IL&FS

RAPID METRO

Smart Urban Mobility

elets
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RAPID METRO - Profile

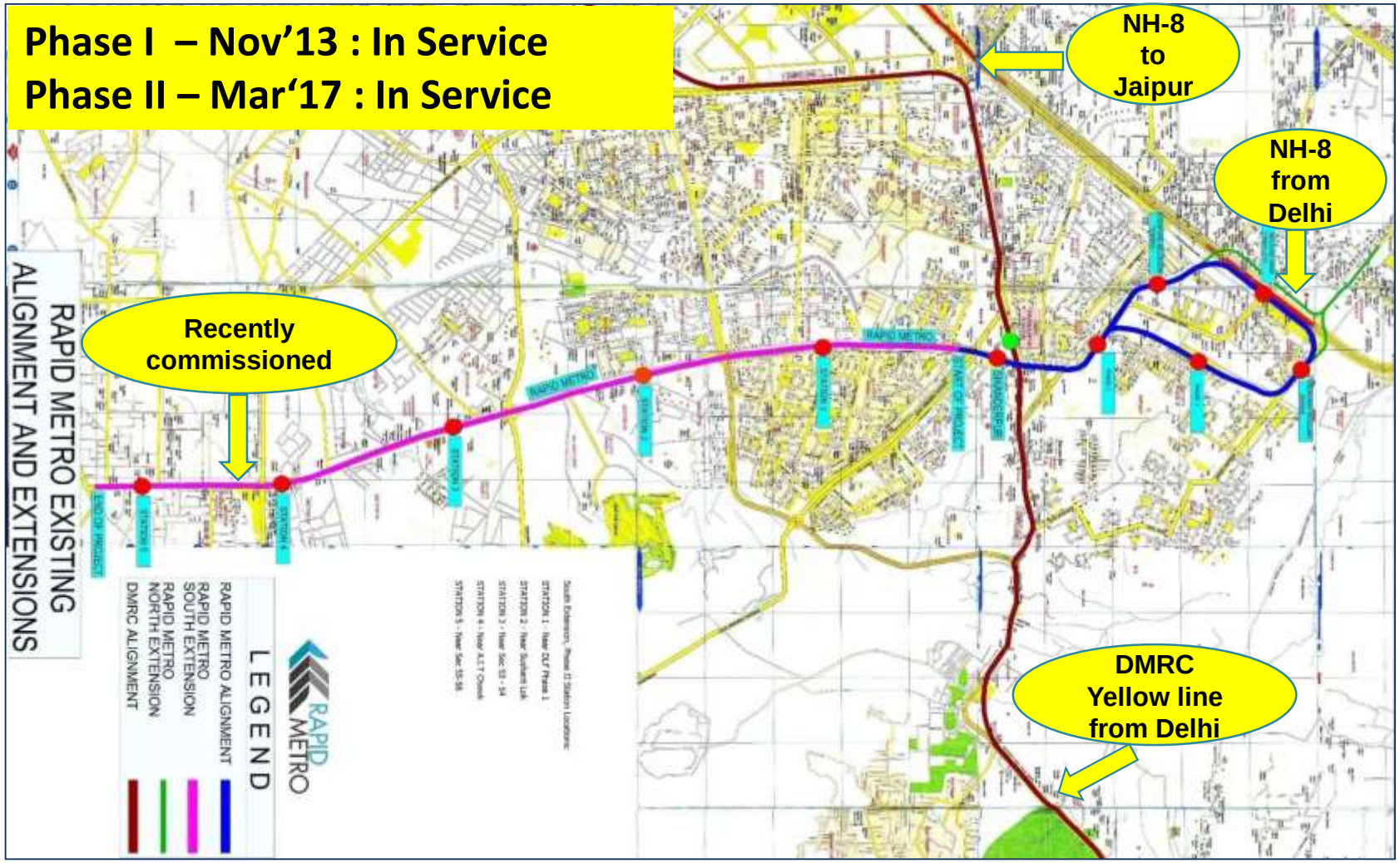
Rapid Metro – Key Project Parameters

Phase I: In Service since Nov '13	
• Route Length (km)	: 5.1
• Project Cost (Rs. Cr)	: 1229
• Concession Agreement	: Dec'09
• Financial Closure	: Jun'10
• Start of Construction	: Nov'10
• GoI Approval	: Dec'11
• Commercial Operation	: Nov'13

