

Metro Rail Sector



Ministry of Housing and Urban Affairs
Government of India



“Delhi is the capital of India which is the largest democracy in the world. The population is growing, and the people want provision of basic facilities”

Late Shri Atal Bihari Vajpayee
(during the launch of Delhi Metro, 24th Dec'2002)



“As we have set a target to become a USD 5 trillion economy in the next five years, we will have to develop our cities in sync with the 21st century world. For this, we will have to develop systems to ensure mobility, connectivity, productivity, safety and sustainability”

Shri Narendra Modi, Prime Minister of India
(Mumbai, 17th Nov'2020)



Metro Growth

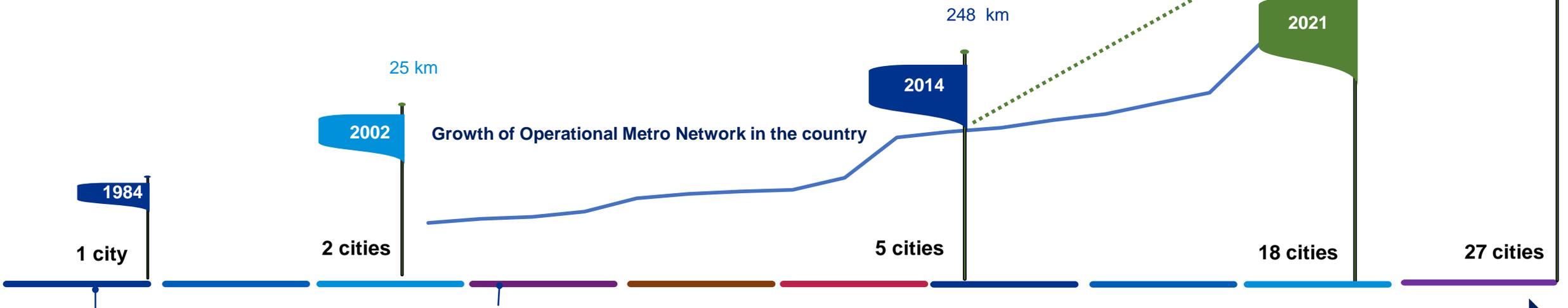
Growth of Metro Rail...



Item	Before 2014	Addition after 2014	Current Status
No. of cities with operational Metro Network	5	13	18
Commissioning of new metro rail lines (km)	248	454	702
Approved metro networks, including RRTS for construction (km)	659	1,059	1,718
Approved RRTS corridor for construction (km)	0	82	82
Metro passengers per day (ridership in lakh)	17	68	85 (pre-Covid19)



1,700 km
2025



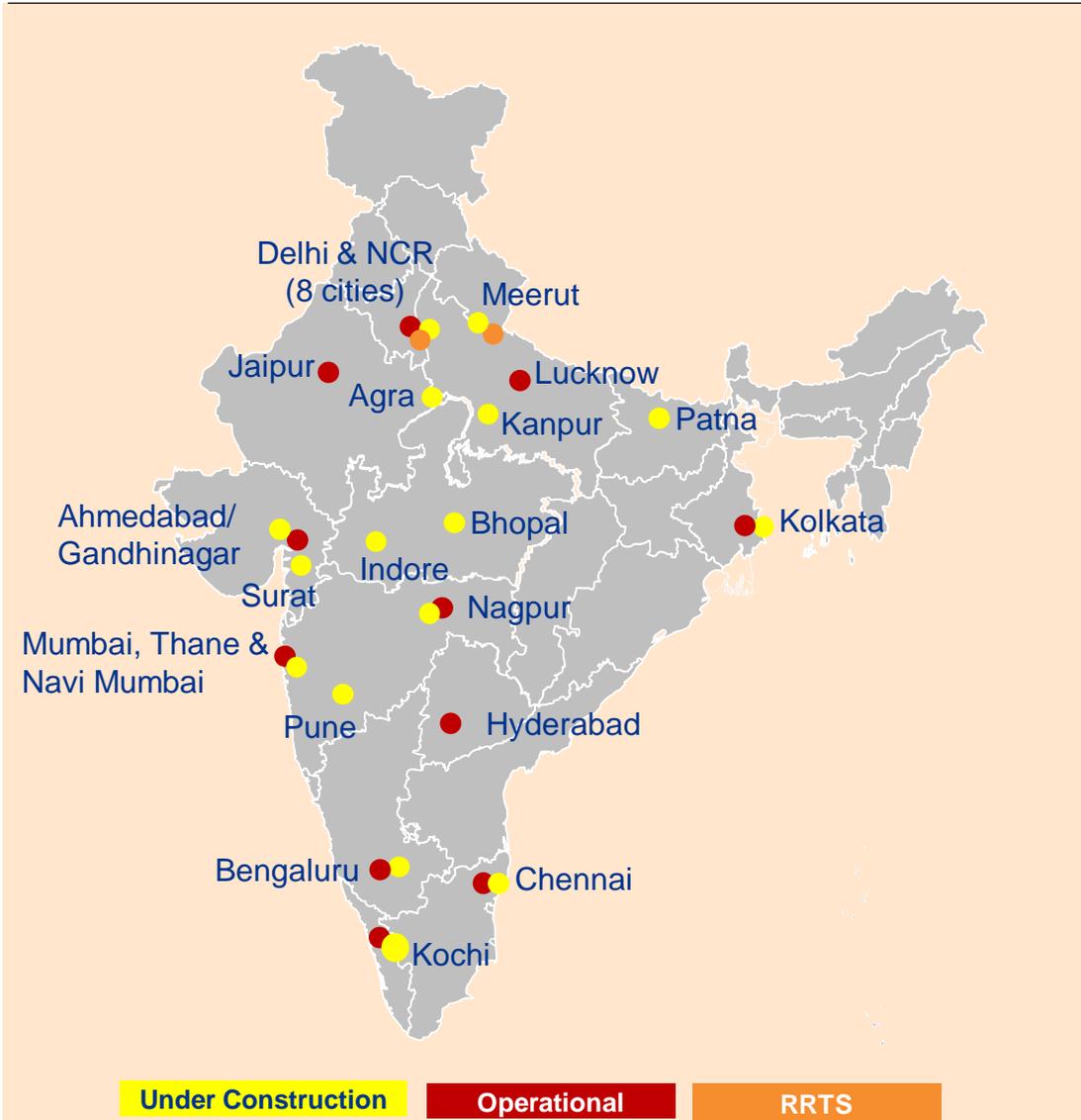
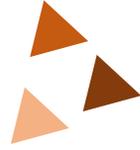
First metro service started in Kolkata - a small section of 3.4 km underground metro network; 12 years to construct

