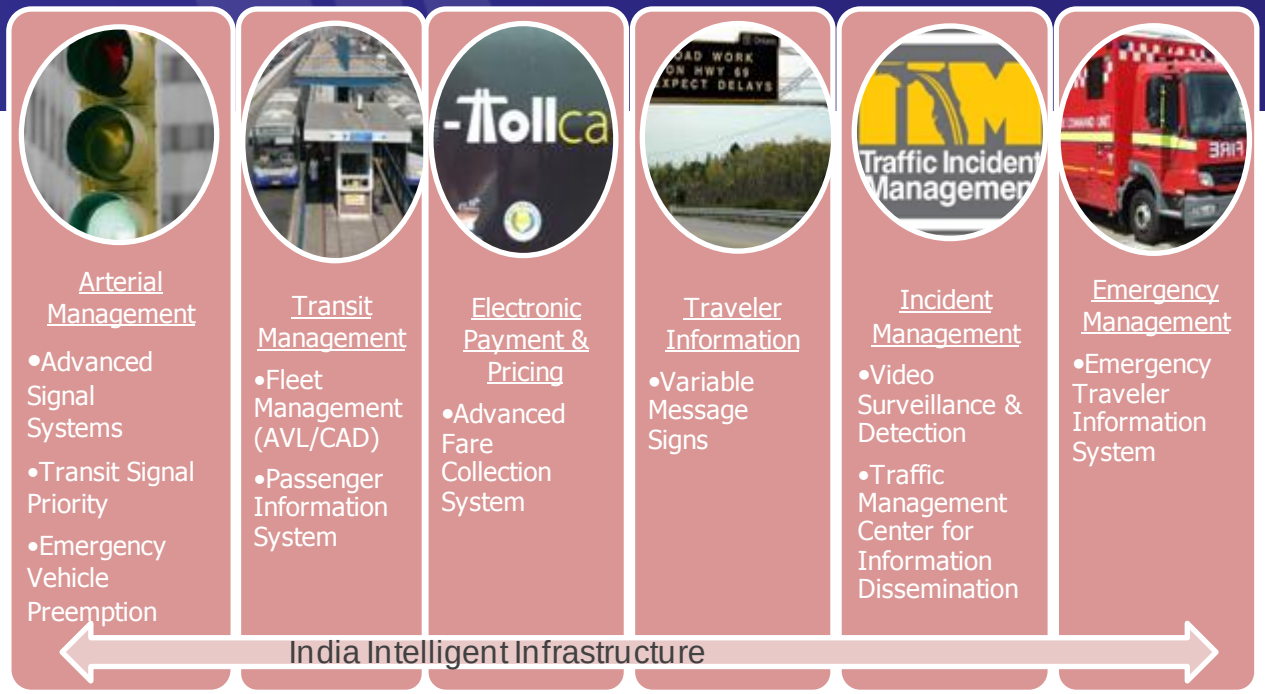
 Insignificant Presence

 Partial Presence

 Significant Presence

 Full Presence

Proposed Intelligent Infrastructure – India



Components of the proposed ITS architecture in India

- Advanced Signal Systems with emergency preemption and transit signal priority
- Automated Fare Collection System
- Network Surveillance with CCTV cameras
- Traveler Information through VMS signs
- Traffic Management Center for centralized operations control
- Data Archiving & Algorithm Development

Regions (Demo Projects)

City	State	Public Transport	NMT*	ITS	Integrated Development
Pimpri-Chinchwad	Maharashtra	√		√	√
Pune	Maharashtra	√	√		
New Raipur	Chhasttigarh	√		√	√
Indore	Madhya Pradesh	√		√	
Mysore	Karnataka	√		√	

ITS has been identified the key area in the demo projects

Opportunity for the EU in the above identified areas to begin with

* NMT – Non-Motorised Transport

E-Mobility Value Chain Growth Opportunities (EU & India)