Phase II: In Service since Mar '17	
• Route Length (km)	: 6.6
• Project Cost (Rs.cr.)	: 2423
• Concession Agreement	: Jan'13
• Financial Closure	: Jul'13
• Start of Construction	: Oct'13
• GoI Approval	: Nov'14
• Commercial Operation	: Mar'17

Rapid Metro: Phase I & II- Alignment

Phase I – Nov'13 : In Service
Phase II – Mar'17 : In Service



Rapid Metro – Salient Features: Many Firsts in India

- Fully privately funded metro rail project
- Metro rail system providing last mile connectivity
- Elevated Depot
- Common ticketing with another metro railway operator (DMRC)
- Pioneered Innovation with Station branding and naming rights in India
- Train wraps for advertising
- Turnkey supply contract for Key Railway systems
- Turnkey maintenance contract for Key Railway systems

Rapid Metro – Achievements

Environment friendly, Safe and Reliable mode of public transport in Gurugram

- **Punctuality:** 99.88 % since inception
- **Reliability** measured as Mean Distance Between Failures (MDBF): >10.0 Lakh Kms
- **Regeneration Efficiency (avg.)**: >30% since inception
- **Availability levels**: 99.94 % since inception
- **Safety First:** No instance thus far of any de-boarding or serious safety related issue.

IL&FS Rail Limited: Strengths

We have expertise to support all the functional requirements of Mass Rapid Transit Projects such as:

- Develop and deliver integrated solutions for Rail Transit projects
- Financial Modelling and Analysis
- System Engineering and Integration
- Project Management and Change Management
- Interface Management
- Procurement Management
- Civil Construction
- Testing and Commissioning and Integrated Trials
- Operations and Maintenance

IRL has grown as one of the most efficient MetroRail Systems with best in class O&M performance indicators.

Urban Mobility - Context

Visible Trends

Climate Change & Sustainability

COP21
To keep global warming below 2◦ C

UNFCC
Reduce the emission intensity of its GDP by 33%-35% by 2030

SDG-2015
To achieve the 17 SDGs by 2030

Rapid Urbanization

~31 %. living in urban areas

472x vehicular growth since 1951

53 cities with million plus pop.

10 % decadal growth in vehicle pop.

Digital Proliferation

65 crs. smartphone users by 2019

Demographic & Societal Change

~ 65 % population under 35 years

Rise in per capita income by 7.4 %

Requirements

Low Carbon Transport

Demand Responsive Transport

Smart and Integrated Services

Segmented User Market

Urban Mobility Trends in India

3 %

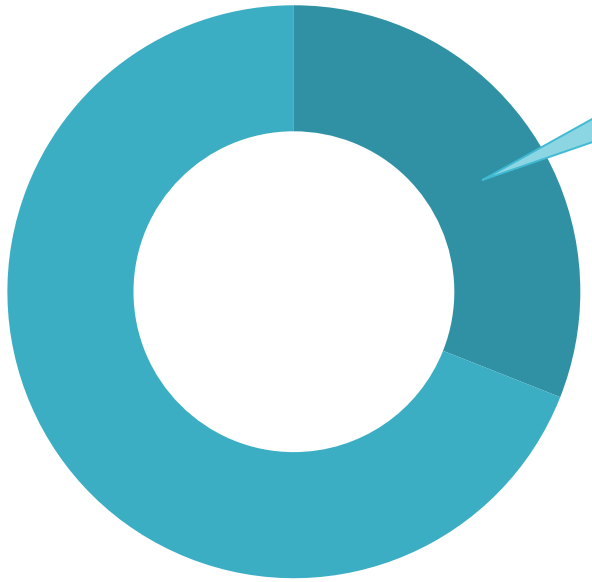
Urban Population Growth Rate

35 to 53

One million plus cities

60 Mln

vehicles registered in the million plus cities



31% Urban Population contributes to 63% of India's GDP

Rapid growth in vehicles has led to:

