The National Smart Cities Mission

Top Ranked Cities
- **Bhubaneswar**: A Comprehensive Strategic Plan
- **Pune**: Exemplar of Citizen Engagement
- **Jaipur**: Heritage Conservation for Economic and Social Development

Emerging Themes
- Financial Resource Management
- Integrated Mobility
- Sustainability: Climate Change and Air Quality
- Role of ICT: From Governance to Planning and Beyond

Game Changers
- Learning and Replicability
- Demand Driven Planning
- Convergence
- Special Purpose Vehicles

Smart City Corner
- **Conversation**: Comparison of Smart City Programs in India and the US
- **Innovation**: District Heating and District Cooling Systems in France

Data Sheet: Light House Cities
- Spatial Extent of Area Based Development: Lighthouse Cities

Glossary
The Smart Cities Mission of India has caught global attention with its scale as well as game changing interventions that redefine the planning practice in Indian cities. The mission aims to develop 100 smart cities in India over a period of 5 years. The Smart City Proposals of the 20 lighthouse cities that were selected in the first round are ‘lighthouses’ not only for the other 80 cities of the mission, but are examples of strategic planning exercise for cities across the world to see.

CIDCO Smart City Lab studied and analysed the Smart City Proposals (SCPs) of these 20 cities and has come out with the ‘Smart Cities Special Issue’ of its newsletter. This newsletter looks at the game changing interventions in the smart cities mission such as demand driven planning, learning and replicability, special purpose vehicle and convergence, and discusses them across the lighthouse cities. The newsletter also presents preliminary analyses of several emerging themes the SCPs focus on, which include integrated mobility, environmental sustainability, use of information and communication technology and financial resource management. Beyond the national smart cities mission, the newsletter in the section ‘smart city corner’, engages the readers in a comparison of the smart city programme in India and the US. This section also discusses latest technology used in France for sustainable district wide heating and cooling. Additionally the newsletter features snapshots of three top ranked cities of the first cycle of national smart cities mission- Bhubaneswar, Pune and Jaipur, with highlights of their SCPs that make them stand apart from the rest.

With contents that cover the expanse of the smart cities mission of India, this data rich newsletter is intended as a summary of the SCPs of the 20 lighthouse cities.
Smart Cities Challenge

OVERVIEW
The National Smart Cities Mission was launched by the Government of India in June 2015 with the aim of improving the quality of lives of citizens by transforming the areas of urban infrastructure planning and management through adoption of technology. The mission objective is unambiguous in its formulation as stated-

To drive economic growth and improve the quality of life of people by enabling local development and harnessing technology as a means to create smart outcomes for citizens.

The National Smart Cities Mission’s aim to develop 100 smart cities in India over a 5 year period 2015-2019 is underlined by multiple game changing interventions in the usual planning and implementation practices in India cities. These are-

Strategic Planning: A strategic approach to planning rather than the usual physical land use approach is advocated under this mission. It insists on cities to identify their strengths, weakness, opportunities and threats (SWOT); prepare suitable vision statements, make proposals and, implementation and financial plans for the same.

Convergence: The mission encourages cities to leverage their smart city proposals as natural convergence points for various other national initiatives, thus enabling an integrated approach to urban planning and a broader engagement with issues ranging from economic development (Make in India), adoption of digital technologies (Digital India) and housing (Pradhan Mantri Awaas Yojana) to urban infrastructure (AMRUT), heritage conservation (HRIDAY) and urban sanitation (Swachh Bharat Abhiyaan).

Collaborative Competition: The mission is a departure from various national missions as it establishes a competitive process for the cities to engage in. It sets a broader framework for the cities to strategically develop their smart city proposals and enables them to innovate depending on their institutional, administrative and financial capacities. This competitive method does not penalise the weaker cities, in fact, it allows for cities with varying capacities to engage in a larger pool of collaborative learning by ensuring a handholding process by the Ministry of Urban Development, Government of India for about a year before applying to the competition.

Demand Driven: The Smart Cities Mission puts a significant emphasis on stakeholder consultation, particularly involving citizens, businesses, academia, civil sector, media as important sources for needs assessment, project prioritisation and risk mitigation within the broader strategic planning process. This conscious top down effort to drive bottom up engagement was evident from the fact that the competition assigned 16% weightage to the citizen engagement process. The smart city proposal (SCP) mandates citizen engagement in three rounds - visioning the smart city, identifying area based development and pan-city solutions and during implementation of the area based development proposal and pan city solution. It provides the opportunity to use non-traditional information and communication technology (ICT) and social media technologies to reach a wider audience. It also allowed for wider concerns such as climate change, focus (or lack of) on non motorised transport, civic problem solving as priority areas that otherwise have not been incorporated in a top down approach to urban planning.