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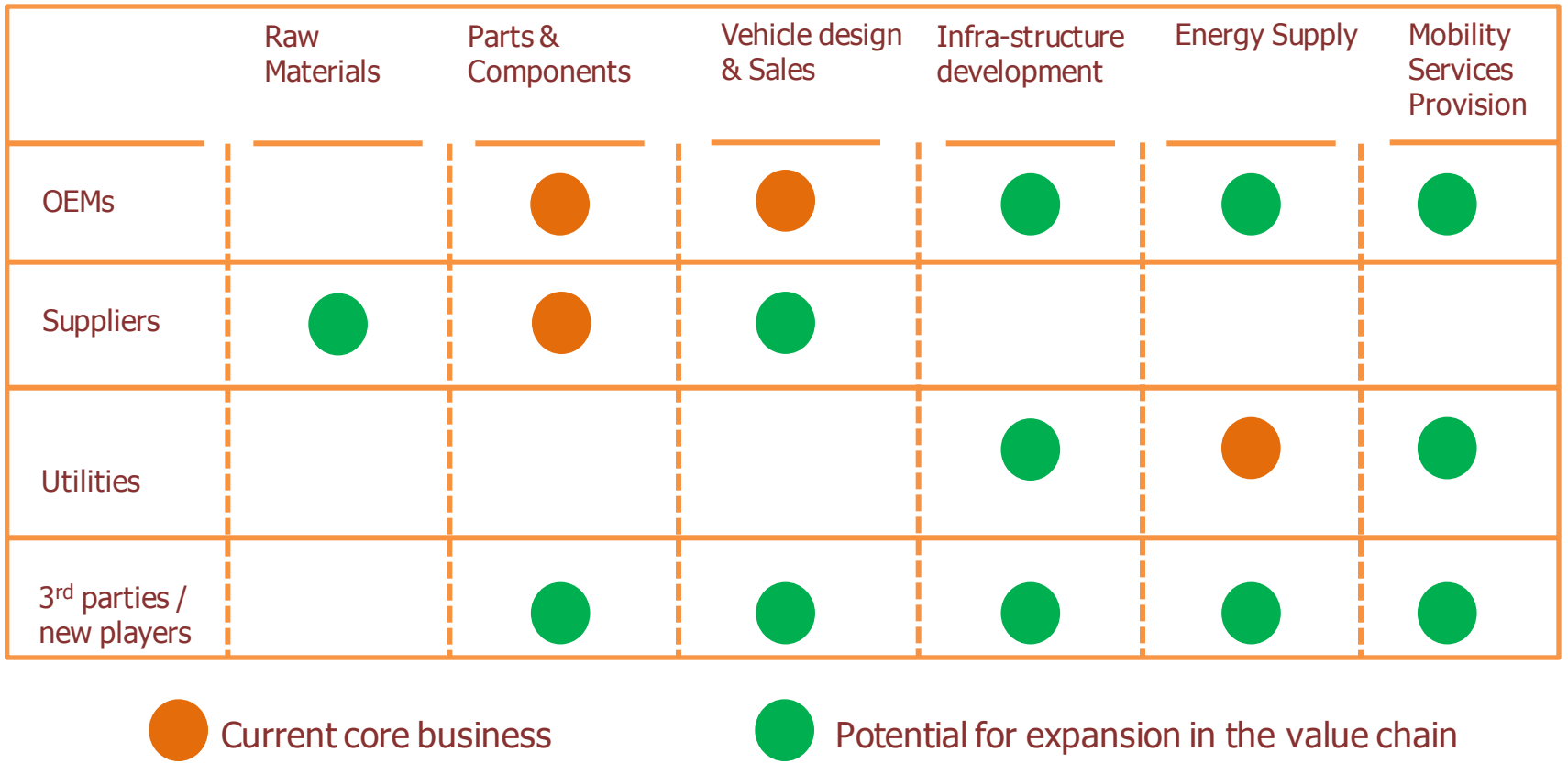

- OEMs & suppliers have the chance to expand their operations in the value chain
- Utilities & 3rd parties can position themselves as mobility providers , undermining OEMs' positioning with respect to the customers