- Higher congestion- Decrease in average speed of vehicles
- Higher Pollution levels - Transport sector is the fastest growing consumer of fossil fuels & contributes 13% to carbon dioxide emissions
- Worsening Road Safety- 1.4 lakh accident deaths annually

Mass Transit Systems in India

BRTS (Operational – 7 & Under Construction – 5)

METRO (Operational /partly Operational – 11 & Under Construction including expansion – 12+)

City Bus Service (all Major Cities)

Monorail (Operational – 1)

“Mass Transit” Technology Options

METRO RAIL

Light Rail Transit / Light Metro

Tram

Monorail

Bus Rapid Transit (BRT)

Cable Car

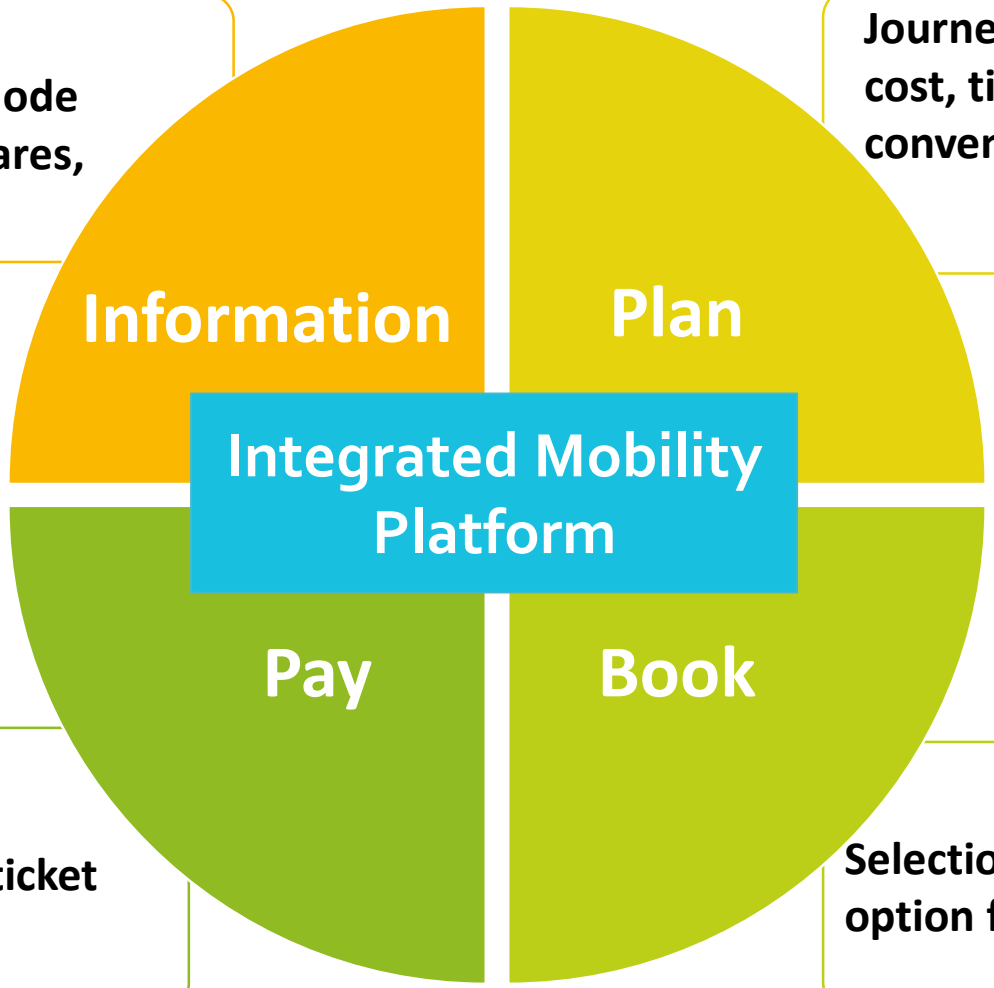
Approach to Smart Mobility

- **Integrated Public Transport**
- **Robust digital infrastructure for ticketing integration across modes**
- **Mobility integrated with land use**