First modern energy efficient AC metro services started in Delhi; 8 km stretch between Shahdra and Tis Hazari



Prior to 2014, about 248 km metro network was operational in 5 cities. 484 km operational metro network added during 2014 to 2021 in 18 cities

Metro Rail Spread



“Today metro work is going on in many cities. Very soon there will be metro network in 50 cities and the world is also surprised that the work on metro is being done at such a scale in any country and investors in the world are taking keen interest in this.”

Prime Minister Shri Narendra Modi
(Noida, Uttar Pradesh, 25 December 2017)



Revolution Through Reforms...

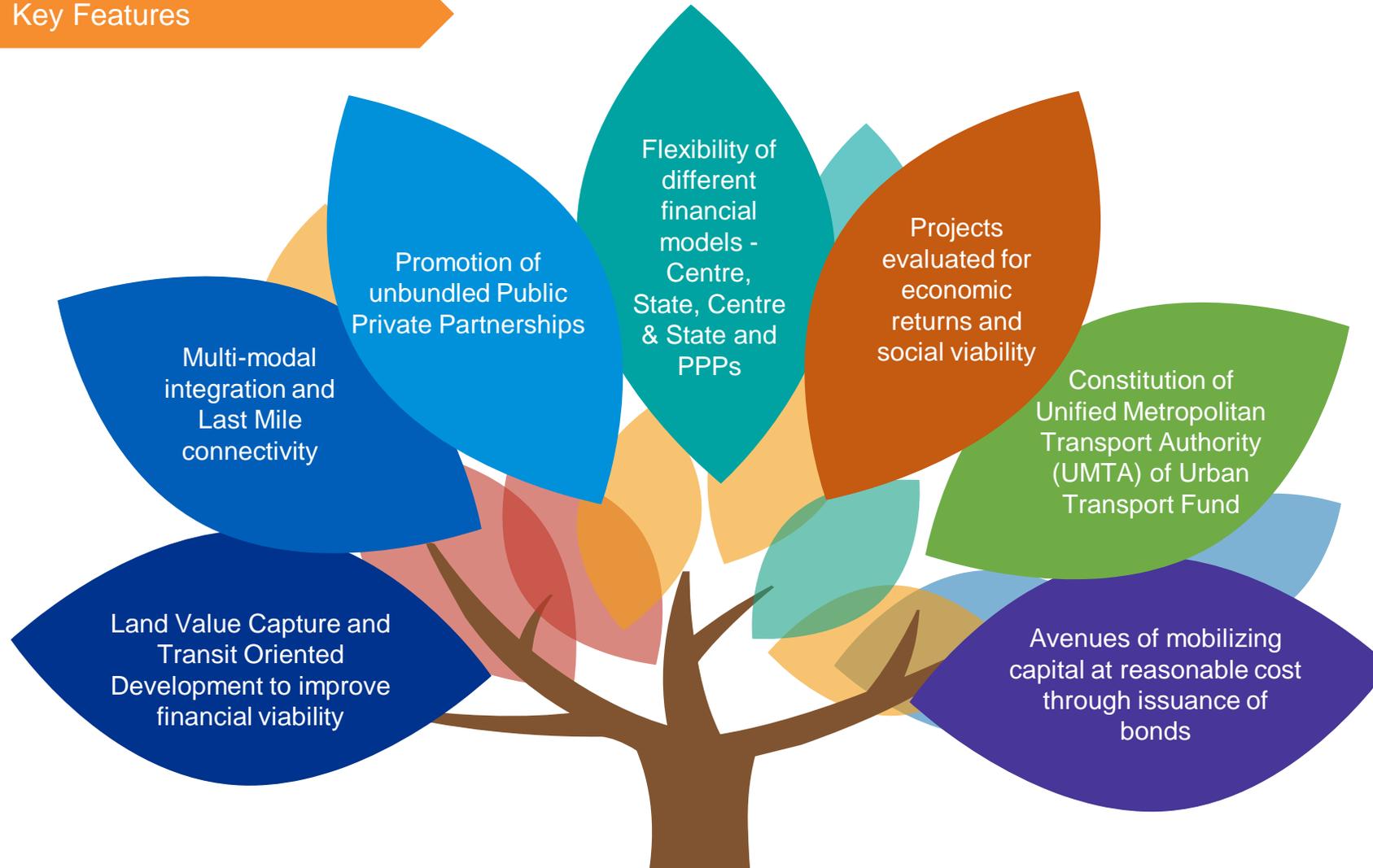


Policy Reforms - Metro Rail Policy 2017