Technology Comparison - EU and India

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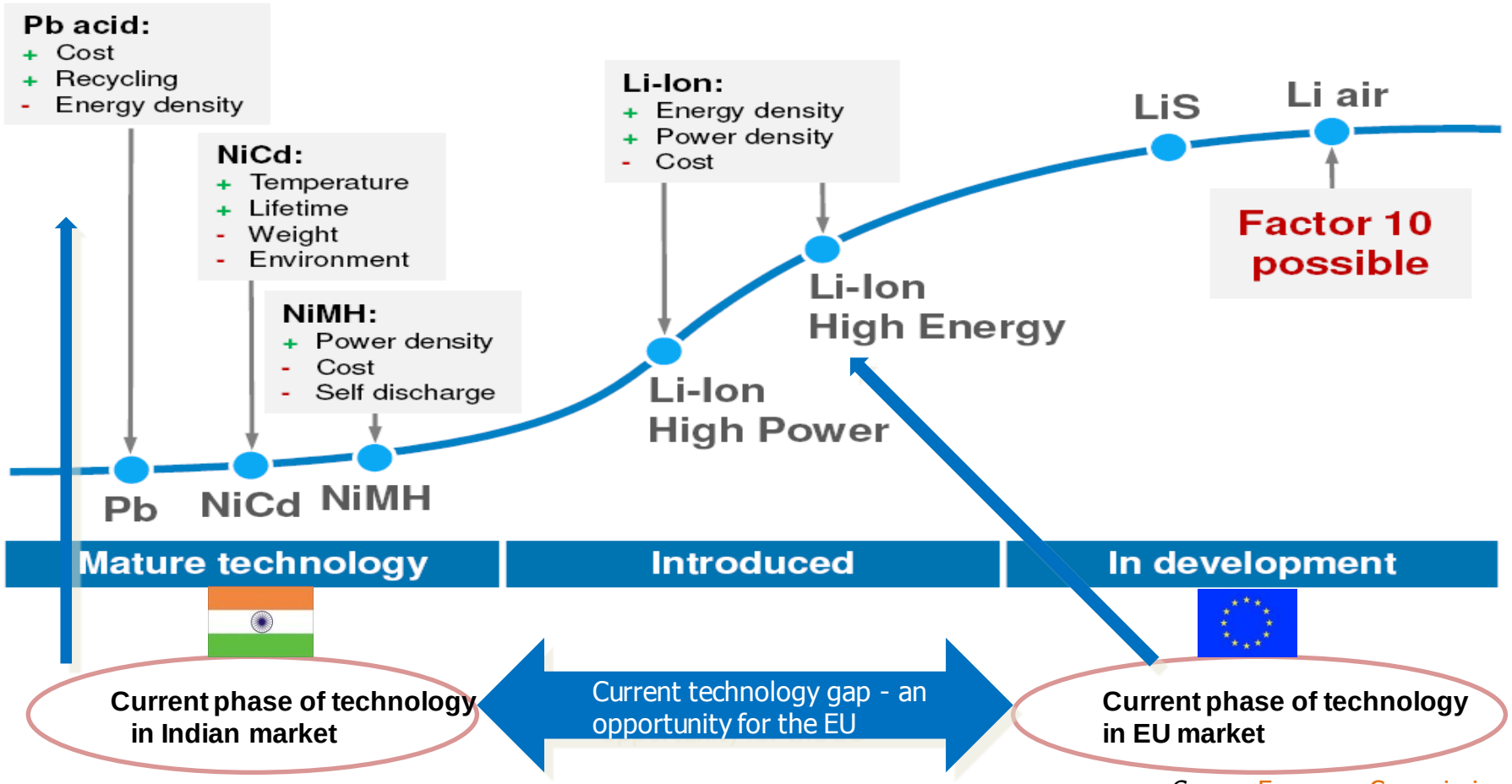
EV / HEV / PHEV Technology	EU	India	Gaps	Opportunities
Battery Technology			▪ In India Lead Acid technology holds a major share in electric vehicles Battery ▪ No developed battery technology for higher energy density and better life span	▪ With significant technological development in Electric motor technology EU can look for opportunities by providing solutions related to upcoming Li-Ion chemistries
Electric Motor Technology			▪ PMM is the most popular development in Electric Motor technology - Known in India	▪ With the advent of Hybrid and Induction motors In EU market offering lower cost & simple configuration seems to be an ideal solution for India as high cost of EV is seen as the major restraint by consumers