Integrated Public Transport – Salient Features

- Mass Transit system to be the backbone of Public transport
- Multi-Modal integration for
  - Seamless journey - enhanced user experience
  - Feeder/evacuation service
- Tailor made feeder service
  - E-Rickshaw /autos
  - Feeder buses
- Accessibility – pedestrian walkways
- Parking in the vicinity of metro stations – “Park & Ride” is a proven, global principle.
- Public Transport reach to >80% of city area
- Facilitate “densification” through framework for “Transit Oriented Development” around mobility corridor
- “Ticketing” integration across modes – need for robust infrastructure

Integrated Mobility Platform



One platform for information on mode choices, routes, fares, travel time

Journey options based on cost, time comfort and convenience

One journey one ticket

Selection of most suitable option for journey

Integrated Mobility Platform – Consumer Experience

1

Enter details

Enter Starting Location:

Ambience Mall, Gurgaon

Enter Destination:

CP New Delhi

Get journey choices

2

Get multimodal routes with option of

- Travel cost
- Travel time
- Number of Interchanges

3

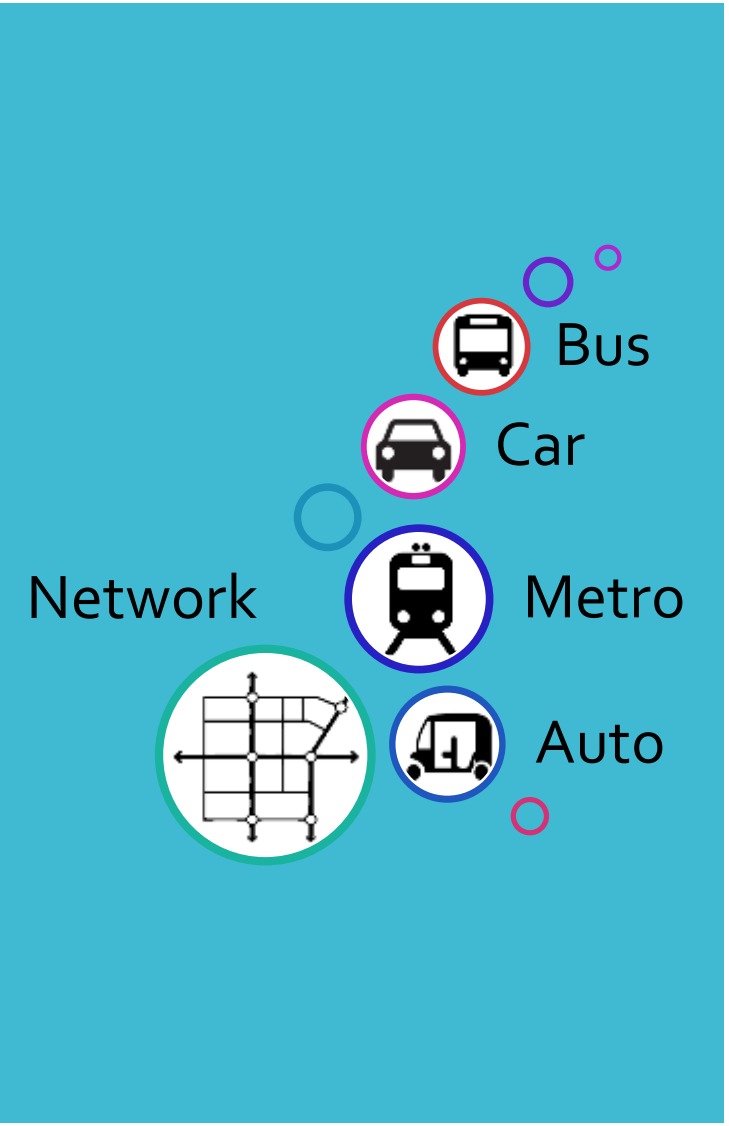
Book the preferred journey option & single payment

