CIDCO@SMART
Newsletter

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CIDCO Smart City Lab @ NIUA

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2
Smart City @ CIDCO Navi Mumbai (South)
- Objective Area: Inclusive Planning
- Project in Focus: Urban Renewal Schemes
- Objective Area: Environmental Sustainability
- Project in Focus: Passenger Water Terminal

8
Knowledge Lab
Training Policy for CIDCO

9
Data Sheet: Smart Cities
- Jabalpur: Central Business District in Area Based Development
- Vishakhapatnam: Placemaking, Public Health and Disaster Preparedness

17
Data Sheet: Lighthouse & Fast Track Cities

22
Inclusive Planning
- Gender Mainstreaming in Housing
- Women’s Safety Audits

25
Initiatives @ Smart City Lab
- Research on Transit Oriented Development in Indian Smart Cities
- Reimagining the approach to TOD

28
Smart City Corner
- Conversation: Data and Transportation
- Emerging Ideas: LinkNYC Free Wi Fi Kiosks in New York
- Smart City Plan: Smart London Plan

36
National Smart Cities Mission Update
A city may be called “Smart” when investment in human and social capital and traditional and modern communication infrastructure encourages sustainable economic growth and a high quality of life with a wise management of natural resources through participatory governance. Participatory governance asks for inclusion in the city. Cities need planning that recognizes that every individual has the right to full and equal participation in the built environment and that they can shape their own environment to meet their own needs. A city is truly inclusive when women, elderly and the physically challenged feel at home. For CIDCO Navi Mumbai (South) Project Affected Persons (PAPs) is another important group to be considered while planning for inclusiveness. CIDCO’s initiatives geared towards inclusion are primarily of four types:

1. **Physical Design and Infrastructure**
   - Audio-visual clues at traffic lights and for way finding
   - Pedestrian priority signals
   - Emergency/panic button
   - Universal design for accessibility across the city

2. **Policy Initiatives**
   - Policy of economic independence of disabled
   - Changes to DCR to include access for physically challenged
   - Affordable studio housing for single women, retired citizens
   - Dedicated dial-in numbers for reporting harassment
   - Mandating inclusive planning in all infrastructure projects
   - Car free days on certain streets to accommodate various groups
   - PAP capacity building

3. **Grassroots Advocacy**
   - Educating women and children about their rights
   - Setting up public information messages for driver behaviour
   - Building community support and funding for at-risk children and youth.
   - Sensitivity training for police officers, and CIDCO employees

4. **Technology Driven Monitoring and Vigilance**
   - Integration of police records with GIS to map the at-risk hotspots in the city
   - Mobile apps to inform the safety index of a neighbourhood and the nearest police station and hospital
   - Registration of service providers with police stations

CIDCO is also establishing a Women’s Resource Centre and 14 Virangula Kendra across the city for the elderly.
Urban Renewal Schemes

Background
CIDCO Navi Mumbai foster a vision to promote sustainable neighbourhoods that are safe, livable and affordable where services are accessible to all residents, and thereby reduce haphazard development in and around planned nodes. The following three pronged approach is adopted to achieve the urban renewal schemes vision:

- Incremental redevelopment of gaonths and dilapidated housing stock, and retrofitting of old neighbourhoods
- Leveraging densities and providing alternative forms of mobility to private transport, and efficient management of resources
- Optimising infrastructure by introducing new concepts in provision of infrastructural services like water, decentralized waste treatment systems, energy

CIDCO has developed the following goals for the same:

- Redevelopment of all gaonths with higher FSI and up to 4 by 2030, and by providing access to basic infrastructure, quality public open spaces, and better quality of internal and external roads
- Redevelopment of all dilapidated buildings in CNMS by 2020, and by retrofitting them with the new infrastructure technologies for better building performance.
- Integration of the transport systems and mobility networks of existing neighbourhoods with the newly redeveloping areas

Various urban renewal schemes are proposed for this, major of which are:
1. Garajepoti Scheme for Village Redevelopment
2. Redevelopment of dilapidated buildings
3. Single window clearance system for redevelopment

Garajepoti Scheme for Village Redevelopment

Context
The Navi Mumbai Notified Area measuring 344 sq. km. includes around 95 gaonths. The lands under these Gaonths was not acquired by CIDCO. These gaonths have now developed and expanded in an unplanned and haphazard manner. To develop these areas, the state government has issued a notification to allow a maximum of 4 FSI by way of cluster development approach. Following this decree, CIDCO developed the Garajepoti scheme for redevelopment of villages.

Objectives
The scheme will facilitate urban renewal plan for all the gaonths. The scope of work shall be:
- To prepare detail Urban Renewal Scheme Plan
- The in-situ type regularization within cluster
- Entire cluster redevelopment along with the Urban Renewal Scheme Plan
- The model for the Urban Renewal Scheme

Benefits
The implementation of the redevelopment scheme will benefit the residents by providing access to basic infrastructure, quality public open spaces, and better quality of internal and external roads.

Redevelopment of dilapidated buildings

Context
As per housing stock data of CIDCO, the dilapidated tenements constitute to 51%. Among these 35% of the housing stock (44394 tenements) is of more than 30 years or age and 16% (19420 tenements) are between 25 years and 30 years of age. It is deemed necessary to redevelop the dilapidated buildings so as to add to housing stock to meet the housing demand in CIDCO Navi Mumbai.

Objectives
Redevelopment of dilapidated buildings is expected to increase the housing stock by 1.5 times the existing housing stock on exiting land with up gradation in infrastructure. The scheme promotes cluster development and wider streets will be developed in coordination with localities by sharing land from the plots/condominium. Salient features are-
- Rehabilitation area entitlement shall be increased by 15% of the existing carpet area
- Incentive FSI
- Sharing of balance FSI entirely available to CIDCO for implementing affordable housing project
- If plot area is >1000 sq.m, fronting road >20m wide, 5% convenience shopping. If plot area is >1000 sq.m, fronting road >30 m wide, upto 10% convenience shopping.
- If land area is 2500 sq.m or above then 10% mandatory clear open space on ground open to sky
Single window clearance system for redevelopment

Context
Redevelopment of housing societies is usually burdened with bitterness and complaints of high-handedness and corruption against the Managing Committee. To ease it out, CIDCO is formulating a single window clearance system by a proposed Redevelopment Cell of CIDCO.

Objectives
Single window clearance system will bring forth the following-
• Timely guidance will be provided by this cell online as well as in person or in hearings
• The formats are made in such a manner that the society will get step by step guidance to complete the entire process
• Guidelines for society, developer and architects are being made with legal backing
• Necessary information/FAQ’s will be uploaded on website for easy reference
• All payments will be made online
• A third party monitoring will be done for quality of construction
• A timeline will be issued to the developer for completion of new buildings along with undertaking i.e. Bank guarantee, transit camp/rents for rehabilitation, indemnity bonds etc.
• The website will also include information stages of approval process for redevelopment and also prerequisite which include conversion of all Association/ Apartment owners to Society as per MOFA Act., and to transfer all the members of society as per CIDCO’s records
• For Redevelopment FORM ‘A’, ‘B’ and ‘C’ is divided in 3 stages to give the society required time for collecting/preparing documents/drawings

Benefits
Single window clearance system eliminates the need to visit multiple departments by integrating all activities of redevelopment.

NEWS @ Smart City Lab

Smart City Lab presents on National Smart City Mission to Members of Parliament at Constitution Club, New Delhi
CIDCO Smart City Lab submits comments to MoUD for the National TOD Policy Draft
CIDCO Smart City Lab participates in International Workshop for Development of TOD Projects in Indian Smart Cities
CIDCO Smart City Lab participates in Roundtable on Smart Cities: Enabling Citizen Participation Through Technology at Janaagraha, Bangalore
CIDCO Smart City Lab publishes combined issue (Vol 2, issue 2 & 3) of its newsletter
CIDCO Smart City Lab joins immersion visit to UK with 10 city representatives and MoUD representative
Environmental Sustainability has been an integral part of the smart city vision. CIDCO has been sensitive towards preservation of environment since the inception of the Navi Mumbai project and has accordingly taken measures to protect it. With renewed vigour it is rededicating to this cause by strengthening its efforts through development of mangrove parks, nature park, missions like Swacch Bharat Abhiyan, special projects like riverfront developments and promoting causes such as conversation of water by mandatory stipulations.

CIDCO is investing Rs. 418 crore by 2019 in various initiatives in its efforts towards environmental sustainability. These initiatives include:

1. **Air and Noise Quality Monitoring Network**
   CIDCO aims to establish air-quality sensor network. Its goal would be to achieve sustainable management of the traffic in the CIDCO Navi Mumbai (South) by using air quality sensor networks and prediction models. The sensor networks to be deployed in different locations, measuring a range of parameters such as temperature, relative humidity, Co, NO2 O3 Noise and particulate matter.