With increasing number of cities aspiring for metro rail system as a primary mode of urban transportation, a need was felt to institutionalise a comprehensive Metro Rail Policy for creating an enabling environment for expansion of metro rail system across the country

Key Features



Impact delivered...



Emphasis on standardization and indigenization leading to reduction in cost



683 km metro & RRTS network approved after Metro Rail Policy



New urban transit modes - RRTS, MetroLite, MetroNeo & WaterMetro

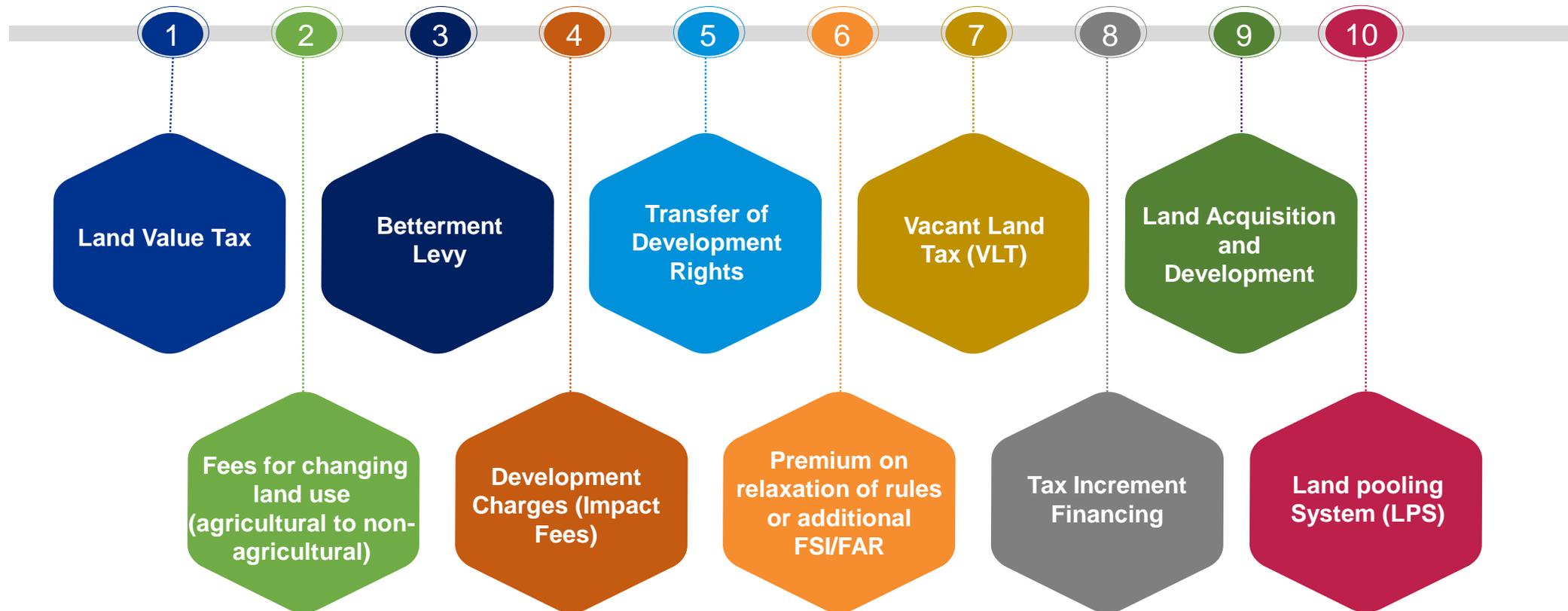


363 km of metro network made operational after Metro Rail Policy

Value Capture Finance Policy Framework



Mass Transit Systems across the globe face challenges related to financial sustainability and are dependent on alternate sources of funding, beyond fare box revenue. The Value Capture Finance (VCF) Policy Framework, 2017 identified tools for financing infrastructure projects.



