TRANSIT ORIENTED DEVELOPMENT

A TOOL FOR SMART & INCLUSIVE CITIES

2019 INDIA -TAIWAN SMART CITY SUMMIT
18TH OCTOBER , 2019

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DIRECTOR, WRI INDIA
MODE SPLIT - GREATER MUMBAI

Pedestrians: 46%
Motorised: 11%
Others: 43%
42% Walk

Source: CTTS, MMRDA
MUMBAI’s huge potential

Source: Comprehensive Mobility Plan, 2014, MCGM

COMPACT

DIVERSE

FINE GRAINED PUBLIC TRANSPORT NETWORK

46% Walk in Greater Mumbai

Source: WRI India | Sustainable Cities
It’s impact on traffic.

Over 40% of carriageway capacity is compromised if the footpath is not carefully designed.
**Mumbai metro**

<table>
<thead>
<tr>
<th>Line</th>
<th>Detail/ Connecting stations/ OG/UG</th>
<th>EL or UG</th>
<th>Status</th>
<th>Length (km)</th>
<th>Cost (INR) in Crores</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Versova – Andheri – Ghatkopar</td>
<td>EL</td>
<td>Operational</td>
<td>11.4</td>
<td>2,356</td>
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<td>2A</td>
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<td>18.6</td>
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<td>4A</td>
<td>Kasarwadavali-Gaimukh</td>
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<td>949</td>
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<td>Thane – Bhiwandi – Kalyan</td>
<td>EL</td>
<td>Approved (bidding process)</td>
<td>23.1</td>
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<td>7A</td>
<td>Andheri-CSIA</td>
<td>UG</td>
<td>Tendering</td>
<td>3.2</td>
<td>TBA</td>
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<tr>
<td>8</td>
<td>CSIA T2-NMIA</td>
<td>UG-EL</td>
<td>Proposed</td>
<td>35</td>
<td>15,000</td>
</tr>
<tr>
<td>9</td>
<td>Dahisar (East)-Mira-Bhayander</td>
<td>EL</td>
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<tr>
<td>10</td>
<td>Gaimukh-Shivaji Chowk (Mira Road)</td>
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<td>4,476</td>
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<td>12</td>
<td>Kalyan – Dombivli – Taloja</td>
<td>TBA</td>
<td>Proposed-undergoing feasibility study</td>
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<td>4,132</td>
</tr>
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</table>

**146.5 km rail based system**

http://mmrda.maharashtra.gov.in:8080/metro-piu
Job density across metro line 1

Employment density: **22394** jobs/ Sq.km

**5.8 lakhs** jobs in 26 Sqkm area

61% **Formal** (office + industry)

By 2034, **24,706** jobs/ Sqkm
The North American Model: High Density, Mixed Use around Transit (focused on better productivity)

Focus: Better Productivity

**TOD as an ECONOMIC model to improve productivity**

- High Density Mixed Use around Transit Stops (Greenfield)
- Rosslyn-Ballston corridor
  - 2.5 miles, 5 metro stations
- Mixed Land Use—
  - Commercial: Office, retail, hotels
  - Residential: Single-family, townhouse, condos, high-rise

26% of the county population lives in the Metro corridor.

Metro corridor takes up 8% of county land.

Image Credit: Reconnecting America Flickr Stream
The South American Model:
High Density corridors connecting parts of the city (focus on Integrate land use and transport).

Curitiba, Brazil
TOD as means to INTEGRATE LAND USE AND TRANSPORT to improve connectivity
Integrated land use and transit
Mixed land use
Inclusion of affordable housing
Protect historic city center
Contain urban sprawl

Passengers per day on the BRT system 2.7 million

Focus:
Integration of land use and transport
Copenhagen, Denmark

TOD as a LIVABILITY and ACCESSIBILITY model to improve QoL
Regional transport system
Green fingers
Decentralised concentration along transport corridors
Pedestrian and bicycling priority

Mode share of bicycle trips for work or education trips 52%

Focus:
Better livability/QoL

The European Model: Mid Density, Mixed Use around public spaces connected with Transit, Biking and Pedestrian facilities (focused on better livability).
The Asian Model: Co-development model to begin with, focused on leveraging real estate around transit to create funds for development.
Inference?
TOD

• Is NOT homogenous i.e. One size doesn’t fit all

• Should respond to LOCAL context

• Requires LONG term vision

• Land use and transit integration is CRITICAL

• Means to IMPROVE productivity

• Must address LIVEABILITY

• EQUITY is critical
Why TOD for India?