2. **Annual Environmental Status Review**
   As per the Bombay Provincial Municipal Corporations (BPMC) Act 1949, Section 67 (A), it is mandatory for all the Urban Local Bodies (ULBs) in Maharashtra to submit an annual ESR to respective ULB General Body. In order that the ESRs emerge as a more comprehensive document and play a better role in aligning developmental policies with environment, Maharashtra Pollution Control Board (MPCB) has proposed an indicator based framework. This framework of indicators follows the international practice with adaption to Indian cities. CIDCO proposes to adopt this framework for documentation of Environmental Status Report of CIDCO Navi Mumbai area under its administration.

3. **Smart City Lighting (LED Street Lights for Pushpak)**
   The existing street lighting installations and other infrastructure developments are of conventional type. With the aim to be ‘green’, CIDCO is exploring possibilities to shift to LED based energy efficient lighting system with automation. The possibilities of use of non-conventional energy sources like solar energy for LED lighting systems by utilizing the roof top spaces of CIDCO premises so as to minimize the use of conventional energy are being explored. These efforts are being taken in CIDCO’s Mass Housing scheme by using LED Pathway lighting system, advance internal electrification work, lifts, pumps etc.

4. **Nature Park**
   In 2006, Nature Park was taken up for development with an objective of organising the largest Regional Park Zone (RPZ) in Navi Mumbai. This will be done by introducing nature trails interspersed with adventure sports, opening it to the residents of Navi Mumbai. It was expected that development of Nature Park will ensure...
protection of environment, especially the hill slopes. In addition to that, it will provide a rich natural environment to the urban population in the region.

5. Grey Water Pipeline Network
With the objective of a greener environment, CIDCO proposes to reuse water and hence conserve potable water. SBR technology in place in CIDCO’s new STPs generate water of excellent quality for non-potable use. It is hence deemed necessary to lay grey water pipelines so as to develop a dual pipe system for water supply.

6. Water Leakage Prevention System Automation
For the Hetawane water supply scheme, water quality at the source is being monitored for site in a chemical lab at Jite. The operation is supervised daily through the works contract of the Water Treatment Plant. Disinfection is also carried out at the commencement of water supply distribution preferably in the GRS/MBRs in respective nodes with gas type chlorination system & the system is effectively being implemented and carried out since long.

This system of disinfection is proposed to be integrated in the PLC-SCADA of the pumping system for effective & efficient functioning.

SCADA system operates with coded signals over communication channels and thus gives control over remote equipment. SCADA system for quality monitoring of water is proposed as a part of Instrumentation and Automation for Hetawane Water Treatment Plan, Transmission and Distribution Network. This system of disinfection is proposed to be integrated in the PLC-SCADA of the pumping system for effective & efficient functioning.

7. Mangrove Park Airport Site
In order to mitigate the impact on mangroves, resulting from the development of Navi Mumbai International Airport, CIDCO is conducting their plantation and protection over an area of 615 ha. Three sites have been identified to satisfy 615 ha mitigation requirement. This has been proposed at three sites - northeast of the airport, at Vaghivali island and near Moha creek.

8. Mangrove Park Nerul - Navi Mumbai Mangrove Wetland Centre (NMMWC)
In order to converse and maintain some mangroves in the Northern part of Navi Mumbai and to increase awareness among the public regarding the ecological resources, CIDCO is developing a wetland centre along the Palm Beach Marg in Nerul. An area of 289 ha has been identified in Nerul, Sarsole & Sonkar villages for this project.
The economic fortune of a region is believed to depend upon the growth in infrastructure in various sectors. It is imperative to develop infrastructure towards sustaining the economic momentum at both national and regional levels. A sound and reliable transport infrastructure is a definite asset towards ensuring all round growth and development. Navi Mumbai is well connected with other regions of MMR with rail based and road networks. However water transport system needs to be fully explored.

With the increase in population and employment the demand for travel (passenger as well as goods) will increase and planning of transportation infrastructure to meet the growing demand is at most necessary. Since Mumbai has vast coast line, the city’s configuration offers the possibility of passenger water transport to augment the existing transport capacity. Nevertheless, there is a growing realization of the importance of a water based transport system given its relatively low development time and cost, low operation costs, high capacity reserves, low energy consumption and its minimal impact on the environment.

To improve the transportation system in Mumbai Metropolitan Region (MMR), Government of Maharashtra (GoM) is keen to exploit the potential of water transport facilities. Continuing its efforts in this direction, GoM was keen to develop Inland Water Transport facilities along the East and West of Mumbai and appointed Maharashtra Maritime Board (MMB) as nodal agency for implementation of water transport facilities on the East coast of Mumbai. MoU has been signed between MMB and Mumbai Port Trust (MbPT) for the development of waterways around Mumbai. As per this MoU, it has been decided to start Ro-Ro PAX services between Ferry Wharf (Mumbai) to Mandwa and Ferry Wharf to Nerul will be appointed by MMB. The operation and maintenance of terminal will be the responsibility of respective organization.

**Location**
Nerul, Navi Mumbai

**Scale**
Regional

**Detailed Scope**
The project will develop infrastructure facilities at Nerul for PWT ferry services system along east coast of Mumbai between ferry wharf (Mumbai) to Mandwa (Alibaug) and Nerul (Navi Mumbai). Infrastructure facilities for Ro-Ro & passenger ferry service will be developed at Ferry Warf (Mumbai), Mandwa (Alibaug) and Nerul (Navi Mumbai) by Mumbai Port Trust (MbPT), MMB and CIDCO respectively. Once the terminal facilities are developed, Ro-Pax vessel operator for Ro-Ro ferry service between Ferry Warf to Mandwa and Ferry Wharf to Nerul will be appointed by MMB. The operation and maintenance of terminal will be the responsibility of respective organization.

**Benefits**
- The travel time from Nerul to Mumbai is reduced by 27 minutes as compared to roadway and 34 minutes as compared to railway
- Eco friendly mode of transport

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**Upcoming trainings for CIDCO staff**

**April 2017**
- Integrated Municipal Solid Waste Management

**May 2017**
- Grid connected Solar Rooftop PV System : Design, Development and Simulation
- Managing Recruitment, Selection and Induction
- Faecal Sludge Septage Management

**June 2017**
- Communication and Presentation Skills
- Orientation on GIS, Remote Sensing, GPS & Surveying for Managers
- Building Organizational Excellence
- Leadership Skills
- From Data to Decisions
- Environmental Impact Assessment for Projects
- Creating and Managing Digital Presence
- Towards Zero Waste- Decentralized Solid Waste Management
- International Certification Programme Change Management for Achieving Continuous Water Supply for Urban Areas
Training Policy for CIDCO

Context
CIDCO was formed under the mandate to develop the new city of Navi Mumbai to decongest Mumbai. Having achieved the mandate, CIDCO is now entrusted to drive growth investments into the region. This role necessitates CIDCO’s planners, engineers, architects, economists, development specialists, land specialists to learn about, to apply and to evolve the emerging concepts in urban planning; concepts that extend beyond basic infrastructure provision. The existing problem of shortage of human resources of adequate skills in urban planning and management in Indian cities makes it doubly necessary for existing staff to assimilate new subjects into their existing knowledge domains and co-create solutions.

The Ministry of Urban Development (MoUD), Government of India draws attention to the need for capacity building by making it an integral part of the missions initiated by the Government of India. Various Urban Local Bodies (ULBs) of the country are improving their institutional capacities under the ambit of these missions. Development agencies such as CIDCO by the very nature of their work and for reasons of self-sufficiency do not qualify for direct funding of capacity building under these missions.

Training Policy
CIDCO has therefore undertaken independent measures towards capacity building. Under the CIDCO Smart City Plan, ‘Smart Organisation’ is one vertical that deals with building capacities of the organisation and its employees. The NIUA-CIDCO Smart City Lab was formed to develop capacity building and knowledge documentation programs on Smart Cities. An exercise conducted by the team to highlight issues that acted as barriers to uptick in knowledge production and sharing revealed that 60% of the top 5 and 70% of the top 10 issues related to training, career and talent management and lack of exposure to global practices.

Over the two years 2015-2016, NIUA-CIDCO Smart City Lab identified training programs, workshops and partner institutes, both global and national that will help enhance the knowledge of the technical personnel in CIDCO. Concurrently, YASHADA has delivered training sessions to Class III and Class IV employees. Additional training has also been provided for Project Affected Persons (PAPs) for low skilled employment. But, the results have been marginal in terms of sheer number of trainings identified and actual number of employees sent for trainings, especially in the higher cadre (Class I and Class II) employees. Moreover, no tracking mechanism currently exists for evaluation of these trainings. To institutionalise and provide a systematic strategy, the NIUA-CIDCO Smart City Lab prepared a draft training policy in consultation with CIDCO, which is now being revised before adoption. The draft policy is structured into three modules: recipients of training, mechanisms and delivery institutions, and supporting ecosystem. Key highlights of the draft policy within these modules are as under.

Recipients of training
• Training becomes a mandatory part of employee policy for CIDCO.
• The minimum duration of training for every employee is 5 days every two years and maximum of 15 days every three years (excluding e-learning).
• Employees will be eligible for various types of trainings depending on the skills and the nature of tasks assigned to the employee and not on the rank/seniority of the employees.
• Submitting feedback and knowledge sharing after having attended training is mandatory.