Policy adopted by Maharashtra, Rajasthan, Madhya Pradesh, Karnataka.....

National Transit Oriented Development Policy



Integrated land use & transport planning to develop compact growth centers within influence zone of 500-800 m on either side of transit stations

Promote public transport

Reduce carbon footprint

Develop inclusive habitat

Integrate economically weaker section & affordable housing

Development of safe society

Prevent urban sprawl

3 levels of TOD implementation

Station level TOD

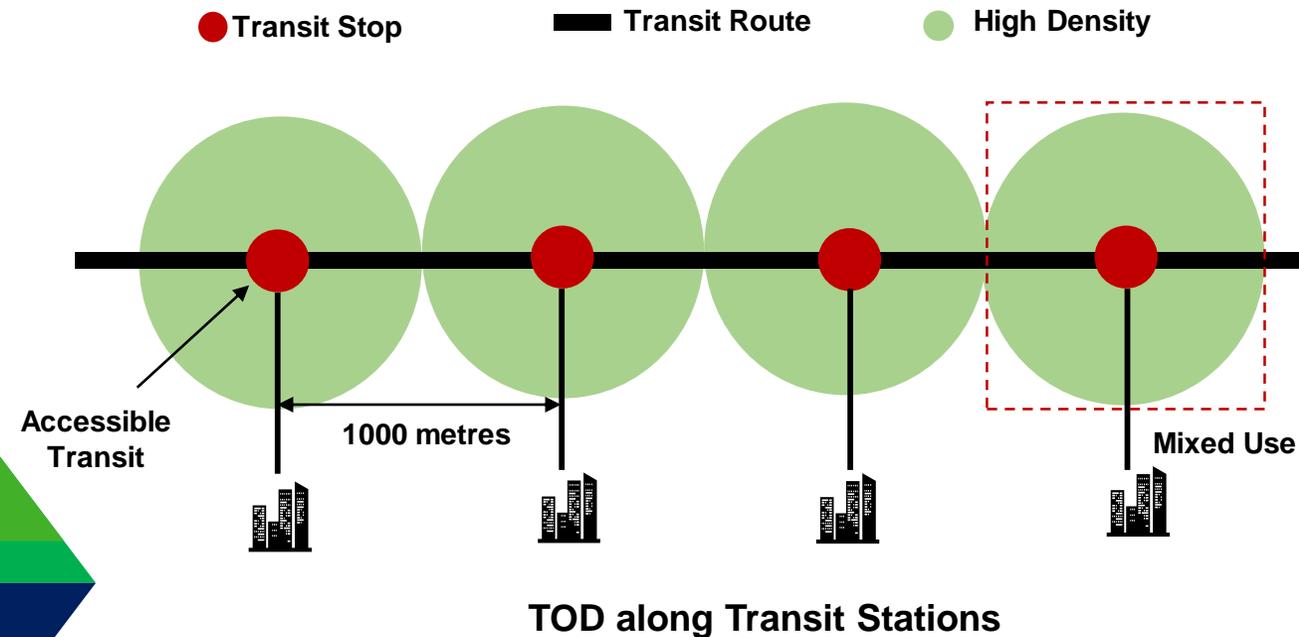
Development of TOD around existing/proposed mass transit stations e.g. Ahmedabad, Kochi and Surat

Area level TOD

Development of TOD around Central Business District areas e.g. Delhi, Bhopal, Mumbai & Raipur

City level TOD

Development of TOD within an activity node across the city e.g. Naya Raipur and Navi Mumbai



Standardization & Indigenization Reforms



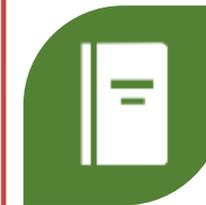
Improve interoperability, promote indigenous development and manufacture, promote long term investments, substitute imports, & reduce cost



Standardized metro components viz. Rolling Stock, Signaling and Telecom systems, Electrical & Electromechanical components and Civil Engineering structures



Benchmarking of unit cost of metro components, resulting in reduction of project cost



Standard eligibility criteria for procurement of metro rolling stock, minimum 75% of tendered quantity of rolling stock to be manufactured indigenously