4

Receive mobile ticket for full journey

Hassle free journey

Institutional framework – creation of UMTA



- **Creation of a Unified Metropolitan Transport Authority**

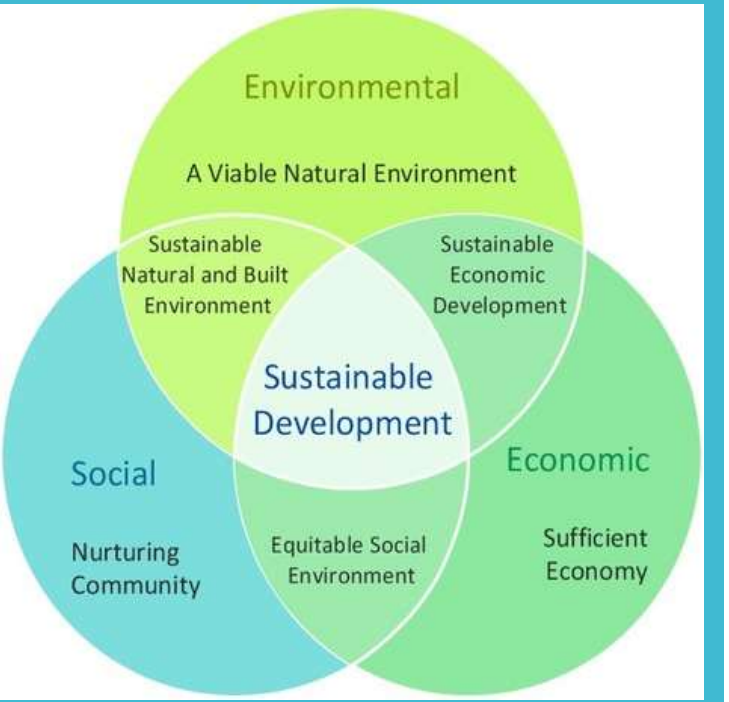
- **An executive body governed** by a Board made up
  - Heads of various departments
  - Local elected leaders
  - Eminent citizens
- **Empowered to set up SPV's**

- **Functions for Urban Transport**
  - Formulation of policies, strategies and financing
  - Co-ordination of various available modes of public transport
  - Integrated and holistic planning
  - Planning of road network and associated infrastructure
  - Organising and co-ordinating services
  - Management of urban transport funds

Smart Mobility in the Indian Context

- "Smart Mobility" in the context of developed countries may mean intelligent, ICT-based solutions (telematics) that enable:
    - Ease of individual transport (in megacities) while attending to environmental concerns
    - Mobile Office Applications (work flow management)
- In India's context the term has to be redefined to include all modes of transport that enable:
    - Ease of Individual transport in rural and semi-urban areas as well as in urban mega cities while attending to environmental concerns
    - Creation of sustainable mass transportation systems as well as greater penetration of environmental-friendly (motor) vehicles for personal use
    - The distances to be covered in India may be large, both intra-regional and inter-regional

Benefits for People



- Ease of access to the transit stations within 500 meters
- Better first/last mile connectivity after organised IPT

Accessibility

- Enhanced user experience after seamless integration
- Encourages people to use public transport

Seamless Travel

- Elimination of vehicles from streets on a working day

Less Vehicles on Street

- Reduction in time for travel
- Reduction of operating cost for service providers
- Reduced time for transfers
- Reduced waiting time with desirable frequency of the system

Reduced Travel Cost

- Reduction in Carbon Dioxide levels
- More energy efficient and cleaner mode of Public transport including IPT system

Reduction in Emissions

- Providing mobility for reducing Social and gender inequality
- Increasing employment opportunities in TOD zones

Socio Economic Development

Benefits for Government

- Creates Public Infrastructure assets for the city
- Infrastructure cost savings

Lasting Value

- Higher living standard attracts investments
- Inflow of skilled people, knowledge ecosystem

Economic Prosperity

- Economic growth momentum to fuel high contribution to the exchequer

Higher income for Govt.