• 10+ cities are opting for metro rail
• 7+ opting for BRT
• $30 bn transit investment, another $30 bn on the anvil
Policy landscape in India

Ministry of Housing and Urban Affairs (MoHUA), Government of India has recognized Transit Oriented Development (TOD) as a key urban growth strategy to help create liveable communities along public transit.

• National Urban Transport Policy (NUTP), 2014 (prioritized PT and advocated creation of UTF)

• National TOD Policy, 2017 (design of efficient, walkable, liveable communities; advocates pvt sector, channelling LVC revenues by creation of TOD fund)

• Metro Rail Policy, 2017 (mandates TOD adoption and need to earmark revenues from VCF modes & increase credit rating)

• Value Capture Finance Policy, 2017 (designed to support govt. missions; explains methods to capture incremental increases)

source: http://smartcities.gov.in/upload/5901982d9e461VCFPolicyFrameworkFINAL.pdf
TOD = DESIGN PRINCIPLES

- Walking & bicycling (complete Streets)
- Mixed Use & Density (Compact Development)
- Public Transport (Integrated Transport)
- Active edges (Transit Supportive Uses)
- Environmental & Cultural Landscapes
- Public Spaces
- Travel Demand Management

WRI INDIA | SUSTAINABLE CITIES
Module Structure: Design Components of TOD

1. Density
2. Quality Public Transit
3. Non-motorized Transportation
4. Vehicle Demand Management
5. Mixed-use Development
6. Neighborhood Centers & Active Ground Floors
7. Public Spaces and Natural Resources
8. Community Identity and Heritage
9. Resilience
Value Capture Financing

Land-based VCF tools

1. Land Value Tax
2. Fees for changing land use (agricultural to non-agricultural)
3. Betterment Levy
4. Development charges/ Impact Fees
5. Transfer of Development Rights (TDRs)
6. Premium on relaxation of rules or additional FSI/FAR
7. Vacant Land Tax
8. Tax Increment Financing (TIF)
9. Land Acquisition and Development
10. Land pooling system (LPS)

Value Capture Finance Models

1. Development-based Instruments
   (direct transaction of properties)
   TDR, FAR, air rights, land rights, TPS, land acquisition and dev.

2. Fee-based Instruments
   (indirect method- one-time charges)
   Betterment levy, cess on new dev, landuse change fee, impact fee, regularizing unauthorized dev

3. Tax-based Instruments
   (indirect method- extracting value through taxation- recurring stream)

BANGALORE METRO
LAND VALUE CAPTURE MECHANISMS
Bengaluru at a Glance

Major institutions:
1. BMRCL
2. DULT
3. BDA
4. BBMP

Phase-1: Commissioned
- 42 kms
- 40 stations
- 0.35 million paxs/day

Phase-2: 72 kms / 61 stns.
Phase-2A: 17 kms / 13 stns.
Phase-2B: 30 kms / 7 stns.
Phase-3: Under study
TOD Policy and Planning Framework

Currently the State has not yet prepared a dedicated TOD policy for urban areas in the State, however the Master Plans for Bengaluru city have incorporated TOD as part of their strategies

RMP 2015:

- **Additional FAR (0.25 – 0.5 for plots above 360 sqm):** To encourage redevelopment in older core areas, amalgamation and reconstitution of properties (within the Outer Ring Road or ORR)

- **FAR 4 around metro stations (with 150 mts.):** Through various amendments to the RMP 2015, provisions towards TOD were introduced in 2009. Areas within a 150m radius of Metro stations were eligible for a maximum FAR of 4 for all permissible uses

Draft RMP 2031:

- **Restricts development in core city** and encourages development beyond the ring road

- **Proposed to withdraw existing FAR 4 around metro stations.** Whereas BMRCL (metro agency) has forwarded the proposal to extend the FAR-4 upto 500 mts (instead of 150 mts)
## Financing Arrangements – Phase wise