“Our Make in India push has led to development of tremendous indigenous capacity for production of transportation systems. It is going to help us push our sustainable transport goals in a big way”

Shri Narendra Modi, Prime Minister of India
(addressing Bloomberg New Economic Forum, 17th Nov'2020)

'Make in India' in Metro Rail



'Make in India' initiative has significantly reduced dependence of Indian Metros on foreign vendors, who had monopoly in technology-based systems



Standardization & indigenization of rolling stock components

Reduction in the cost of rolling stock from INR 12 crore to INR 8 crore per coach

Progressive increase in minimum local content

Rolling Stock-60%, Tele communication-50%, signalling system-50 %, Electrical and Mechanical-60%, Civil works-90%-elevated structure & 80%-underground structure

Local Procurement

Saves foreign exchange and generates local employment leading to AtmaNirbhar Bharat

Indigenous Manufacturing

Minimum 75% of the tendered quantity of rolling stock to be manufactured indigenously with progressively increased indigenous content



(Metro coaches manufactured in India are also being exported)

Mantra of ‘Vocal for Local’



“Vocal for Local should become mantra for every Indian” - Shri Narendra Modi, Prime Minister of India , 15 August 2020



Four companies manufacturing metro coaches in India



BEML, PSU,
Ministry of Defence



Alstom, Sricity,
Andhra Pradesh

BOMBARDIER

Bombardier,
Savli, Gujarat



Titagarh Firema,
Kolkata, West Bengal

Four companies bagged tenders for >1,200 Metro & RRTS coaches in last three years through global tendering process



Several companies are manufacturing various Metro components in India



Knorr-Bremse,
Baghola, Haryana



Faiveley Transport,
New Delhi, Delhi



Automator Alliance
Limited, Noida, UP



Dellner India,
Noida, UP



Mitsubishi,
Bangalore



Sidwal,
New Delhi Delhi



Schunk,
Bengaluru

SIEMENS

Siemens,
Nasik, Maharashtra

ABB

ABB,
Bangalore



Ample domestic capacity also developed for construction of civil structures

A front-facing view of a modern light rail train, likely a Hyundai Rotem model, positioned in a maintenance or assembly facility. The train is white with blue and red accents. The front features a large windshield with a white sign that reads "HYUNDAI" and "T2000". Below the windshield, the "HYUNDAI Rotem" logo is visible. The train is surrounded by industrial infrastructure, including metal walkways, stairs, and overhead beams. An orange banner is overlaid on the left side of the image, containing the text "New Transit Modes".

New Transit Modes

Regional Rapid Transit System (RRTS)



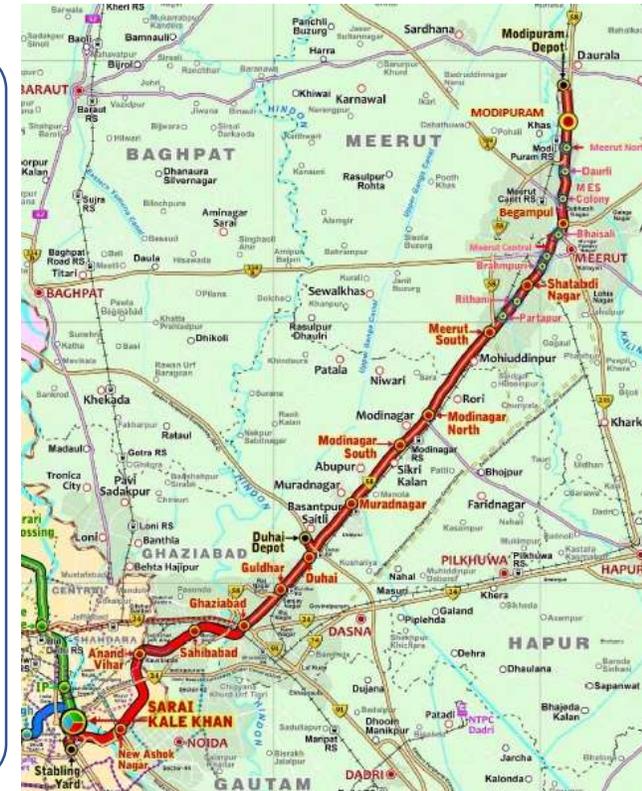
For the first time a Regional Rapid Transit System connecting two cities in National Capital Region (Delhi – Meerut) is being introduced, which is a transformational intervention set to revolutionise regional development

Key Features

- 180 kmph design speed & 160 kmph operational speed
- First of its kind ETCS – L2 signalling on Long-Term Evolution (LTE) backbone
- Rigid Overhead Catenary System suitable for high speed
- High performance, low maintenance Ballastless Track for high speed

Regional Transformation

- Polycentric economic development – improved access to the Capital city
- Reduced congestion, pollution and urban sprawl in NCR
- Creation of economic opportunities along the entire corridor
- Further create new opportunities in other regions of the country