Mechanisms and delivery institutions
• Mechanisms for training will include on-site training (at CIDCO), off-site training and e-learning.
• Various types of training will include technical, managerial, behavioural and induction.
• The CIDCO Smart City Lab will identify delivery institutions and develop relationships with them continually through Memorandum of Understanding (MoU).

Off-site training and on-site training will be delivered by technical and policy training institutes such as Administrative Staff College of India (ASCI), Indian Institute of Human Settlements (IIHS), Center for Environmental Planning and Technology (CEPT), School of Planning and Architecture (SPA), Indian Institute of Technology’s (IITs), Indian School of Business (ISB), The Energy and Resources Institute (TERI) etc. Course providers such as Coursera (www.coursera.org), Edx (www.edx.org), World Bank (www.einstitute.worldbank.org), United Nations (www.unitar.org/event/elearning e-learning), Asian Development Bank (www.myelearn.org) etc. are identified initially for e-learning.

Supporting ecosystem
• A training cell set up at CIDCO will coordinate all capacity building initiatives including identification of training, participation in training and gathering feedback.
• An online training portal will be developed that will host all activities regarding training including training calendar and employee training profiles. Employees will be able to apply for trainings on this portal.
• A dedicated annual budget will be allotted capacity building.

This draft policy deals with the capacity building within CIDCO and excludes the efforts needed to develop capacities within the communities that CIDCO works with. It is but hoped that the augmentation of global knowledge within CIDCO staff will translate directly into more effective working within and outside the organisation.
Jabalpur
Central Business District in Area Based Development

Rank 7

Population 10,55,525
Area 152.53 sq.km
Density 6920/sq.km
Literacy rate 87.39%
Total SCP project Cost 3808 Crore INR
Gender Ratio 912
Slum Population 45.82%
Unemployment 0%

Area Based Proposal (ABP)  
Retrofitting & Redevelopment
2.97 sq.km (1.95%)
3605 Cr. INR (94.67%)

Pan City Proposal (PCP)
203 Cr. INR (5.33%)
Context
Jabalpur is a Tier II city in the central state of Madhya Pradesh in India. The city’s name is derived from the legendary sage Jaabaali, who is mentioned in the Ramayana, and the name may refer to Jaabaali’s tapasya-bhoomi (place of penance). It is part of the “Mahakoshal” region and is a centre for government, judiciary, defence and railways. Also known as Sanskaardhaani, it has a syncretic culture as a result of different influences from Kalchuri and Gond dynasties to Mughal, Maratha and British rulers. Under the British Raj, “Jubbulpore” was a cantonment town. Today it is the home to the Army Headquarters of five states - Madhya Pradesh, Chattisgarh, Orissa, Bihar and Jharkhand. The High Court of Madhya Pradesh, the headquarters for the West Central Railway and the Gun Carriage Factory are also located in the city. The Gun Carriage Factory is the oldest of its kind in Central India. It caters to the needs of all three wings of the Indian defence forces, the Indian Army, the Indian Navy, and the Indian Air Force. Apart from the three Armed Forces it also caters to the needs of state police and paramilitary forces such as Central Industrial Security Force (CISF), Central Reserve Police Force (CRPF), Border Security Force (BSF), Indo-Tibetan Border Police (ITBP), etc. Jabalpur has excellent road, rail and air connectivity. It is connected to two national highways and it is the only airport for 15 to 20 nearby districts with daily flights to six major Indian metropolitan cities. The city is surrounded by vast forests and includes the natural parks and wildlife sanctuaries of Kanha, Pench, Bandhavgarh and Panna. Stretching out from the city limits, Duma Nature Reserve spreads over 2600 acres of area. Jabalpur is in a rich mineral belt and has abundant water supply due to its proximity to Narmada and its tributaries. It also has 37 lakes and ponds spread out across its area. The natural water resources nearby provides 409 Million Litres per Day (MLD) of water supply where as the present demand is only 221 MLD. The city has installed total water treatment capacity of 371 MLD out of which 195 MLD is currently utilised. Jabalpur has constructed 15000 individual toilets in one year under the “Swachh Bharat Mission”. It is also among the few cities in India in the advanced stages of establishing waste to-energy incinerator plant on public private partnership (PPP) model. Jabalpur is among the first in the state for implementation of e-governance in citizen services. It also boasts an excellent overall quality of life and affordable cost of living which is about 15-20% lower as compared to the metro cities of the country. In recent years, Jabalpur has gained popularity in the film and music industry. Connectivity, natural resources and cultural heritage makes Jabalpur a natural gateway to eco and ethnic tourism. The city aims to become a hub for tourism and recreational activities. It also seeks to harness the promise shown by the garment manufacturing industry in the last decade. The garment industry currently employs more than 50000 skilled workers. The goal is to further organise this sector and leverage information technology for its development.

The city is presently struggling with gaps in its public transit network, particularly for last mile connectivity. It also has inefficient sewerage collection and solid waste management systems, particularly for poorer households. Lack of new avenues for employment is seen as a result of the slowdown in industrial growth in the city. This is also reflected in its “slightly lower than the national average” population growth rate of 29.49%. The city offers good educational facilities as compared to the metro cities of the country. In recent years, Jabalpur has gained popularity in the film and music industry. Connectivity, natural resources and cultural heritage makes Jabalpur a natural gateway to eco and ethnic tourism. The city aims to become a hub for tourism and recreational activities. It also seeks to harness the promise shown by the garment manufacturing industry in the last decade. The garment industry currently employs more than 50000 skilled workers. The goal is to further organise this sector and leverage information technology for its development.

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Project Overview

Jabalpur’s area based development (ABD) relies on a financially robust and sustainable, retrofit cum redevelopment “hub and spoke” model in Wright and Napier Town (743 Acres). It interlinks existing strategic urban spaces to regenerate its central business district (CBD) and create plug-and-play infrastructure. It will create dense, compact, mixed use parcels with vibrant streets and safe public spaces for enhanced social interactions. The transformation will unlock a new growth axis and series of cultural (Gol Bazar, Bhanvartal), economic (Civic Center) and environmental hubs (Ranital lake) to serve as community destinations for the entire city. The area’s existing British town planning will be invigorated with a layer of improved infrastructure (roads, signage, lighting, smart metering for water services and radio frequency identification- RFID for waste collection points). It will also incorporate context-sensitive regulations like zoning restrictions, regulation of building heights, reconfiguration of marginal spaces and guidance for parking, facades and transit systems. Jabalpur’s pan city proposal focuses on solid waste management. Jabalpur Municipal Corporation (JMC) is a pioneer on solid waste management and waste-to-energy in the state. Thus, leveraging existing effort in the city, a RFID-based, real-time, smart waste management system has been selected for the pan city initiative. Waste management is a basic requirement of an ecologically sustainable development. It will be a comprehensive programme optimising waste collection, transport, and disposal—along with activities to prevent, recycle, and draw energy from waste. Smart bins, RFID and geographic information system (GIS) solutions will be used to optimise processes along the entire value chain of solid waste management. Data on all operations transmitted to a central command and control centre (where other municipal services will also be monitored) will facilitate sector reform. The solution will improve public health, optimise government resources, and support environment sustainability.

Salient feature

Central Business District in Area Based Development

Jabalpur’s strategic blueprint has three components - economic revival and urban regeneration for scaling up the city’s potential to respond to growing citizens’ aspirations in the region; creating a financially robust and environmentally sound development model for replication and coupling the city’s comparative advantage with frugal innovation to deliver impacts speedily and efficiently. Its strategic focus areas include employment generation, creation of a gateway for responsible eco and ethnic tourism, logistics transportation and environmental sustainability and service efficiency. Jabalpur’s ABD includes Wright town, Napier town, civic centre, Madan Mahal railway station and Ranital Lake. It has proposed a “hub and spoke” model for connecting spaces and activities to improve its function through its growth axis and involves both retrofit and redevelopment solutions. Retrofitting involves reconfiguration of building heights, marginal open spaces and infill development. Along with mixed land use these solutions are meant to lend more compactness to the neighbourhood. Environmental assets, landscaping, up-gradation of sports enclaves, development of convention cum exhibition centre, night markets and green corridor for pedestrian and non motorised vehicles are proposed as part of the redevelopment solutions. The in-situ slum redevelopment will be a major catalyst of change in the area. Rehabilitation of 9200 slum dwellers will provide socio-economic boost to the community. The plan encourages a cohesive CBD to permit diversification and promotion of businesses, enterprises and creation of jobs along with recreational facilities, environmental regeneration, improved connectivity and housing. The city anticipates greater support for local businesses, an increase in employment, tax revenue and economic and social opportunities for all. The conglomeration of international sports complex, convention and exhibition centre, stadium and sports areas and Ranital lake will generate employment and revenues for the city. Creation of transit oriented development (TOD) around Madan Mahal station will provide affordable and comfortable transit solutions for all members of the society. Together with Gol Bazaar and the additional commercial development in the neighbourhood, it will activate the urban spaces. The compact development, improved streetscapes, promotion of street vendors and better transit will promote walking and use of non-motorised vehicles. Overall the area based development will lead to an increase in the land value in the neighbourhood. Additional charges in form of smart city cess, enhanced property tax, water charge, sewerage cess, municipal solid waste management (MSWM) charge, cumulative tax and education tax will be also implemented on the residents of the area based development over varying time periods.
MEASURABLE IMPACT