Thanks

BACKUP

Integrated Transportation for City -Benefits

- Convenient multimodal travel
- Transparent traveling information

Consumers

- Reduction of operating cost
- Additional sales channel
- Improved utilization

Service Providers

- Optimized utilization of infrastructure
- Increased control of traffic management

City/Public Authorities

O&M Staffing Comparative (Non-Managerial): Operations & Revenue

Metro	Staff Count Benchmark Per Unit
DMRC*	13.00 / Route Km
BMRCL$	12.80 / Route Km
Rapid Metro#	12.52 / Route Km

***Source: MoUD's REPORT OF THE SUB-COMMITTEE ON OPERATIONS AND MAINTANENCE SYETEMS FOR METRO RAILWAYS NOV 2013**

$ BANGALORE METRO LINE 1 + LINE 2 (42.3 KM)

 # RAPID METRO PHASE I + PHASE II

O&M Staffing Comparative (Non-Managerial): Permanent Way Works – E&M Traction

Metro	Staff Count Benchmark Per Unit
DMRC*	9.00 / Route Km
BMRCL[$]	10.40 / Route Km
Rapid Metro[#]	6.68 / Route Km

***Source: MoUD's REPORT OF THE SUB-COMMITTEE ON OPERATIONS AND MAINTANENCE SYETEMS FOR METRO RAILWAYS NOV 2013**

[$] BANGALORE METRO LINE 1 + LINE 2 (42.3 KM)

[#] RAPID METRO PHASE I + PHASE II

O&M Staffing Comparative (Non-Managerial): Signal, Telecom & AFC

Metro	Staff Count Benchmark Per Unit
DMRC*	5.90 / Route Km
BMRCL$	6.80 / Route Km
Rapid Metro#	4.43 / Route Km

***Source: MoUD's REPORT OF THE SUB-COMMITTEE ON OPERATIONS AND MAINTANENCE SYETEMS FOR METRO RAILWAYS NOV 2013**

$ BANGALORE METRO LINE 1 + LINE 2 (42.3 KM)

 # RAPID METRO PHASE I + PHASE II

O&M Staffing Comparative (Non-Managerial): Rolling Stock and Depot M&P

Metro	Staff Count Benchmark Per Unit
DMRC*	1.25 / Car
BMRCL$	1.60 / Car
Rapid Metro#	0.86 / Car

***Source: MoUD's REPORT OF THE SUB-COMMITTEE ON OPERATIONS AND MAINTANENCE SYETEMS FOR METRO RAILWAYS NOV 2013**

$ BANGALORE METRO LINE 1 + LINE 2 (42.3 KM)

 # RAPID METRO PHASE I + PHASE II

O&M Staffing (Non-Managerial) : Comparison# Based on Benchmarks

Department	DMRC	BMRCL	RMGL
Operation and Revenue	325	320	313
Permanent Way & Works E&M and Traction	225	260	170
S&T and AFC	148	170	111
Rolling Stock and M&P	75	96	52
Total	**773**	**846**	**646**
Manpower % over RMGL	**19.6**	**31.0**	**Base**

 # For a typical 25 km line with 60 coaches and a maintenance depot. Comparison based on these major departments only.

Layer 1 Private Security (non-CISF) further adds to significant cost advantage.