Delhi to Meerut in 55 mins
with stoppages of all 14 stations

Delhi - Ghaziabad - Meerut
82 km RRTS under construction

Innovative dual transit mode
RRTS & Metro on same infra over 22 kms in Meerut

Delhi-Gurugram-SNB and Delhi-Panipat RRTS in NCR under active consideration

MetroLite



MetroLite is a low-cost Mass Rapid Transit System with same experience and ease of travel in terms of comfort, convenience, safety, punctuality, reliability, & environment friendliness as that of conventional metro system

Key Features

- Suitable for smaller cities with Peak Hour Peak Direction Traffic **up to 15,000**
- Potential to transform smaller cities with reduction in road congestion & environmental pollution
- Cost of MetroLite is 40% of conventional metro (INR 120-140 crore per km)

Salient Features of MetroLite

1

Low-cost Mobility Solution for Tier-2 Cities

3

Unmanned Stations with Minimal Infrastructure

2

60kmph Maximum Speed
25m Curve Negotiation

4

Segregated section interlocked with road traffic



MetroLite being planned in..

Rithala- Narela corridor in Delhi and other cities such as Jammu, Srinagar and Gorakhpur

MetroNeo



Rubber tyred electric coaches powered by overhead traction system running on a road slab with exclusive right of way, with same experience and ease of travel in terms of comfort, convenience, safety, punctuality, reliability, & environment friendliness as that of conventional metro system



Suitable for smaller cities with Peak Hour Peak Direction Traffic up to 8,000 PHPDT



Potential to transform smaller cities with reduction in road congestion and environmental pollution



Cost of MetroNeo is 25% of conventional metro (INR 70 to 80 Cr. per km)



Salient Features of MetroNeo

1

Metro on rubber tyre

3

70 kmph maximum speed

2

Exclusive right of way

4

Electric articulated coaches

MetroNeo being planned in Nasik, Maharashtra

WaterMetro



WaterMetro is a unique urban mass transit system with same experience and ease of travel in terms of comfort, convenience, safety, punctuality, reliability, & environment friendliness as that of conventional metro system

Country's first WaterMetro is under development in Kochi

Phase I of 38 km to be operationalized by June 2021

Targeted for fully operationalization by June 2022

Salient Features

1

1 lakh daily ridership

4

78 boats & 45 terminals

2

15 routes, 78 route km, connecting 10 islands

5

Multi-modal integration and last mile connectivity

3

Reduced travel time and increased reliability
Decongestion on roads

6

Enhanced employment opportunities

7

Universal accessibility

8

Socio-economic development of islands





Technology Indigenization

National Common Mobility Card (NCCMC)



Hon'ble PM launched **indigenously developed and internationally accredited National Common Mobility Card & Automated Fare Collection (AFC) Gate - SWAGAT**, on 4th March 2019

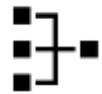


Automatic Train Supervision System (iATS)



Communication Based Train Control (CBTC) system makes our metro fully automated and consists of Automatic Train Control System, Automatic Train Supervision System, Computer Bases Interlocking and Radio System