AREA BASED PROPOSAL

Social
› Public health & environment
› Home ownership
› Social inclusion
› Access to social amenities

Governance
› Real estate prices
› Citizens’ perception of the government
› Public asset management
› Demand for space
› Revenue collection
› Property tax collection
› Service delivery of public utilities and facilities
› City management

Spatial
› Investment environment
› Economic growth
› Density

Environmental
› Lake eco-system
› Pollution
› Water use
› Walkability
› Mobility
› Management of municipal services
› Quality of public transportation

Economic
› Retail & economic activities
› Employment
› Urban spaces
› Tourism

PAN CITY PROPOSAL

Public Services
› Solid waste management
› Spread of mosquitoes & pests
› Drainage
› Public health & environment
› Public service delivery

Governance
› Waste collection & management
› Cost recovery
› Operation & maintenance costs
› Public health
› Pollution
VISAKHAPATNAM
Placemaking, Public Health and Disaster Preparedness

Rank 8

Population 17,28,128
Area 513.61 sq.km
Density 3365/sq.km
Literacy rate 81.79%
Total SCP project Cost 1601.87 Crore INR
Gender Ratio 977
Slum Population 44.61%
Unemployment 3.95%

AREA BASED PROPOSAL (ABP)
RETFITTING
6.6 sq.km (1.29%)
1461 Cr. INR (91.2%)

PAN CITY PROPOSAL (PCP)
141 Cr. INR (8.8%)
**City Self-Assessment**

|-----------------------|-----------|-----------------|-------------------|--------------------------------------|-----------------|------------------|-----------------|-------------|----------|-----------------------|------------|-------------|------------------------|--------------------------|-------------|--------------------------------|-----------------|--------|-----------|-----------------------|

**Context**

Visakhapatnam, also called Vizag, is the largest city in the state of Andhra Pradesh, both in terms of population and area. The name Visakhapatnam is believed to be derived from the shrine of God Visakha, built by a 4th century ruler of Andhra. Historically, Visakhapatnam was considered part of the Kalinga region, and later ruled by the Vengi kingdom, the Pallava and Eastern Ganga dynasties. The present city was built around the 11th and 12th centuries and has been ruled by the Chola dynasty, Gajapati kingdom and the Vijayanagara empire, Mughals, French and then the British, who controlled it until independence. During the 18th century Visakhapatnam was part of the Northern Circars, a region comprising coastal Andhra and southern coastal Odisha which was first under French control and later British. Later, Visakhapatnam became a district in the Madras Presidency of British India. After India’s independence it was the largest district in the country, and was subsequently divided into the districts of Srikakulam, Vizianagaram and Visakhapatnam. The city’s railway station was called Waltair railway station during the colonial era, later the name was changed name to Visakhapatnam. The neighbourhood surrounding the station is still called Waltair.

Visakhapatnam is a land-locked harbour, connected to the sea by a channel cut through rock and sand. The city is nestled between the Eastern Ghats mountain range and the Bay of Bengal, and is often known as “the jewel of the east coast”, “the city of destiny” and “the Goa of the east coast”. The city is well connected by road, rail, air and water and its beaches, parks, museums, and proximity to areas of natural beauty have helped the city become a significant tourist destination. Visakhapatnam’s economy ranks as the tenth-largest among Indian cities and is fuelled by heavy industries, tourism, industrial minerals, fishing, and information technology.

It is the fifth busiest port in the country and has the oldest shipyard on the east coast. Visakhapatnam is the headquarters of the Eastern Naval Command, the Naval Science and Technological Laboratory (a DRDO Lab), a Chief Quality Assurance Establishment (CQAE), a Naval Dockyard (established in 1949) and Naval Bases. The defence controlled Hindustan Shipyard in the city built India’s first ship Jala Usha. Visakhapatnam was ranked as the fifth cleanest city in India according to the government’s Swachhta Sarvekshan rankings. The city has received the National Energy Conservation award in 2015. Public health is a growing concern in the city with pollution, sedentary lifestyles and disasters being frequent causes of death. Visakhapatnam does not have a comprehensive disaster management plan. There is limited availability of public transport and the quality of pedestrian infrastructure is poor. The city lacks a comprehensive solid waste management (SWM) strategy and the waste is disposed in a dump site in Kapplupada. The city loses 10 million gallons per day (MGD) in a total from the clear water supply of 67.39 MGD (Domestic + Non-domestic). Non revenue water is 15% of the overall supply. There is a deficit of approximately 30 MGD in water supply including losses (Total demand is 97 MGD and supply is 67.39 MGD). In 2015, only 1.2% of the energy generated was through solar. About 40% of Visakhapatnam’s population does not have access to the sanitation network and open defecation is a major public health hazard.

**Project Overview**

The selected area for area based development (ABD) in Visakhapatnam is 1650 acres around R K Beach up to Waltair main road. The ABD proposal focuses on the core theme of “prevention is better than cure” and aspires to address key issues that emerged out of citizen engagement. The inspiration behind ABD smart solutions includes: building upon the ongoing initiatives within the city, such as speed limit cap, vehicle free zones initiatives by Greater Visakhapatnam Municipal Corporation (GVMC) and Andhra University, beach beautification and shorefront restoration project to enhance tourism potential. With a view to enable an intelligent, data
Driven and people-centric smart city, the pan city proposal of Vishakhapatnam combines effective e-governance with an enhanced disaster management system. The proposal by interconnecting sectors ensures e-services, effective city administration and emergency services. “Disaster and emergency management” has emerged as the key theme in the citizen engagement exercise. The fact that the city is frequently hit by natural disasters warrants an emergency action plan which mitigates the impact on human lives, city assets and economic activities. Hence, a “disaster management system” (DMS) built on a strong information and communication technology (ICT) infrastructure is the planned pan city solution. The same system will be leveraged during non-emergency days to strengthen e-Governance. The ICT backbone for DMS will serve as a central control and command centre for city operations. Monitoring services such as energy, water, transportation, citizen interaction, public safety etc. through this system will not only improve the city services but also ensure that the system remains operational and ready to handle emergencies at any given point.

Salient feature

Place-making, public health and disaster preparedness

The strategy outlined for the city in the smart city proposal (SCP) focuses on health, livability, resilience and vibrancy. The city wants to focus on three things - public health, sustainability and resilience in the face of climate change, improved service delivery and job creation. These areas are reflected in the area based and the pan city proposals for the city. It includes a place making strategy to activate the public space, traffic calming techniques to streamline traffic and a disaster management strategy to make the city resilient.

The basic purpose of the area based development (ABD) is to demonstrate that efforts towards creating pedestrian oriented and cycling friendly neighbourhoods and public places result in not only promoting tourism but have a direct positive impact on the health of the citizens. The development has a mix of land uses ranging from residential, commercial, institutional, open greens and some amount of mixed use. This area has an abundance of hotels, hospitals, schools and colleges along with city level markers such as the Visakhapatnam Urban Development Authority (VUDA) Park, R K Beach, Yoga Village, Andhra University, Collectors office etc. The chosen area has a population of 80,000. This area is a good reflection of the city’s fabric and is very popular with the residents, regional visitors and global tourists due to the presence of R K beach.

The R K Beach area development proposal strives to be catalytic in nature, and serve as a model of sustainability for other areas in the city to emulate. The components of the proposal collectively aim to shape the area with an active and vibrant public realm while reducing its environmental footprint and visual/physical clutter. Two lanes of the beach road for a 4 km stretch are apportioned to accommodate walking and bicycling. Innovative use of open spaces is proposed which includes VUDA park retrofitted with sports facilities in a phased manner. This will help to reduce air pollution while also encouraging citizens to have a more physically active life-style that will help reduce incidents of diseases such as diabetes and...
heart ailments. Enhanced facilities in parks, active streets and active public spaces will make streets and neighbourhoods safer in the city, especially for women, children and the elderly. The proposal also gives particular attention to the universal accessibility component through its landscape and transport strategy. A dedicated hawker zone in ABD has been proposed to avoid haphazard commercial activity which can lead to congestion and as a result higher emissions. Smart parking as dedicated on-street parking spots or multilevel car parking will ensure that streets are not taken up by illegal parking leading to congestion. Proposed and existing bus stops will be fitted with ICT enabled information systems along with charging points for electric bicycles and e-rickshaws. LED street lights and institutional lighting will be powered through solar energy. Infrastructure will be made resilient by addressing missing linkages in the storm water drainage and the sewage network. The beach is proposed to be landscaped with native species of flora. A shore protection plan will be developed and implemented to protect the beach from erosion. Beach beautification, sidewalk construction, shore protection and other activities once completed shall provide an integrated public green space, give a distinct identity to the public realm and encourage pedestrian movement along the coast. These initiatives would guide current unorganised development in a sustainable manner, in-turn leading to a well governed and an economically viable solution for the beach road stretch. Visakhapatnam can truly transform into a “Healthy Metropolis for its People” and deliver on its promise of cities shaping their citizens, by replicating their ABD initiatives at city level.