<table>
<thead>
<tr>
<th>Phase</th>
<th>Length</th>
<th>Status</th>
<th>Total Cost (INR)</th>
<th>Funding (INR)</th>
<th>Financing (INR)</th>
</tr>
</thead>
</table>
| Phase 1| 42.3 Km; 40 stations     | Complete and Operational (Oct 2011 -- Jun 2017) | 13,845 Cr (actual expense) 14,405 Cr (incl. taxes) | ~ Government of India and Government of Karnataka (equal equity + subordinate debt): 8155.52 Cr (59%)  
~ Approved amount for long-term loan: 5689.49 Cr  
**Progress up to March 2017:**  
- Domestic agency loans (HUDCO+KUIDFC): 504.83+5.07 Cr  
- Foreign agency loans (JICA + AfD): 3164.11+873.29 Cr  
- ADB – 1100 Cr  
~ Metro bonds: 300 Cr | Proposed Alternate Financing (estimated yield): 682 Cr# |
| Phase 2| 72.1 Km; 61 stations     | Approved and Under Construction (~ 2021) | 26,405 Cr * | Government of India: 5281 Cr  
Government of Karnataka: 8983 Cr  
~ Approved amount for long-term loan: 9000 Cr  
- Foreign agency loans (AfD + EIB): 1600+3700 Cr |                                                            |
| Phase 2A| 17 Km; 13 stations       | Approved (~ 2020) | 4202 Cr * | Government of India + Government of Karnataka: 500 Cr  
BMRCL: 500 Cr  
Foreign + Domestic agency loans: 2200 Cr (max) | Proposed Innovative Financing: 1100-2100 Cr |
| Phase 2B| 29.6 Km; 7 stations      | Approved (~ 2021) | 5950 Cr * | Government of India: 500 Cr  
Government of Karnataka: 1250 Cr  
**BIAL:** 1000 Cr (User Development Fees)  
Loans/Bonds: 3200 Cr |                                                            |
| Phase 3| 105.5 Km;                | DPR under preparation by BMRCL    | 20,000 Cr ^ |                                                                                                                                                            |                                                     |

* approved estimated project cost  
LVC Proposals for Phase 2 / 2A

**Phase - 2**
- Levy of Cess/Surcharge (5% within BDA)
- Cess on additional FAR (revenue-sharing)
- Transfer of Development Rights (TDR) (in lieu of compensation)
- Public-Private Partnerships (PPP)
- Carbon Credits (finance operations)
- Differential Fare Pricing

**Phase – 2A**
- Premium FAR
- Betterment Levy
- Location, Naming, Advertising Rights
- Premium Ramp Access/Royalty
- Airspace Commercialization
- Add. Cess on New Projects
LVC Proposals for Phase 2 / 2A

Long-term lease and development of BMRCL lands and properties:

Metro agency has raised INR 251.01 Cr by leasing 13 acres of land to IKEA India Pvt. Ltd. near Nagasandra Metro Station on Tumkur Road through a bidding process. Leasing / Renting office space, etc.

Station joint development agreements under PPP scheme:

Contribution of INR 100 Cr BMRCL each station. So far BMRCL has secured INR 300 Cr for the Phase 2A ORR line, through MoUs with Embassy Group, Intel Technology India Pvt. Ltd. Prestige Group. Leasing station premises
INDIRANAGAR

A CASE OF METRO STATION IN INNER CITY AREA
Indiranagar, Bengaluru Case Study

- Indiranagar developed during 1960s to 80s as residential neighbourhood in Bangalore.

- Transforming from a residential neighbourhood into an commercial sub-centre of the city from last 15 years.

- Metro connectivity has increased demand for commercial space and redevelopment, this led to steep increase in property value in the area.

- Between 2004-2018
  - 30% of plots have undergone development
  - 325% increase in commercial areas
  - FAR-4 is allowed within 150 mts around the station (from 2011)
Increase in built-up (2004-2018)

Data Source: BBMP; BMRCL; EMBARQ India; Google Earth; WoNOBo; Sample of Site Surveys 2018

Disclaimer: This map is created for study purpose, boundaries indicated are representational only.
Increase in commercial built-up (2014-1018)

• 325% increase in commercial areas.
• Tap the full potential of land use conversion charges as part of land value capture

Data Source: BBMP; BMRCL; EMBARQ India; Google Earth; WoNOBo; Sample of Site Surveys 2018

Disclaimer: This map is created for study purpose, boundaries indicated are representational only
Commercial activity around metro station

Commercial Built Space in 2004, 2013 & 2018 with reference to Distance from Metro Station

- Total Commercial Built-up in 2004
- Total Commercial Built-up in 2013
- Total Commercial Built-up in 2018
Indiranagar – total Consumed far (2018)

- Only 4.6% plots consumed 3.5 FAR (or more).
- 40% FAR consumed of the total build space allowed within 150 mts (FAR-4)