Key Features



DMRC, in collaboration with BEL, has developed iATS system



iATS provides interface to core signalling function, which can be customized



iATS is planned to be fully operational on Red Line (Line-1) of Delhi Metro

Impact of iATS



Substitute imports



Reduce cost significantly on O&M

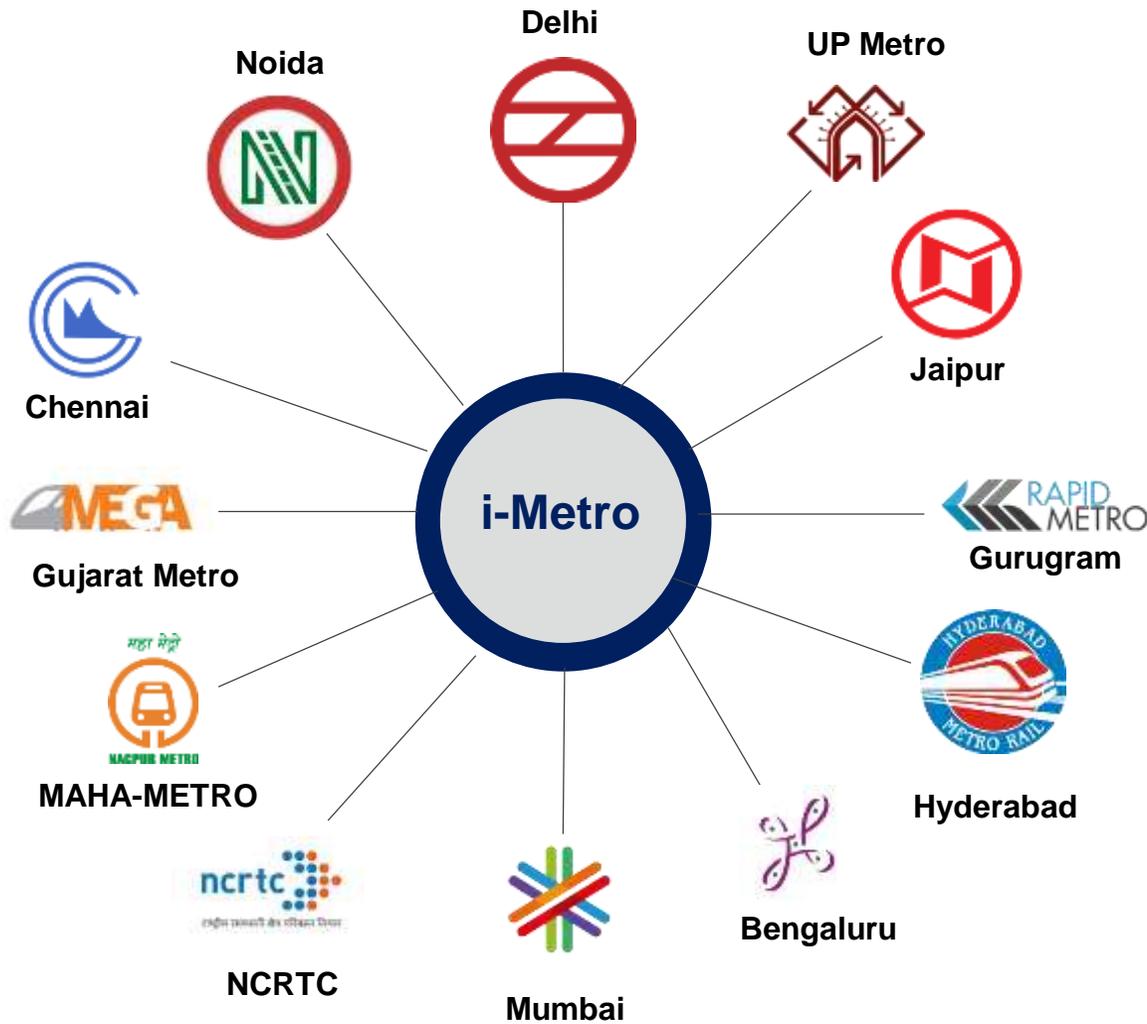


No dependence on OEM



Move towards Atmanirbhar Bharat

Indian Metro Rail Organisations' Society (i-Metro)



Aims and Objectives

1

Forum for exchange of ideas and information

2

Standardization, benchmarking and best practices for efficiency

3

Innovate urban transportation

4

Share knowledge and build capacities

5

Cooperation with research institutions and international metro organizations

A front-facing view of a modern high-speed train, likely a KTX, in a maintenance or testing facility. The train is white with blue and red accents. The front features a large windshield with a white sign that reads "KTX" and "T2001". Below the windshield, the "HYUNDAI Rotem" logo is visible. The train is positioned on tracks within a large industrial building with metal structures and stairs. An orange banner is overlaid on the left side of the image.

New Technology

Driverless Train Operation



Introduced on 37 km Magenta of Delhi Metro

Trains designed and manufactured by BEML in Bengaluru

India enters exclusive club of 7% metro infrastructure having driverless train operations

57 km of Pink Line is planned to be commissioned by 2021



Benefits of driverless train

01 Pre-movement testing & certification done remotely

01

02 Improved efficiency and operational flexibility

02

03 Human errors eliminated – enhanced passenger safety

03

04

Higher reliability

05 Saves 3 hours for train operators

05

06

Initially train operator to be deployed in passenger operation

A photograph of the front of a modern high-speed train, likely a KTX, in a factory or assembly plant. The train is white with blue and red accents. The front features a large windshield, headlights, and a digital display. The train is positioned on a track, and the background shows industrial structures, including stairs and overhead beams. An orange banner is overlaid across the middle of the image, containing the text "Technological Indigenization Under Progress".

Technological Indigenization Under Progress

HYUNDAI
Rotem

Technological Indigenization Under Progress



Automatic Train Supervision System



Platform Screening Doors



4 Indian companies are manufacturing Metro Coaches

Many SME engaged in manufacturing Metro Components

Other Positives



Improved Domestic Capabilities



Reduced dependence on foreign consultants in Metro projects

Delhi Metro is providing consultancy services to Dhaka Metro and developing domestic metro projects



Kochi Metro is developing WaterMetro in Kochi, and providing technical assistance for AMRUT & Smart City projects



MaHa-Metro, Bengaluru, Chennai, and U.P. Metro, have gained expertise in providing consultancy on Metro projects



Domestic capacity for manufacturing metro coaches and other components which were earlier imported.