Special Purpose Vehicle: The special purpose vehicle (SPV) mechanism required by the mission is meant to facilitate the planning, implementation and resource management while quickening the process of learning, innovation and knowledge diffusion within the city agencies or ULBs (urban local bodies). The SPV is an integral part of the reform process for the ULBs to undertake tasks such as getting a credit rating, coordinating with other parastatal service providers such as

LIGHT HOUSE & FAST TRACK CITIES

Legend
- Fast Track Cities
- Light House Cities
state electricity boards, managing convergence of smart city projects with other missions and importantly monitoring and evaluating the city’s progress as a smart city. The SPV will be a Limited company incorporated under the Companies Act, 2013 and therefore expected to follow accounting and managerial practices.

**Learning and Replicability:** The mission by combining an area based component along with pan-city solutions facilitates generative learning that can be quickly scaled up for city wide replication. Three different options for area based development - retrofitting (500+) acres, redevelopment (50+ acres) and greenfield (250+ acres) allowed the cities sufficient options to tailor their area based approaches depending upon their SWOT, land availability, citizen preferences and financial capacity.

**PROGRESS**
Given this paradigm shift and the federal nature of urban management in India (urban planning and city management are a state subject), the selection of the cities was done in two stages.

Stage I of Smart Cities Mission was completed in August 2015 when 98 cities were identified and nominated by the states to compete for the mission funding. The states identified these cities based on service delivery levels, institutional capacities, the ability to self finance and the track record in undertaking JnNURM reforms. Once identified, these cities were consulted in collaborative workshops through the year to address their queries about requirements for the next stage and to expose them to global best practices of area based development approaches, citizen engagement, place making and financial planning.

Stage II had 97 cities submitting their smart city proposals for evaluation by a team of national and international experts. In this evaluation the city assessment and visioning exercise was given a 30% score, area based development took 55% and the remaining 15% was attributed to pan city solutions. The SCPs were evaluated also for the planning of financial resources and risk mitigation and an early list of 20 winners were declared in January 2016. Another 23 ‘fast-track’ cities were given an additional opportunity to improve their proposals and re-compete for the first year’s allocation. These 23 cities are currently revising their proposals and will submit them back to the competition by April 2016. The remaining cities will be improving their proposals for Year 2 of the competition.

The 20 lighthouse cities selected as the first winners of the mission are (1) Bhubaneswar, (2) Pune, (3) Jaipur, (4) Surat, (5) Kochi, (6) Ahmedabad, (7) Jabalpur, (8) Vishakapatnam, (9) Solapur, (10) Devanagere, (11) Indore, (12) New Delhi Municipal Council, (13) Coimbatore, (14) Kakinada, (15) Belagavi, (16) Udaipur, (17) Guwahati, (18) Chennai, (19) Ludhiana and (20) Bhopal. These cities are geographically spread across 12 states and have populations between 0.2 million and 5.5 million. The cities have proposed retrofitting and redevelopment based area development models and none have proposed greenfield development exclusively. The 20 cities have collectively proposed investments totalling Rs 48000 crores for developing smart areas over a period 2015-2019. Indore has the largest proposed plan of about Rs 5100 crores and Ludhiana has the lowest proposed investment of about Rs 1049 crores. The cities are now expected to begin the implementation of the plans after instituting the SPVs in their respective cities.

**Note:** $1 = ₹ 66.48
VISION

Through participatory decision-making, responsible governance and open access to information and technology the city’s vision is to create a transit oriented, livable city which is child-friendly and ecologically conscious. The proposal envisions a regional economic centre attracting knowledge based enterprises and sustainable tourism activities by leveraging and empowering its institutions, local businesses and informal workforce.

The City of Bhubaneswar replaced Cuttack as the capital of Odisha in 1948. Designed by Otto Königsberger in 1946, it was among the first planned cities of India. Located on the east coast of the Indian Subcontinent, it endowed with natural resources. It is known for its cultural festivals and heritage. With 27 protected monuments, it is known as the Temple city in India.

CITY SELF-ASSESSMENT

Population
8,40,834

Area
135 sq. km

Density
6228/sq.km

Literacy rate
91.89%

SCP Budget
4537 Crore INR

Gender Ratio
883

% of Slum Population
19.5%

Unemployment
4.27%
**STRATEGIC FOCUS**

- Focus on principals of new urbanism for sustainable development
- Transitioning from the traditional approach of spatial planning to the “three legged” approach adopted from Habitat III’s new urban agenda - legal systems, urban planning & local fiscal systems
- Integrated Land Use and Transport Planning, Infrastructure Planning, and Socio-Economic Planning
- 10 strategic directions covering the 5 pillars.