Size of plot and other regulations are not allowing full utilisation of FAR-4
Current market appetite (2018) – Unused FAR as per RMP 2015

- 64% of the properties have not consumed the FAR allowed even in the current RMP-2015

Data Source: BBMP; BMRCL; EMBARQ India; Google Earth; WoNOBo; Sample of Site Surveys 2018

Disclaimer: This map is created for study purpose, boundaries indicated are representational only
F.A.R. proposed and consumed

1. Encourage amalgamation of plots
2. Further simplify rules and regulations
Amalgamated plots (2004-2018)

• Very few amalgamations happened despite providing higher FAR – 4 within 150 mts of station area.

• More instances of amalgamation are noticed outside the 150 mts. areas

Data Source: BBMP; BMRCL; EMBARQ India; Google Earth; WoNOBo; Sample of Site Surveys 2018

Disclaimer: This map is created for study purpose, boundaries indicated are representational only.
Amalgamations help to achieve higher f.a.r.
Amalgamations help to achieve higher f.a.r.

<table>
<thead>
<tr>
<th></th>
<th>Before Amalgamation</th>
<th>After Amalgamation</th>
</tr>
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<tbody>
<tr>
<td>Plot size</td>
<td>121 + 121</td>
<td>242</td>
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<tr>
<td>Built-up</td>
<td>312</td>
<td>625</td>
</tr>
<tr>
<td>FAR achieved</td>
<td>1.3</td>
<td>2.6</td>
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</table>
Evidence shows current TOD framework is highly insufficient

• 150 meters is too small an area to fully achieve the potential: need for larger area to tap the potential of amalgamation. Lesser the area considered as TOD, fewer the number of plots and lesser the possibilities of redevelopment in realizing the intended TOD principles.

• Proposed RMP-2031 further restricts floor space in the central areas (inside ORR): Plan intends to deflect development away from the central areas. The FAR allowed in general along Indiranagar area has been reduced considerably in the Draft RMP 2031 compared to that is allowed as per RMP 2015
THALGATTAPURA

A CASE OF METRO STATION IN PERIPHERAL AREA
Landuse wise f.a.r. consumption (2015)

Data Source: BBMP; BMRCL; BDA RMP-2031 (ELU-2015)

Disclaimer: This map is created for study purpose, boundaries indicated are representational only
Consumed f.a.r. in thalgatpura

- Almost half of plots are yet to be taken up for development
- 74% plots less than 250 sq. mts.
- Rest half used less than 1.5 FAR
- Huge potential for amalgamation
Amalgamations in peripheral areas

Fragmented development not in sync with adjacent uses - leading to structural problems in peripheral areas
Potential for LVC in Peripheral Areas

- Low density sprawl mode of development
- Fragmented large parcels in peripheral areas
- High residential price appreciation
- Ongoing amalgamation in peripheral areas
- High potential for LVC
- Need for incentives for amalgamation – high proportion of small plot sizes which are not developed
FINDINGS
AT CITY LEVEL
Challenges in Realising Land Value Capture

• Efforts for LVC along Metro are fragmented and actual potential remains untapped:
  • Efforts to enable LVC are still at preliminary level and disjointed
  • Value Capture Finance remains to be explored in full potential across Government programs

• Current gaps in planning framework for TOD
  • The current approach of additional FAR for 150 m around Metro stations is insufficient
  • No TOD in central areas of the city
  • Growth directions of the city – Development happens and then infrastructure follows
  • Insufficient regulations and framework for further planning
  • Problem of blanket regulations without scope for modulations as per local context
  • Limitation of the additional FAR approach
  • The current market unable to consume additional FAR
  • Metro Phase -2 proposal not concurred by draft RMP 2031
  • Need to enable amalgamation of plots to achieve TOD
  • Risk of the proposed tool for premium FAR across the city may prove counterproductive to TOD
Resentment/reservations against premium FAR in draft RMP-2031

Premium FAR versus TDR (preference for TDR market)
- Inflationary pressures (reducing base FAR >> hike in real estate prices >> gentrification)
- Resentment against betterment levy (why should I pay?)
- Limitations with Additional FAR Approach (other factors ignored)
- Difficulties in Coordination Between Agencies (lack of common mandate)

The move to reduce base FAR and introduce Premium FAR has met with criticism and stiff opposition from all corners of the society.