Rapid Metro Phase I - Snapshot

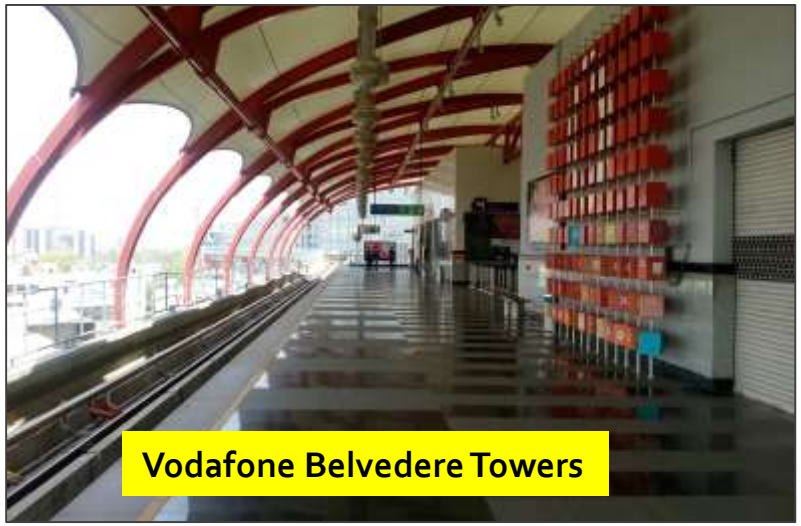

Operation Control Centre


Seamless Interchange with DMRC


India's First Elevated Depot


750V DC 3rd Rail, SG Track

Rapid Metro Phase I - Snapshot


Vodafone Belvedere Towers


IndusInd Cybercity Station


Wrapped Train


Sikenderpur Crossover

Challenges – Mobility

System	Urban Mobility Issues
Metro	• Network Coverage currently limited to South Gurgaon
Buses	• Unreliable; Overcrowded, Poor Image • Limited Network Coverage
IPT	• Unreliable & Unorganised • Unsafe, Price swings
Aggregators	• Lower access to technology & service • Not affordable to all classes
Roads	• Congestion; Inaccessible • NH-8 acts as a barrier

Lack of a comfortable & integrated system unable to offer a seamless public transport journey

Integrated Mobility Platform Ecosystem

Commuters Mobility Needs 1	Shift from private vehicular mobility to integrated transit accessibility – Seamless, Convenient, Affordable		
Mobility Integration infrastructure 2	Real-time transit information and planning	Single payment mode	Seamless journey through Integrated modes
	Physical integration	Sharing of data	Operational integration
	Rapid transit stations and parking lots	Fare integration and online payment	Institutional integration
Stakeholders 3	**Infrastructure providers** • Telematics, telecomm companies • IT and payment systems • Parking operators	**City administrators** • Municipal Corporations • Transport Authorities	**Transport modes operators** • Ride sharing/pooling Companies/individuals • Public transport providers • Aggregators/taxi services