**AREA BASED PROPOSAL RETROFITTING**

3.9 sq. km (2.8% of city)
4095 Crores (90.2% of SCP budget)

**BUILD BASICS**
**SUB-PLAN**

**TOD SUB-PLAN**
**URBAN MOBILITY**
**SUB-PLAN**

**HOUSING FOR ALL**
**SUB-PLAN**

**SOCIAL**
**DEVELOPMENT**
**SUB-PLAN**

**ECO**
**NOMIC**
**DEVELOPMENT**
**SUB-PLAN**

**BASIC SERVICES**
**SUB-PLAN**

**TECHNOLOGY FOR ALL**
**SUB-PLAN**

**FUTURE PROOFING**
**SUB-PLAN**

**PAN CITY PROPOSAL**

442 Crore INR
9.7% of the Budget

- Traffic Management
- Parking Management
- Bus Service Operations
- Common Payment Card
- Emergency Response
- City Incidence Management & Command Control Centre

**BUDGET HIGHLIGHT**

Bhubaneswar will spend about 54,147 INR per capita. The largest source of funding for the proposal is Public Private Partnership, generating 2578 Crore INR.
Bhubaneswar’s Strategic plan is one of the most well laid out among the 20 light house cities. Its vision elements include participatory decision making, child friendly city, transit oriented city, responsible governance, open access to information and technology, Eco-city, livable city and regional economic center. Each of the vision element is derived from the strategic directions and leads to specific goals and catalyst projects.

The SCP recognizes the city’s significance in the ‘Golden Tourism Triangle’ and city’s bid for status as the world heritage city as a significant influence for the growth of tourism and economy. It highlights the availability of support from organizations such as ADB, World Bank, KFW and DFID. The SCP identifies benefits of location, natural resources, culture, history, the positive investment climate, high land ownership, innovative public service management and educational facilities in the implementation of the SCP. The city’s progress in enacting municipal finance innovations providing access to land value capture under CDP Land & Implementation Policy 2015 and approval of provision for levy of city infrastructure impact fee along with its strong regional economy and social equity will also have a significant impact of success of Bhubaneswar as a Smart City.

All of this is captured well in the city’s strategic and implementation plans. Projects are listed under sub-plans and their relationship with the vision elements is clearly mapped. The implementation plan presents the indicators associated with each of these projects for area based development and the different components of the pan city proposal. It also lists baseline, an expected end-date and resource requirement for each, giving a detailed picture of the proposal.

Bhubaneswar has proposed a “Bhubaneswar Town Center District” (BTCD), a 985 acres retrofit-redevelopment model, for the land around the main railway station in the heat of the city. It expects to make BTCD its signature intervention reflecting the city’s image. It is envisioned as a walkable, well connected, mixed use area built as a model low-carbon neutral development built using transportation and green infrastructure. It is expected to be a model for social equity through planning with children as the focus and an economic engine supporting the region’s knowledge industry along with a pro-business environment.

Bhubaneswar’s pan city proposal includes state-of-the-art Intelligent City Operations and Management Centre (iCoMC) is at the core. This centre will provide digital platform for integrating multiple city sub-systems of Traffic Management, Parking, Bus/Para-Transit Operations, Common Fare Card, Emergency Response and City Incident Management along with seamless integration of BTCD’s utility operations requirements. This 24X7 centre will deliver evidence based decision making and responsive operational control for real-time incident management, inter-agency and inter-sectoral collaboration, service delivery improvements. iCoMC will result in safe mobility, responsive city operations and management along with optimization of capital expenditures by providing real time data support.

All of this is captured well in the city’s strategic and implementation plans. Projects are listed under sub-plans and their relationship with the vision elements is clearly mapped. The implementation plan presents the indicators associated with each of these projects for area based development and the different components of the pan city proposal. It also lists baseline, an expected end-date and resource requirement for each, giving a detailed picture of the proposal.
## MEASURABLE IMPACT

### AREA BASED PROPOSAL

#### SOCIAL
- Livelihood
- Willingness to pay
- Public health & hygiene
- Safety & mobility
- Access to housing
- Digital divide
- Women empowerment
- Social cohesion

#### GOVERNANCE
- Public service delivery
- Transparency in governance
- Accountability
- Public discourse
- Interdepartmental coordination
- T&D Losses
- Community based organization
- Evidence based planning

#### SPATIAL
- Uptake of public services
- Use of public realm
- Job & housing access
- Redevelopment of public lands
- Use of streets by pedestrians
- Livelihood linkages
- Urban sprawl
- Landfills
- Form of the city