Double decker elevated road cum metro flyover constructed by MAH-METRO in Nagpur maintaining city aesthetics with 20% cost saving



Double decker elevated road cum Metro flyover in Nagpur

Green Initiatives in Metro Rail



All metro stations have adopted green building concept

Use of energy efficient gadgets

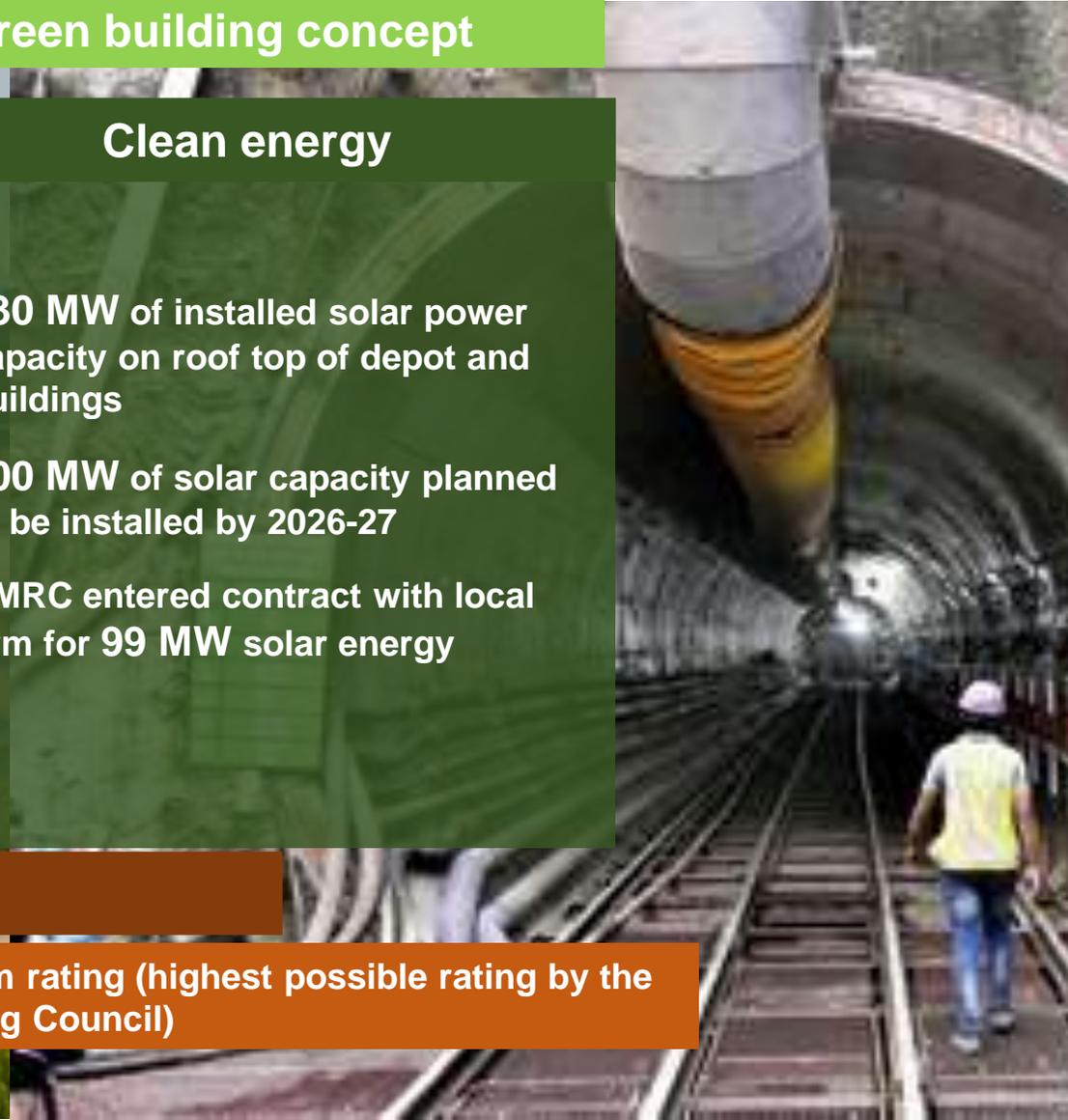
- Regenerative braking system in coaches – 50% of which goes back to grid
- Energy efficient propulsion system in coaches
- Energy efficient air conditioning systems
- Light weight coach design
- Use of LED lights and aluminum third rail

Clean energy

- 130 MW of installed solar power capacity on roof top of depot and buildings
- 600 MW of solar capacity planned to be installed by 2026-27
- DMRC entered contract with local firm for 99 MW solar energy

Awards

Stations of various Metros awarded with platinum rating (highest possible rating by the Indian Green Building Council)





सत्यमेव जयते

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