 Very Strong Presence  Weak Presence

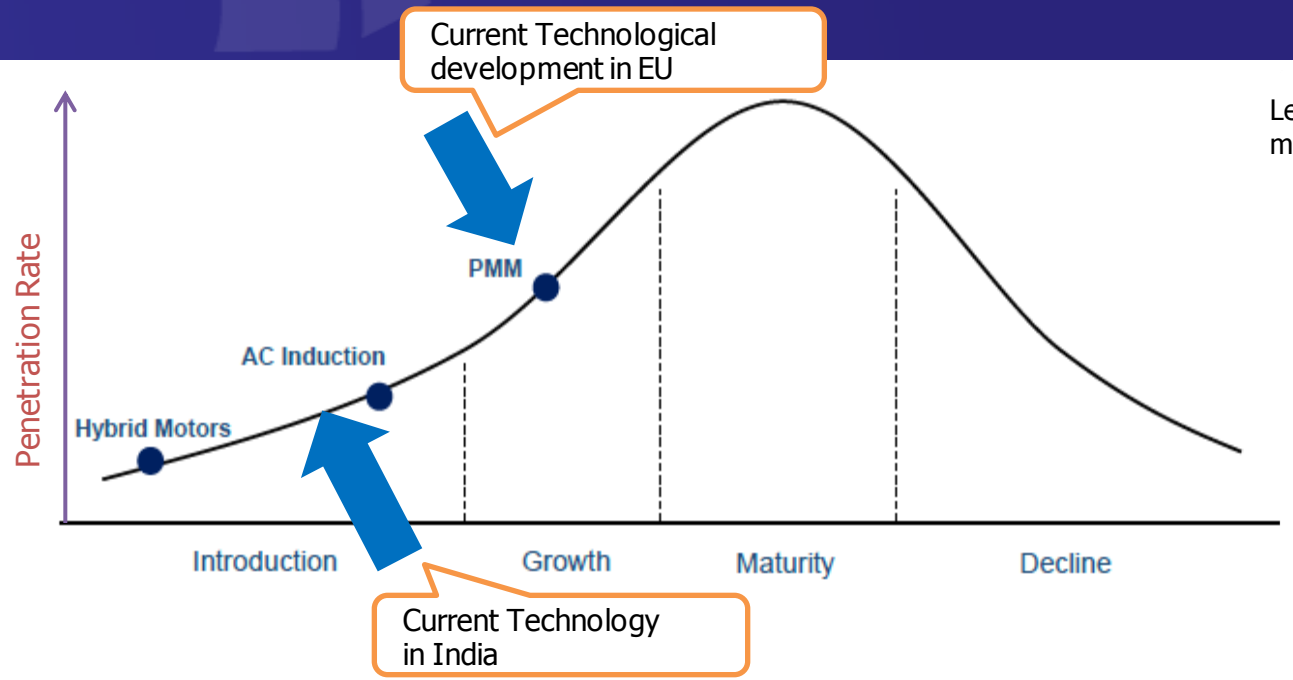
Battery Technology – EU and India Strengths