### MEASURABLE IMPACT

#### AREA BASED PROPOSAL

**Social**
- Universal access in public spaces & transportation
- Mode share
- Job opportunities

**Governance**
- Service delivery network
- Identity
- Regulation unorganised development
- Disaster management
- Provision of municipal services
- Response time for various departments
- Losses in the supply systems

**Spatial**
- Public health
- Use of street right of way

**Environmental**
- Emissions
- Noise
- Vehicle speeds
- Fuel efficiency
- Mobility

**Economic**
- Retail & economic activities
- Employment & job opportunities
- Urban spaces
- Tourism
- Workforce
- Revenue generation
- Investment opportunities

#### PAN CITY PROPOSAL

**Public Services**
- Service delivery
- Response time
- Resolution time
- Transparency

**Governance**
- Surveillance
- Mosquito breeding control
- Emergency response
Lighthouse & Fast Track Cities

Number of Cities
33

Total Urban Population Impacted
4,67,59,388

Total Cost of Projects (in INR Crores)
77,859

SCP FINANCIAL RESOURCES PLAN

Average budget: INR 2351 Crore
## LEARNING AND REPLICABILITY

### SUMMARY OF PAN CITY PROPOSAL

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• Overall 542 projects = INR 25,000 crore approx. (32% of SCP budget)
• Heavy focus on Green City Design and Resilient Infrastructure
  These are primary utility systems such as Sanitation and Sewerage management, Solid Waste Management, Efficiency in Water Supply (metering and leakage detection)

### INTEGRATED MOBILITY

| Row Labels          | 5 | 13 | 11 | 2 | 6 | 5 | 2 | 2 | 5 | 2 | 3 | 2 | 11 | 1 | 10 | 9 | 2 | 1 | 8 | 5 | 5 | 8 | 3 | 5 | 2 | 3 | 4 | 152 |
| Physical Infra      | 3 | 3 | 11 | 6 | 5 | 2 | 2 | 6 | 4 | 1 | 2 | 13 | 6 | 8 | 1 | 5 | 9 | 6 | 2 | 4 | 6 | 3 | 2 | 4 | 3 | 1 | 3 | 129 |
| ICT/ITS             | 1 | 5 | 13 | 1 | 1 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 1 | 1 | 22 |
| Clean Fuel          | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Public Transit      | 4 | 2 | 5 | 1 | 1 | 8 | 3 | 1 | 1 | 1 | 3 | 2 | 5 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 105 |
| Traffic Management  | 4 | 2 | 5 | 1 | 1 | 8 | 3 | 1 | 1 | 1 | 3 | 2 | 5 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Vehicles            | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 19 |
• Use of ICT beyond e-Governance towards Solutions for Planning
• Investments in 330 projects about INR 15,000 crore on ICT based technologies
• Main focus in using ICT beyond governance is for energy efficiency and mobility solutions

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<th>Count of Capacity Building and Public Outreach</th>
<th>Count of Provision of Spaces (Innovative Hubs, Wifi Hubs, Control and Command Centres)</th>
<th>Count of Sensor Based Systems</th>
<th>Count of Stakeholder Collaboration and Collective Problem Solving</th>
<th>Count of City Apps, City Dashboards and Open Data</th>
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## FINANCIAL ANALYSIS

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### 1st Quartile

1. Budget (INR Crore)
2. Budget Efficiency
3. Funding Leverage
4. Mobilisation Diversity
5. Revenue Capacity*
6. Expenditure Capacity

### Definitions

- **Budget (INR Crore)**: The overall capital expenditure proposed in the SCPs by each city.
- **Budget Efficiency**: The overall capital expenditure divided by the population of the city.
- **Funding Leverage**: The amount of money to be mobilised by the city divided by the funding identified under national and state schemes.
- **Mobilization Diversity**: Similar to Herfindahl-Hirschman index, calculated to measure the dependence of the proposal on one or more funding sources.
- **Revenue Capacity**: The amount of money to be mobilised divided by the latest municipal revenue of the city.
- **Expenditure Capacity**: The amount of money proposed to be spent under the SCP divided by the latest municipal expenditure of the city.
- **JnNURM Property Tax Reform**: The status of implementation of JnNURM tax reform.
- **Credit Rating**: The credit worthiness of the city.
Gender Mainstreaming in Housing

Summary of ‘Does the Domestic Space belong to Women’ published in TRIA International Journal of Urban Planning (Vol. 9, no. 1), Written by Rewa Marathe and Suzana Jacob

Households in the cultural context of a patriarchal society such as India, are primarily headed by men. The reason why a female heads a household is not a result of improving social and economic status of women—it is unlikely that a woman will be considered head of the household in the presence of her husband. It is mostly because there is no alternative (Masoodi, 2015). And while they are not considered the natural heads of the household, the house remains at the heart of women’s lives. It is where they spend most of their time, look after their family and children and even run businesses. In such a conflicting scenario of ownership and belonging to the house, it is essential to question our housing policies, building and property ownership regulations for their adequacy of providing safety and security to the women.

Need for Gender Sensitive Planning

According to the 2011 Census, about 27 million households in India (11% of total households in the country), are headed by women. Still the socio-cultural system places women as a outsider in their own family - the one who will marry and leave her parents’ house for her husband - and as the outsider in their husband’s house who came into the family through marriage. House is a workplace for the caregiver. In the current Indian context, this is primarily women. Safe and affordable housing for women is a key to combating urban poverty (Khosla).

Women’s participation in housing usually begins where the housing project ends - in the maintenance of housing stock (Fernando, 1985). Women and men differ in their roles, needs, and perceptions regarding housing and conscious efforts to address both their views lead to better project design and performance. Gender sensitive planning is therefore of great value.

Gender & Housing in India

The paper looks at policy, legislation, finance and design & construction processes within the housing sector in India to put together a broad understanding of the gaps in identifying and addressing issues critical to subject. It recognises the following challenges:

• Need of attention to the language used in describing gender
• Little recognition of household management as ‘work’
• Lack of attention to the needs of home based businesses
• Existing gaps & social stigma about female headed households
• Need for higher property ownership among women
• Need for attention towards victims of domestic abuse and the limitations resulting from congruent lack of property ownership
• Gaps in access to finance & homeownership - legal and social
• Little attention to non-conventional familial structures/units
• Necessity of greater focus on women within the structure of housing schemes for poor
• Dependence on women for bridging service delivery gaps
• Need for larger participation of women within the design and planning process (which are both male dominated professions)

The paper also highlights critical progress that has been made in the recent years

• Government of India has developed a Draft National Policy for Women which articulates a vision for women empowerment. The policy looks at enabling environments such as housing and shelter, drinking water and sanitation, social security and infrastructure among others.
• The recent Pradhan Manthri Avas Yojana (PMAY) supports construction of affordable houses for the homeless with basic civic infrastructure and mandates its registration in the name of a woman in the family. Further, allocation of houses to beneficiaries is through a transparent process using an online portal.
• Under the new urban agenda, issues of displacement during slum rehabilitation programmes are addressed by making in-situ redevelopment a condition for national programme funds (in PMAY).

These policies and programmes will help create an environment that will empower and enable women to access housing. But its success will depend on large scale engagement of women, deliberate and sincere efforts from public agencies, and collaboration and shared vision of various stakeholders including public, private and civil society organisations, that is supported by a strategic theme of gender mainstreaming. Gender mainstreaming can begin with the simplest of interventions, as is seen in case of the City of Montreal, where METRAC developed the system of gender based safety audits and the City of Vienna, which adopted gender mainstreaming as a cross cutting strategy for the whole municipality by establishing an Office of Gender Mainstreaming.

While individual women have and will continue to make incredible strides, women as a class will not fully achieve social, economic, and political equality until responsibility for the care of society’s dependents becomes consistent with participation in public life (Silbaugh, 2007). Adopting Gender Mainstreaming in India’s housing policies, will provide equal opportunities for everyone. It will enable equitable distribution of resources, developing a system which is more sensitive to the needs of the society and leads to greater transparency due to wider engagement with the members of the society at different stages of the planning processes.
Women’s Safety Audits

Fear of possible violence shapes women’s ability to use public spaces, defines their comfort levels, and compromises their sense of freedom and inclusion in the city (Viswanath & Basu, 2015). Recent global prevalence figures indicate that about 1 in 3 (35%) women worldwide have experienced either physical and/or sexual intimate partner violence or non-partner sexual violence in their lifetime (WHO, 2016). Sexual violence and harassment happens on streets, in and around public transportation, schools and workplaces, water distribution sites, public toilets, and parks in urban, rural, and conflict/post-conflict settings (UN Women, 2016).