• Lack of Benefits District Framework
  - How funds will be shared and what will they be utilized for?
Opportunities for Land Value Capture

Enormous potential for land value capture in the city

• Higher growth of residential price along Metro than rest of the city
• Considerable advantage of high property value appreciation in areas along Metro stations than in areas far away from them
• Enormous Potential for land value capture need to be used for strategic advantage to support TOD (CAGR comparison)
• Change in land use to commercial in TOD areas, could be a substantial source for land value capture
• Concentration of supply of housing units along Peripheral stations (existing and proposed corridors) need to be addressed
Residential Floor space appreciation

Appreciation of residential floor space price in 1 Km along Metro Phase 1 & 2 corridors, compared with average appreciation across the city

- CBD stations
- Inner city area stations
- Peripheral stations
- Peripheral ongoing construction
- All stations
- Wt. Avg. of overall apartments price in City
# Price Appreciation along the metro corridor

<table>
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<td>82</td>
<td>7.19</td>
<td>5.26</td>
<td>3.92</td>
</tr>
</tbody>
</table>

Above table clearly shows the concentration of development activity and higher rise in property price in proximity along the Phase -1 and 2 Metro corridors.
Bengaluru properties – year wise addition

- Many residential properties are added in the peripheries in the last 10 years
- Development is ahead of the metro phase-2, 2A, 2B and 3

Legend
- Metro Stations
- Metro Lines
- Buffer (1 & 2 kms)
- BBMP Boundary

Year of commencement
- Before 2009
- 2009 - 2012
- 2012 - 2015
- 2015 - 2018

Data Source: BBMP; BMRCL; Sample of Site Surveys 2018
Disclaimer: This map is created for study purpose, boundaries indicated are representational only
Properties added in the city from 2009

- Development is going beyond city limits.
- Government should quickly execute the metro TOD policy to tap the remaining developments.
Value change around metro lines

- CAGR of the housing value appreciation along areas which are connected by the Metro ranges between 7% to 20% whereas the CAGR of overall city level growth of housing prices is around 9.3%.

Data Source: BBMP; BMRCL; Sample of Site Surveys 2018
Disclaimer: This map is created for study purpose, boundaries indicated are representational only
Housing units supply

Concentration of supply of housing units along Peripheral stations:

- As expected peripheral station areas are contributing highest supply of housing stock along the entire Metro Corridors. The lower price of built space along the peripheries also leads to new migrants into the city to settle in these areas.

Data Source: BBMP; BMRCL; Sample of Site Surveys 2018
Disclaimer: This map is created for study purpose, boundaries indicated are representational only.
Price Appreciation over the years

Comparison of appreciation of property price along Metro Station and areas far away from them

- Inner city area along Metro stations
- Peripheral areas away from any Metro Station
- Innercity areas away from any Metro Station
- Peripheral areas along Metro Stations completed & ongoing
Value appreciation along n-s corridor

Real estate appreciation along the North - South Metro Corridor / Green Line

Peripheral Stations

Peripheral Stations

Price (INR)
TOD potential around metro stations

Phase-1 of Metro Station area (800mts / 10 mins walk)

- 97.5% i.e., 39 out of 40 station areas have utilized less than 1.75 FAR

- About 22.5% have consumed less than 1 FAR
OPPORTUNITIES FOR LAND VALUE CAPTURE
Achieving Overall Objectives of Sustainable Mobility

• Need to move beyond providing additional FAR to enabling an eco-system of policies to enhance accessibility to mass transit
• Seamless integration of multi-modal with public transit
• Enhancing Accessibility to station
• Enhancing Public realm
• Parking Management
• Organizing Street vending
• Mixed use neighborhoods through Development Control Regulations (DCR) Amendments
• Institution Structure, Operation and Maintenance strategies
• Evaluation and Performance Indicators
Ring-fenced financing for TOD areas as benefit districts

• Formulate clear benefit districts supported by ring-fenced financing

• Strategic approach to bridge inadequacies in infrastructure

• Enhance transparency in expenditure of the funds collected through LVC

• Allow flexibility at local levels to take decisions
Opportunity to formulate Urban Transport Fund (UTF) supported by LVC

• UTF supported by LVC could fund TOD

• Additional levy on conversion of land use

• Linking usage of UTF with TOD oriented projects

• Establishment of a Unified Metropolitan Transport Authority (UMTA)
CONCLUSIONS
THANK YOU

Madhav Pai
mpai@wri.org