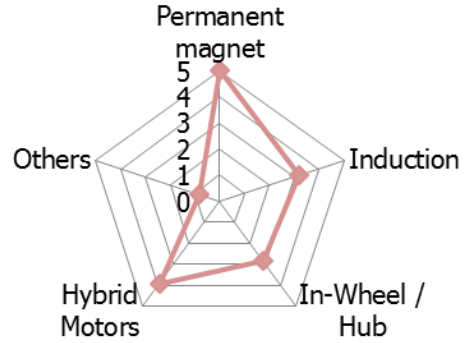
Source: European Commission

EVs on Lead Acid - Li-on batteries will improve EV efficiency

Electric Motor Technology – EU & India

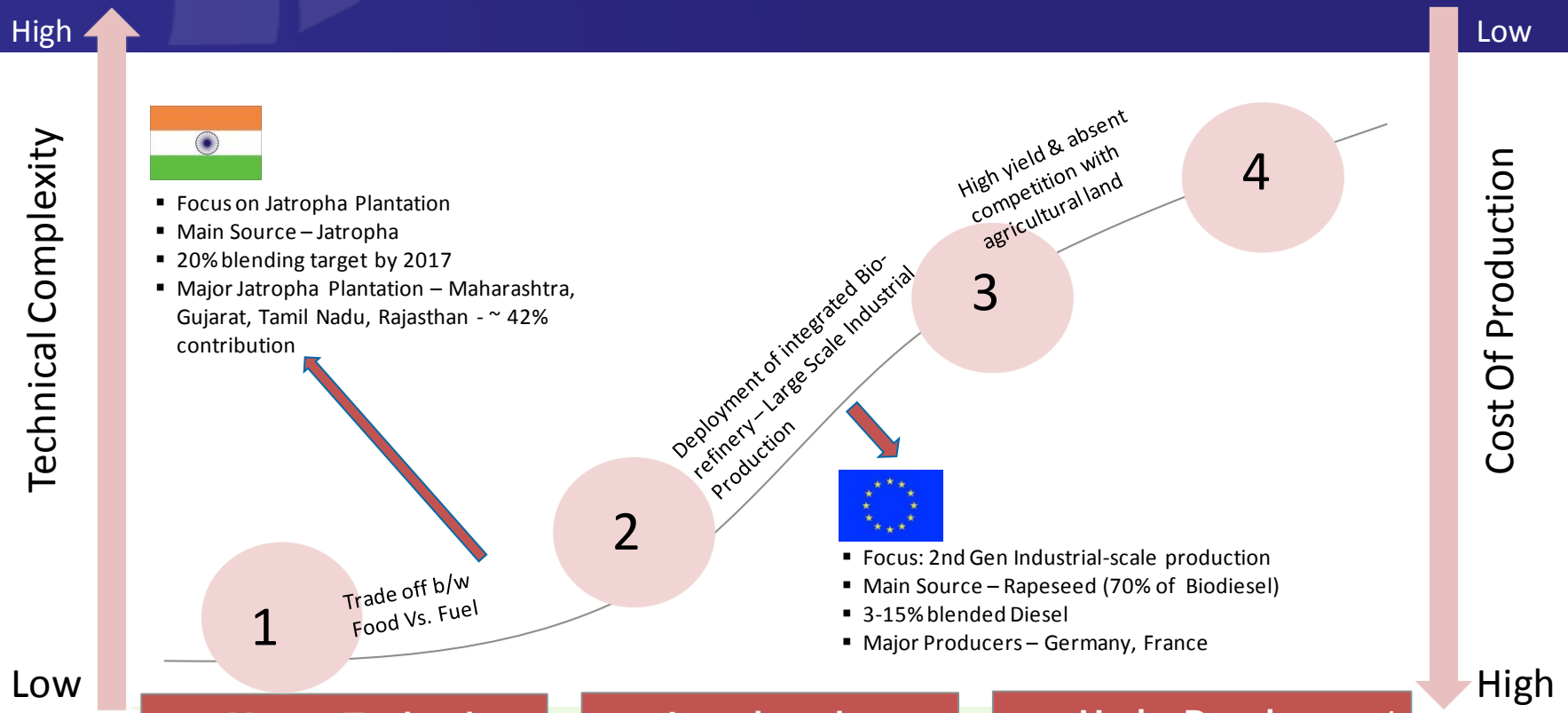


Level of interest in researching and utilizing motors technology (Europe 2010)