Addressing these factors is not about implementing criminal laws but about establishing adequate measures to improve the safety of women (Bhattacharya, 2016). A fundamental step in this process is to accurately identify the prevalence and nature of the problem (Blumenthal, 2014), to identify the factors that affect the ‘feeling of safety’. Measuring this ‘feeling of safety’ to make public spaces inclusive and safe for marginalized groups is key to the issue.

Women’s safety audits are used to do this assessment through active public participation in data collection and decision making. It can been defined as ‘a process which brings individuals together to walk through a physical environment, evaluate how safe it feels to them, identify ways to make the space safer and organize to bring about these changes’ (Whitzman, Shaw, Travers, & Kathryn, 2009; WACAV, 1993). Women’s safety audits were first developed in Canada in the late 20th century by Toronto’s Metro Action Committee on Public Violence Against Women and Children in order to mitigate violence against women in the city with the support of local community. The method has since been adapted and used across the globe, leveraging local ‘expertise’ to make neighbourhoods safer.

Women’s safety audit is a dynamic participatory concept that exists in a constant state of modification and improvement (Women in Cities International, 2008). It’s strength lies in the participatory nature. It supports and legitimizes the use of women’s first hand accounts and knowledge in municipal decision-making. To conduct a safety audit, a group of women users of a particular urban or community space walk around that space and using a checklist, they note the factors that make them feel unsafe or safe in that space. The original women’s safety audit checklist included 15 categories, including lighting, sightlines (seeing what is ahead and around), entrapment spots, signage and maintenance. Next, recommendations are formulated, organized and prioritized to bring about the improvements to the neighbourhood, notably by entering into a dialogue process with the local government and other key actors (for example, local development agency, private land owners, police) (Whitzman, Shaw, Travers, & Kathryn, 2009; METRAC, 1989).

Cities across the world use Women’s Safety Audits as a tool of improving neighbourhoods and as a means of...
raising awareness on issues of violence against women and empowering local communities. Cities have conducted safety audits under UN Women’s Flagship initiative Safe Cities and Safe Public Spaces. In India, Jagori in New Delhi and PUKAR in Mumbai have been conducting safety audits. Jagori launched the Safe Delhi Campaign in 2005 to bring into public focus the issue of women’s safety. In 2010, it published a handbook on conducting women’s safety audits, outlining every step and the stakeholders involved at different levels. Unfortunately, so far success of gender based safety audits in India has been limited and they are often turned into a publicity tools by local governments, failing to result in positive change on ground. In these cases, the audit recommendations are quickly forgotten about once the initial act has occurred and public attention has waned. (Women in Cities International, 2009) (Jagori, 2008) (Wekerle, 2005).

With greater access to internet and mobiles, there is an opportunity for widening the scope of engagement with women from different walks of life. Safety audits have now been built into mobile based applications that can be used by anyone with a smart phone or a tablet, recording their experience and crowd-sourcing information about status of infrastructure. Safetipin is one such mobile based app. It collects data about the situation of public places in the city on a set of nine parameters - lighting, openness, visibility, security and other factors. This data is available in multiple forms including maps, reports, csv files which can support urban stakeholders to take important urban planning and monitoring decisions, including deployment of limited resources for lighting, security, CCTVs, public transport at night (Safetipin). In Delhi Safetipin’s data is being used by Delhi police and PWD to improve lighting in public spaces. It is also being used to assess bus stops and metro stations in the city. Globally, there are several similar applications in place. They include Streetscore, Harassmap, Safetipin and Crowdspot.
Rapid economic development in globalised India has led to an immense pressure on the urban infrastructure of the country. With an ever growing population, the country needs to manage its growth through a strategic approach and sustainable practices that encourage efficiency in land use and transportation. Given the large scale of investments underway across hundreds of Indian cities under a variety of national urban development schemes and missions, there is an opportunity to enhance and redirect the planning practices at the city level in India, leading to an integration between land use and transportation. The Smart Cities Mission attempts to do so by encouraging the cities to adopt a strategic approach to planning and by advocating for implementation of Transit Oriented Developments. Transit Oriented Development (TOD) can be used effectively to create high density, compact neighbourhoods supported by public transit, to reduce the dependence on private vehicles and the resulting pollution and congestion. So far, 60 cities have already been selected under the Smart Cities Mission and their Smart City Plans are currently being implemented. Out of these 60 cities, 41 illustrate transit oriented development or land-use-transportation integration.

To support this nation-wide effort in the implementation of TODs, the Ministry of Urban Development recently published a Guidance Document for planning and implementing a TOD in an Indian city. Its purpose is to assist various government organisations, public authorities and development professionals in India, in the process of integrating sustainable transport planning principles in diverse urban contexts. The document outlines 12 guiding principles and 9 supportive principles essential for the successful implementation of a TOD. It is meant to be used to evaluate the implementation of projects under the Smart City Mission. However, there are several limitations to this:

- One year long gap between preparation of the Smart City Mission Guidelines and publication of the Guidance Document.
- The Guidance Document presents a technical approach to planning and implementing TOD according to the needs of each city; whereas the Guidelines for the Smart Cities Mission recommends a broader city level strategic approach, where TOD is one of the possible solutions. This limits the use of MoUD's Guidance Document in assessing the SCPs.
- The Guidance Document recommends identification of scale and site of a TOD based on the availability of resources and enabling environment. Site selection and selection of TOD as an approach in the Smart City Mission depends on the availability of suitable land and expert opinion and citizen engagement.

To overcome these limitation and to use MoUD’s Guidance Document in the assessment of the SCPs, it is important to first identify where the TOD planning and implementation process recommended under each of these two approaches aligns. In February, 2017, NIUA released the publication titled “A Smart(er) TOD” in an attempt to do so.

The document was produced as a deliverable for the TOD in Indian Smart Cities project, conducted with the aid of the Prosperity Fund, Foreign and Commonwealth Office, Government of UK. It is one of four documents published over the course of the research. The other three other publications from the study are:

- Transit Oriented Development in Indian Smart Cities - a Global Review of Best Practices: outlines the five constructs of a TOD - Density, Diversity, Design, Mobility and Affordable Housing
- Game Changers in TOD: Discusses Value Capture Finance and Form Based Codes
- Assessing TOD: Presents a list of indicators and values for assessing a TOD

A Smart(er) TOD proposes a method for assessing individual TOD projects incorporated in SCPs of various cities, using the recommendations of MoUD’s TOD Guidance Document.

- It begins with a description of the proposed method for this and the various documents required.
- Next, it maps the relationship between the five constructs of TOD presented in the Best Practices document and the

• Finally, it illustrates application of the proposed method through analysis of SCPs from 21 cities. It also presents a list of TOD projects from these 21 cities, along with their project budget.

The publication was produced with the purpose of providing support to Indian cities, within or outside the Smart City Mission. It particularly aims to help:

• Cities which have proposed TOD/land-use-transportation integration in the Light House, Fast Track or Round 2: to support the preparation of their Detailed Project Report (DPR) for proposed projects in their Smart City Plans. For example, if a city has proposed a project for building Non Motorised Transport (NMT) infrastructure within the TOD, this study will help identify the various interventions that should be a part of the project beyond the creation of segregated cycle tracks, such as designing intersections and reducing the spacing streets or size of block to reduce trip lengths. Inclusion of such details in the DPR will increase chance of success and improve in the quality of life for the citizens.

• Cities which have not proposed TOD in the Light House, Fast Track or Round 2: it is observed that cities have without TOD still have a significant number of their projects are geared towards enhancement of transportation and housing. The results of this study will provide them with an overview of interventions that should be a part of such projects.

• Cities which are participating in the next round: to support the preparation of their Smart City Proposals and selection of projects if they identify TOD as a relevant strategy.

The publication was available to view on tod.niua.org, along with the other deliverables from the project.

**MAPPING PRINCIPLES TO CONSTRUCTS**

<table>
<thead>
<tr>
<th>Principles of TOD</th>
<th>Density</th>
<th>Design</th>
<th>Diversity</th>
<th>Mobility</th>
<th>Housing</th>
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<td>First and Last mile connectivity</td>
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<td>Interconnected street network</td>
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<td>Complete streets</td>
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<td>NMT network</td>
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<td>Managed parking</td>
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<td>Informal sector integration</td>
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<td>Housing diversity</td>
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<td>High quality transit system</td>
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<td>Preserve and create open spaces</td>
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<td>Green buildings and infrastructure</td>
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<td>Safety and security</td>
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NIUA studied various projects proposed by cities in their Smart City Plans with the help of MoUD's TOD Guidance Document. This was part of a research on TOD in Indian Smart Cities conducted with the support of Prosperity Fund, Foreign and Commonwealth Office, Government of UK. Its purpose is to support cities in Round 2 and Round 3 of the Indian Smart Cities Mission who have proposed or plan to propose Transit Oriented Development in their Area Based Development. It provides a decision making framework for these cities.