Adapted from Urban Mobility Blueprint- E and Y

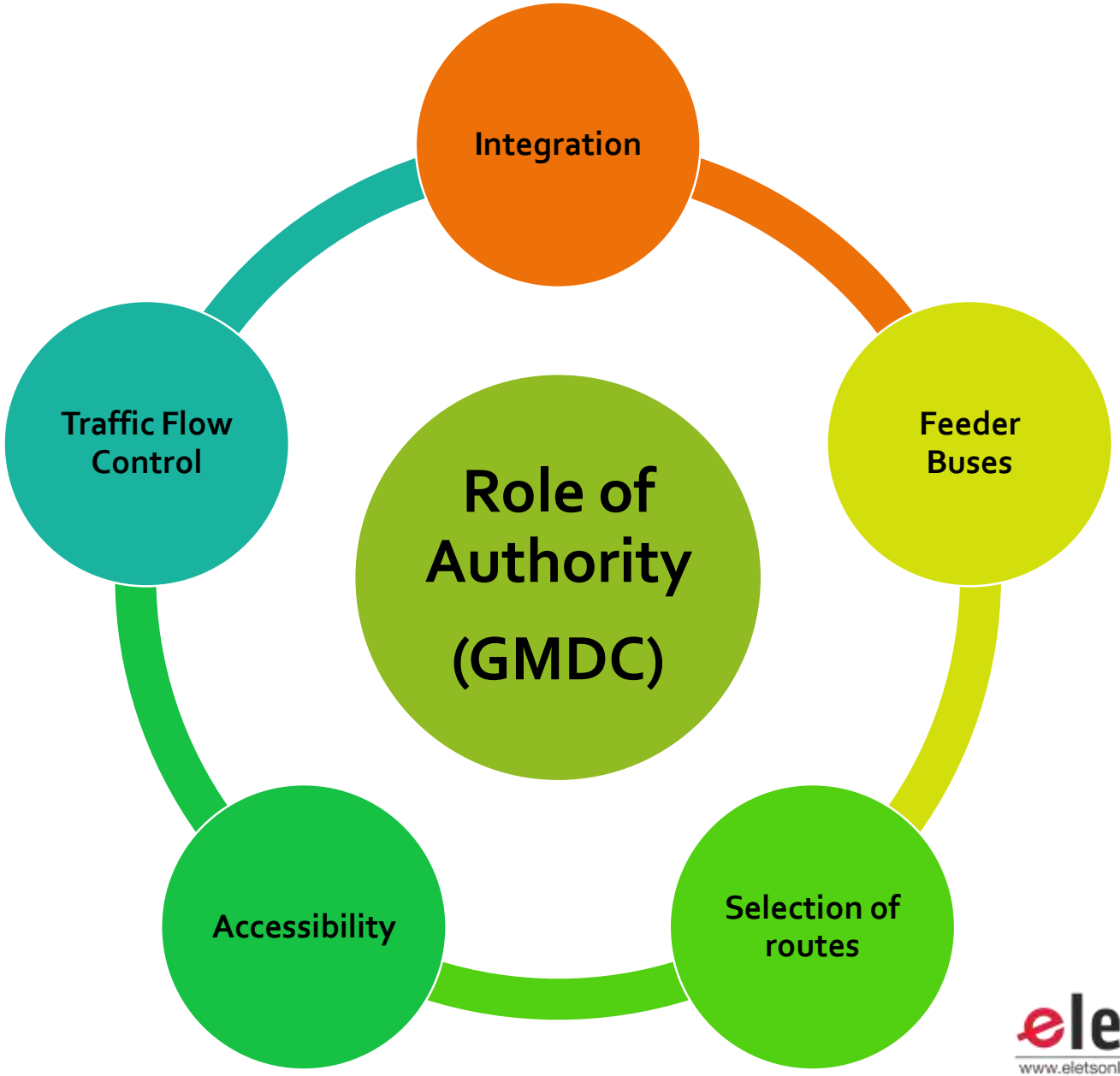
Role of Local City Authorities

The local authority has critical role to play in planning, integrating and supporting the integrated transportation mechanism. The requirement of society viz.

- Ease of planning travel
- Ease of travel
- Ease of interchange
- Predictability

are important factors in planning.

The various modes of travel must operate within defined rules/regulations



Mobility Challenges

Rapid Urban Expansion

- Huge stress on urban infrastructure and services
- Haphazard growth and urban sprawl
- Excessive reliance on private transport and burgeoning vehicle count
- Absence of a seamless integrated public transport option

Liveability

- Vehicular emissions and Construction are major sources of pollution, although diffused
- Attendant challenges of congestion and rapidly deteriorating air quality
- Heightened expectation of young and upwardly mobile population

*Critical need to improve **liveability,** addressing challenges of mobility and environment*

Need of dedicated institution for Smart Mobility

City governments can establish an institution that brings all of these projects together in an integrated way. This institution requires to overcome transportation challenges, active participation and collaboration of different players:

Collaborative service management, Interoperability of assets

Data sharing across mobility services,

Functions of the Institution

1. Develop and implement comprehensive ITS strategies that are long term, flexible and integrated with the city's transport vision.
2. Adopt customer-centered approaches to improve services, understand customers and influence customer behavior patterns.
3. Integrate service delivery across transport modes.
4. Secure funding and apply innovative business models.
5. Effectively manage implementation by addressing the complexity of ITS projects.