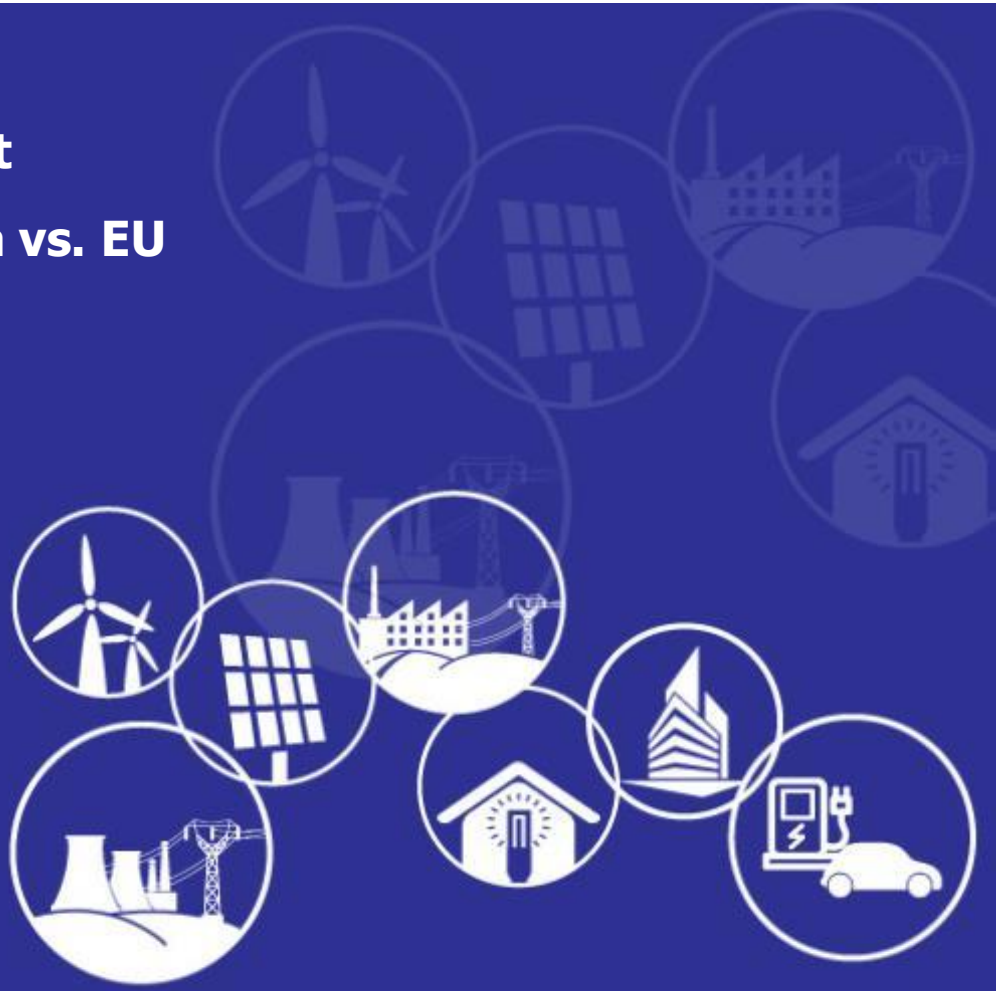
Technology	PMM	Hybrid Motors	Induction
Electric Motor Technology	▪ Permanent Magnet Motors (PMM) are likely to dominate the HEV and EV motor market ▪ Cost & availability of rare earth metals such as neodymium used as magnets have forced OEMs to look for alternatives	▪ European vehicle manufacturers and motor suppliers have found hybrid motor technology which does not have magnets as the most probable alternative ▪ Hybrid motors are predominantly used by European suppliers such as Magna, Continental and Bosch	▪ AC Induction motors are lower priced than PMM (15%-20%). ▪ Technology developed but still at nascent stage

Technology Progression - Biofuel



EU – Yet to explore Industrial Scale Production in India
India- Huge potential for 2nd & 3rd Gen Biofuel