MoUD's Guidance Document for TOD presents 21 Principles for planning and implementing a Transit Oriented Development. To simplify the discussion, the study proposed use of 5 constructs of Design, Density, Diversity, Mobility and Housing. They are a modified version of the 3Ds of Design, Density and Diversity. These five constructs were then mapped against the 12 guiding principles from MoUD's Guidance Document. This exercise resulted in a baseline or 'ideal' weights for each of the constructs. The mapping is based on the Components enumerated by MoUD under each of the Principle. The table on page 26 illustrates the exercise. Next, the framework is used to understand a city's approach to implementation of a TOD in three parts:

1. **Compatibility of projects and policies:** Listing and mapping all the projects proposed by the city against the 21 principles. This is similar to the process of mapping the principles against the constructs. It allows us to identify the constructs prioritized by the city based on the resultant weights. The process is shown in the illustration:

   ![Diagram](Diagram.png)

   **STEPS TO TEST COMPATIBILITY OF THE PROJECTS**

   1. Identify TOD Principles
   2. Map each principle with the projects in ABD of the SCP
   3. Mapping principles against constructs to calculate ideal weights for each construct
   4. Mapping each project against the principles
   5. Compare the city's actual weights for each construct against their ideal weights

2. **Urban Transformation:** Estimating the change in the built form of the area selected for ABD. It estimates the additional built up area required to accommodate the additional population that will make the proposed infrastructure investment financially sustainable. Taking city's current population, growth rate and slum population, the framework estimates if additional interventions are required to stimulate population growth to achieve the desired population. The framework is also used to estimate the expected increase in real estate prices in the ABD using market prices of the land in the area.

3. **City’s Finances:** The approach for assessing the financial sustainability comprised the following:
   - Analyse the past trends in terms of various components of revenue and capital income and expenditure. It is assumed that business as usual situation would follow similar trends.
   - On a single entry basis, closing balance indicates the net of all cash flows. The investments proposed for TOD projects are superimposed on the existing financials and compared in relation to the prevailing composition of municipal finances. This involves comparing quantum of investment in relation to those generated in the past.

The study looked at four cities in detail, mapping each of its projects against the 21 principles to obtain the resultant weights and thus, the construct prioritized by each city. The exercise illustrates how a city can leverage TOD to address its specific issues. It also helps identify areas that a city can focus on, as it moves forward with the implementation of the TOD.

This framework provides a platform for city managers and policy makers to have a quick understanding of how their projects compare against TOD principles in the Indian context. While the application of these principles has been demonstrated for two cities, this framework has potential to be developed as a tool to provide insights to city managers and policy makers to delve deep into granular elements of the process.
India's transport sector is large and diverse, it caters to the transport needs of 1.1 billion people (IIHS, 2015). The absence of a database with scientific management and analysis of urban transport statistics has severely constrained the ability to formulate sound urban transport plans and reliably assess the impact of the different projects carried out in the cities (IIHS, 2015; Ahluwalia, 2011; Agarwal, 2006).

As Indian cities implement information technology services (ITS) to improve transportation planning and operations in urban areas through programmes such as the national Smart City Mission, there is an opportunity to address the following:

- Establishing standard for data collection and management across various transportation systems
- Standardised automatic data collection systems across transit systems in conjunction with ITS
- Coordination and integration of data collected by multiple agencies and in multiple formats
- Maintenance of regular up to date data for larger policy and planning functions
- Open data for the research community and to drive innovation in tech solutions
- Building a legal framework to guide data collection and sharing
- Protection of transit users’ privacy

Automated Data Collection System is an IT based data collection system that can be used to gather data about transportation services and facilities. Its key components are (Wilson, 2011):

- Automatic Vehicle Location System (AVL)
- Automatic Passenger Counting Systems (APC)
- Automatic Fare Collection System (AFC)

ADCS are important for collecting big data, as the use of technology enables data collection at a high speed and large volume. Such data can be used for (TfL, 2014):

- Asset Maintenance
- Road Traffic Management
- Informing users’ decisions
- Management of public transport services

Cities across the world already implement the system at different scales and in different operations to make the system more efficient. Notably, Transport for London (TfL) uses big data from ADCS to manage its road traffic and parking management.

**Parking and Data**

Data collected through for parking through the use of IT tools helps with the following (Bhatt, 2015):

1. **Efficiency Management**
   - Big data can help predict capacity patterns, enabling deployment of appropriate resources.
   - Data on capacity patterns allow the city to adjust rate structures and maximum time stays which benefits both motorists and retailers/businesses

2. **Revenue Management**
   - Using revenue trends and variations in revenue cycles to program variables like maximum parking time, rates, and enforcement hour
   - Occupancy trend versus paid parking spaces to help the city increase its revenue

3. **Parking Metre Management**
   - Real-time metre status and faults, in combination with data on past trends can help metre maintenance personnel mitigate device failure risks, thus reducing impact to capacity and revenue
   - Collecting and analysing user key strokes can help a city to understand metre user interface navigation patterns while power consumption data based on location can reduce failures.

**Smart Parking for London Underground - TfL**

In order to better understand the parking use of London Underground’s 61 car parks (with about 10,000 spaces), TfL
introduced smart parking technology to provide real-time information accessible through smartphones and satnav devices, allowing commuters to better plan their journeys and make informed choices about how, where and when they travel (Smart Parking Ltd).

• This involved use of SmartEye - a vehicle detection sensor connected to SmartRep - a parking management software using SmartLink data transmitters across 28 of the car parks.
• TfL then shares the occupancy data collected through the sensors through a dynamic feed, informing the public about the availability of parking spaces.
• Smart Parking data is available free of charge at http://tfl.gov.uk/developers and is used by nearly 500 third party apps, helping visitors to plan their travel (Smart Parking Ltd).

Traffic Management and Data
Traffic management is the planning, monitoring and control or influencing of traffic. It aims to:

• Maximise the effectiveness of the use of existing infrastructure;
• Ensure reliable and safe operation of transport;
• Address environmental goals; and
• Ensure fair allocation of infrastructure space (road space, rail slots, etc.) among competing users

The solutions for managing traffic can include:

• Traffic Signal Monitoring and Management System: for real time measurement, analysis and adjustment of the signal to improve traffic flow
• Fixed Sensors such as CCTV/Traffic Cameras to monitor traffic, particularly to track congestion and traffic. They include loop detectors (detecting vehicles passing a certain point - such as a traffic signal)
• Mobile Sensors such as GPS/Mobile phone/Dashboard Camera to collect Floating Vehicle Data (FVD), which can be used to determine speed, location and direction of travel. Crowd sourced data from social networking sites is also useful, particularly in case of accidents or other emergencies.
• Freeway electronic message signs for information dissemination to the users (for speed management, ramp metering and tactical management of traffic)

Urban Traffic Management in UK
The Highways Agency (HA) uses road sensors to collect data on traffic flows and GPS data to estimate journey time. It has been using techniques such as self-regulating co-ordinated traffic lights, traffic cameras and variable-message signs to reduce traffic delay and congestion for decades. Now, it has begun to...
use big data in order to gain insights into traffic patterns. Its National Traffic Information Service collects data and provides real-time traffic information through media channels and through the data.gov.uk website. Private companies, such as Inrix and TomTom, also use the data collected through vehicle fleets to gather information on traffic flows and delays.

JamCams: Transport for London (TfL) also uses a “JamCam” system to provide nearly live video clips from all existing cameras. The videos give a better indication of the actual traffic flow compared to static images. Each clip is five seconds long, and encoded using H.264 at the same resolution as the static JamCam images (352 x 288).

Both the examples illustrate use of the data for:

- Immediate information sharing for the users of the system such availability of parking
- Efficient processes and ease of accessibility, for example online payment of parking fees, reservation of parking space online, etc.
- Long term planning and decision making for the administrators based on analysis of trends, for example prediction of parking requirements based on use trends

Initiatives @ CIDCO
CIDCO is also implementing Traffic Management System and Smart Parking as part of CIDCO Smart City (South). The Traffic Management System includes - Area Traffic Control, which will include real time traffic monitoring, traffic surveillance, synchronised signalling and loop detection. Smart Parking will be implemented at 17 locations. It will include sensor based occupancy detection and real time information dissemination about parking availability through website and mobile based applications. Parking payment will also be managed through these medium.
EMERGING IDEA

LinkNYC Free Wi-Fi Kiosks in New York

LinkNYC is a first-of-its-kind communications network that will replace over 7,500 pay phones across the New York City with new structures called Links. LinkNYC is completely free because it’s funded through advertising. It is expected to generate more than a half billion dollars in revenue for New York City.

LinkNYC launched in January 2016 and is currently in its beta phase, giving New Yorkers an early opportunity to try out Link’s features and provide feedback. Additional apps and services will be rolled out on an ongoing basis over the next several years.

Currently it provides:
1. LinkNYC’s super fast, free Wi-Fi to connect personal devices
2. Access to city services, maps and directions
3. Free phone calls to anywhere in the U.S. with the Vonage calling app on the tablet or the tactile keypad, microphone and headphone jack
4. Dedicated red 911 button in the event of an emergency
5. USB port to charge devices
6. ADA-compliant (universally accessible) design with low ground coverage, leaving space on the sidewalk as compared to a conventional phone booth
7. Public service announcements and advertising on two 55” HD displays

In 2014 the de Blasio Administration issued a competitive RFP to repurpose payphone infrastructure with free Wi-Fi, phone calls and advertising. The CityBridge proposal for LinkNYC was chosen for its innovative and community-first approach and was awarded the 12-year franchise. CityBridge is a consortium of experts in technology, media, user experience and connectivity that includes Intersection, Qualcomm and CIVIQ Smartscape. The kiosk was designed by Antenna Design.

The initiative will deploy a total of 7,500 Links throughout
“LinkNYC is our response to some of the most pressing challenges facing New York City—and cities around the world—today. How can we provide greater access and connectivity without costing taxpayers a dime? How can we address the digital divide, where more than 25 percent of New Yorkers lack broadband access at home? The single largest opportunity when it comes to this project is its sheer scale and ability to benefit millions of people every day. In addition to more than 8.5 million New Yorkers, we’re also serving 56 million visitors from around the world. Our objective is to ensure LinkNYC creates real value for these diverse populations. LinkNYC is about reimagining the public-private partnership model to bring the incredible innovation of the digital world into our physical streetscape, providing value to New York City with a state-of-the-art new communications network.”

- Dave Etherington of CityBridge (Kleiman, 2016)
the city over the next eight years. At no cost to the city or taxpayers, CityBridge, the consortium behind the project, is investing $200 million in building the LinkNYC network (Kleiman, 2016).

Through advertising, LinkNYC comes at zero cost to taxpayers. LinkNYC will generate at least $500 million in revenue for the City over the next 12 years and CityBridge will use revenues to maintain and improve the service; the city and CityBridge will split revenues 50/50 (Kleiman, 2016).

Issues with the deployment of the kiosks:

- User data theft by cyber criminals
- People who linger next to it for hours, monopolising it and blocking the sidewalk
- Use of kiosk for other criminal activities and communication

In order to address the issue, in September 2016, the internet browsing facility was disabled on the kiosk screens, with the exception of websites that provide government services, Wi-Fi phone calls and the city’s 311 complaint centre and 911. As of October 2016, LinkNYC Kiosks can also be used for registering to vote. Hi-Speed Wi-Fi for use on personal devices is still in place.

Technology

The Kiosks use Ruckus Wireless’ Wi-Fi technology. It is enabled by Qualcomm’s Vive 802.11 AC Wave 4x4 Chipsets. They use a Qualcomm Snapdragon 600 processor and the Adreno 320 Graphic Processing unit. Qualcomm will provide maintenance for the rest of the service lives of the Kiosks and upgrade to the software is expected in 2022 (Shah, 2016). Qualcomm has provided some of the technologies for the Links, which are designed so the networking equipment, processor, tablet and other components can be regularly swapped out and upgraded (Shah, 2016).
London’s technology market worth GBP 19 billion is the largest in Europe and one of the largest in the world. It has over 40,000 digital businesses and 200,000 employees. The Smart London Plan was published in 2013 to leverage this market to improve the experience of London for everyone. Set within the overarching framework of the Mayor’s 2020 vision, the Smart London Plan looked forward to new approaches that digital technology can bring to support London’s future growth. The Plan was prepared by Smart London Board formed in 2013 under the Mayor of London. The Plan focused on actions that were to be undertaken between 2013 and the end of the Mayoral term in 2016.

The Smart London Plan leverages on London’s innovation lead to drive change with further investment in technology and data to offer Londoners better services; create efficient savings; and lead improvements in enterprise, skills and training, infrastructure and environment, health and well being and transport in London. The term ‘smart city’ means different things to different people. Smart London is about how London as a whole functions as a result of the interplay between its ‘systems’ - from local labour markets to financial markets, from local government to education, healthcare, transportation and utilities. The objective of the Plan was to create an ecosystem where the linkages between these different systems are better understood, where digital technology is used to better integrate these different systems, and London as a whole works more efficiently. The Smart London Venn diagram illustrates the starting approach of the Plan that put Londoners at the core - driven by the principles of openness, collaboration, innovation and engagement.

The Smart London Plan identified three opportunity areas for using innovations and advancements in digital technology.

- To engage citizens- by focussing on inclusive digital engagement and improving digital skills for all.
- To enable good growth- by building resilient digital infrastructure, making more data available and investing in innovation.
- To work with businesses- by breaking down boundaries, supporting common standards and smarter regulations, and scaling-up innovation.

Seven aims in of the Smart London Plan targeted these opportunity areas.

1. The Plan placed Londoner’s at the core by seeking citizen opinion of what a “Smart London” should look like, and deliver. Using digital and offline tools, the plan strategised citizen engagement that is inclusive.
2. The Plan promoted open data, such that relevant data on demand, consumption, services and operations is made available for public. The plan encouraged public and private organisations to open their data and aggregate data sets and sensors networks across London into a developer friendly platform.
3. The Plan encouraged the energy and talent in London to solve the city’s challenges by hosting Innovation Challenges, showcasing investment opportunities for global finance, and providing the necessary ecosystem for start-ups in the city to grow.
4. The Plan brought together the innovation ecosystem created by various organisations including university led activities, corporate led activity, not for profit, public bodies and others in the city for a strategic collaboration to create real efficiencies across London to scale up successful projects.
5. The Plan supported the use of data to identify and plan ‘opportunity areas’- localities and sectors for development. It supported digital solutions across city utilities such as water metering, solid waste management, traffic management, etc.
6. The Plan identified the need for the city authorities to work in an integrated manner by sharing data and analytics and identifying strategic opportunities for applying data and technology for efficiency.
7. The Plan harnessed digital technology to enhance the experience of London for all by investing in wireless networks and digital solutions such as journey planning, digital money etc.

The aims of the Plan was further enhanced with a set of milestones/ indicators to measure success. Some of these milestones/ indicators were measured at the end of the Mayoral term in 2016 and others, which will take longer to affect, measured later. The Smart London Plan was followed...
up with an update report - The Future of Smart in 2016, which provided the status of implementation of the strategies/activities within the seven aims of the Smart London Plan. This report shared the supporting data and statistics for the progress till 2016 in each of the activities within the seven aims of the 2013 Smart London Plan. The Smart London Plan positions itself in synergy with the Mayor’s vision 2020 and provides inputs to Mayor’s Infrastructure Plan 2050. Mayor’s technology programmes in London are guided by the Smart London Plan. The plan hence functions as a digital overlay to the ongoing and proposed interventions/projects in the city.
The National Smart City Mission was launched in June 2015. The centre allotted the total number of smart cities for each state on basis of various parameters, following which states nominated 98 cities in August 2015. This was later extended to 109 cities to include cities from all states, including state capitals. In the first year (round 1), 33 cities (Lighthouse + Fast track cities) were announced winners. In the second year (round 2), 27 cities were announced winners in October 2016. In the third round of the competition, 49 cities submitted their Smart City Proposals in March 2017. These proposals are being evaluated and winners will be announced soon.

The cities from round 1 (Lighthouse and Fast track cities) and round 2 are in their implementation stage now. Out of the 60 Smart Cities announced, 59 cities have formed their SPVs. The Smart Cities are also advancing in implementation with PMCs appointed in 28 cities. The round-wise breakup of the number of cities that formed SPVs and appointed PMCs are shown in table.

### TIMELINE FOR NATIONAL SMART CITIES CHALLENGE

<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
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<tbody>
<tr>
<td>JUNE 2015</td>
<td>National Smart Cities Mission Launch</td>
</tr>
<tr>
<td>AUGUST 2015</td>
<td>98 Cities Nominated for the Competition</td>
</tr>
<tr>
<td>AUGUST 2015</td>
<td>20 Winners Announced for Round 1</td>
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<tr>
<td>JANUARY 2016</td>
<td>Evaluation of the cities based on a pre-define criteria 23 fast track cities</td>
</tr>
<tr>
<td>MAY 2016</td>
<td>Winners announced for fast track round</td>
</tr>
<tr>
<td>MARCH 2017</td>
<td>Revised Submission of Smart City Proposal</td>
</tr>
<tr>
<td>AUGUST - NOVEMBER 2015</td>
<td>Smart City Proposal Preparation</td>
</tr>
<tr>
<td>Each city formulates its own unique vision, mission and plan for a ‘smart city’. Their concepts are meant to reflect the city’s local context, resources, and priorities of citizens. Each city develops a pan-city and area-based proposal based on the needs and aspiration identified in the citizen engagement process.</td>
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### FORMATION OF SPV

<table>
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<tr>
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<th>R2</th>
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<tbody>
<tr>
<td>Total Number of Winning Cities</td>
<td>60</td>
<td>20</td>
<td>13</td>
<td>27</td>
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<tr>
<td>Total Number of SPVs Formed</td>
<td>59</td>
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### APPOINTMENT OF PMC

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<tbody>
<tr>
<td>Total Number of Winning Cities</td>
<td>60</td>
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<td>27</td>
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<tr>
<td>Cities with PMC Appointed</td>
<td>28</td>
<td>19</td>
<td>03</td>
<td>06</td>
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Bibliography


Khosla, R. Addressing Gender Concerns in India’s Urban Renewal Mission. UNDP India.


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