Contents



Recently completed activities
Mobility Matrix

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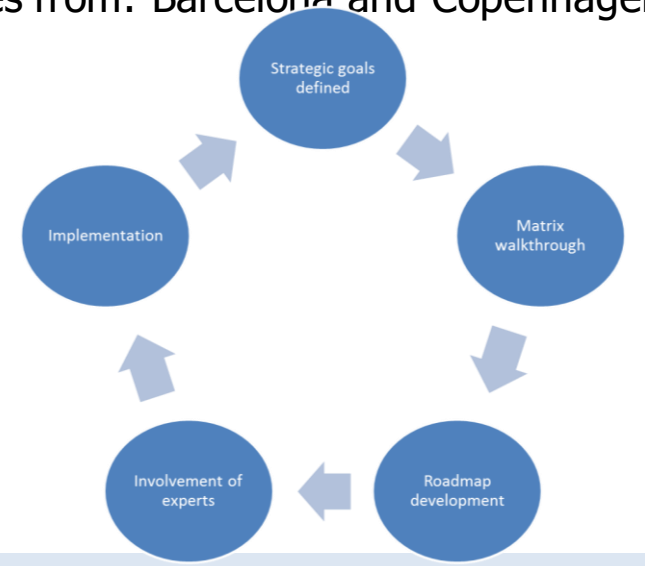
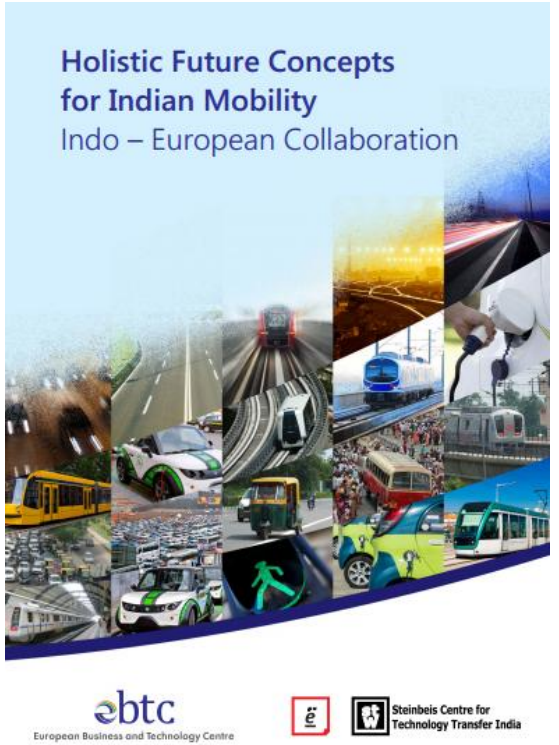
Report: Holistic Future Concepts for Indian Mobility: Indo – European Collaboration

- A joint study to ideate innovative mobility solutions which are applicable in such a big diverse transport society as India
  - Partners: Steinbeis India, Insero E-Mobility, EWF Institute
- Case study Indian cities: Gurgaon and Chandigarh
- Best practices from: Barcelona and Copenhagen





Creation of Indian solutions from EU best practices

Report: Techview: Electric Buses in India

- Partner: Fraunhofer MOEZ

- Discusses
  - Electric Buses and their viability in Indian market
  - To explain the industrial/institutional drivers, provide a market analysis for the validation and commercialization of these technologies in India and
  - indicate a strategy for the companies providing these technologies to enter the Indian market through the services portfolio of EBTC

Market feasibility of Electric technology in Public Transport

On-going activities
Green Freight Initiative

- 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

Important 2015 event
Smart Cities India, 20-22 May 2015, New Delhi

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- A prominent 'European Pavilion' at the Expo – a four side open pavilion with an opportunity to showcase European cities, planners, consultants, companies, clusters and partners.
- Half a day European Workshop – focussing on City-to-City Experience sharing from European cities to Indian cities.
- Event Conference – Opportunity for CXO level speakers to showcase their solution, offers to India.
- Showcases emerging opportunities in developing smart cities. The event supports the views of recently announced 100 smart cities http://indiansmartcities.in/ development plan by the Government of India, to transform satellite towns and existing cities.
- EEN Brokerage Event: B2bs to meet Indian cities managers, companies, clusters and solution providers seeking European collaboration.
  - A dedicated B2Match portal https://www.b2match.eu/smartcitiesindia2015
  - Partners: Chambre de Commerce et d'Industrie de région Paris Île de France

Thank You!

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