#### ENVIRONMENTAL
- Air & water quality
- Congestion and emissions
- Waste generation
- Use of energy
- Carbon footprint
- Agricultural lands & natural landscapes
- Disaster management systems
- Infrastructure lifecycle & social equity

#### ECONOMIC
- Employability
- Disposable incomes
- Economic activity
- Job creation
- Property value & tax revenue
- Asset base for the marginalized
- Ease of doing business
- Innovation in business
- Reliability on transit
- Loss of man hours

### PAN CITY PROPOSAL

#### PUBLIC SERVICES
- Transport
- Parking
- Mode share
- Road safety
- Response to emergencies
- Air quality
- Use of public transport
- Women’s safety
- Incident management
- Tourist experience
- User- interface for service delivery

#### GOVERNANCE
- Transparency in governance
- Accountability
- Interoperability between agencies
- Productivity
- Operational controls
- Transit revenue loss capture
- Asset management through data driven decision making
PUNE
Exemplar of Citizen Engagement

Pune is the 9th most populous city in India and the second largest in the state of Maharashtra. It was once the base of the peshwas (prime ministers) of the Maratha Empire. Called the Oxford of the east, Pune is an educational hub. The city is also known for its manufacturing and automobile industries, as well as for research institutes of information technology (IT).

VISION
Leveraging its rich cultural and natural heritage, strong human capital and strong business environment as key strengths, the city aspires to become one of the most liveable cities in India by solving its core infrastructure issues in a "future-proof" way, and by making its neighbourhoods beautiful, clean, green and liveable.

CITY SELF-ASSESSMENT

<table>
<thead>
<tr>
<th>Citizen Participation</th>
<th>Housing and Inclusiveness</th>
<th>Underground Electric Wiring</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identity and Culture</td>
<td>Transportation and Mobility</td>
<td>Sanitation</td>
</tr>
<tr>
<td>Economy and Employment</td>
<td>Walkable</td>
<td>Waste Management</td>
</tr>
<tr>
<td>Education</td>
<td>IT Connectivity</td>
<td>Water Management</td>
</tr>
<tr>
<td>Health</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety and Security</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mixed Use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compactness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Open Spaces</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Population
31,24,458

Area
276.4 sq. km

Density
11304/sq.km

Literacy rate
89.56 %

SCP Budget
2380 Crore INR

Gender Ratio
899

% of Slum Population
22.10 %

Unemployment
3.29 %
STRATEGIC FOCUS

• Solve issues and future-proof core infrastructure
• Leverage multiple sources of funding
• Make a liveable city
• Create sufficient high end jobs
• Make a beautiful and attractive city

AREA BASED PROPOSAL RETROFITTING
3.6 sq. km (1.3% of city)
1850 Crore (77.7% Approx of SCP budget)

• Electric Buses
• Roads and Junction Redesign
• Non-motorised Streets
• E-rickshaws
• Waste Water Recycling
• Rain Water Harvesting
• Root Zone to Clean Water
• Solid Waste Management
• Solar Energy
• Street Lighting
• Surveillance
• Riverfront Development
• Open Spaces
• Fire Stations
• Skill Development and Healthcare
• Affordable Housing
• E-gov
• IT Connectivity
• Transit Hub
• Start Up Zone

PAN CITY PROPOSAL
270 Crore
11.34% Approx of SCP budget

• Adaptive Traffic Control Systems
• Bus System iTMS
• Smart Parking
• Intelligent Road Management
• E-Challan
• Citilogik Solution
• Bulk, Commercial and Domestic Smart Water Meters
• Helium Leak Identification
• STP Energy Generation
• Customer Mapping and Survey
• Mobile App and Website
• Online Bill Payment
• Consultancy Services
• Consumer Awareness
Pune engaged in one of the largest citizen engagement exercises in the country. The entire administrative machinery along with an ecosystem of the media, NGOs and private companies reached out to over 4 lakh households, i.e., about 50 percent of Pune’s total households. This was done in a true pan-city manner, covering all 15 wards across the city in a door-to-door campaign by “smart volunteers”. The smart volunteers were supported by a team of 400 members across the public and private sectors. More than 35 lakh inputs were received from the citizens across the city in addition to significant citizen involvement through the internet and social media.

**HIGHLIGHTS**

Pune engaged in one of the largest citizen engagement exercises in the country. The entire administrative machinery along with an ecosystem of the media, NGOs and private companies reached out to over 4 lakh households, i.e., about 50 percent of Pune’s total households. This was done in a true pan-city manner, covering all 15 wards across the city in a door-to-door campaign by “smart volunteers”. The smart volunteers were supported by a team of 400 members across the public and private sectors. More than 35 lakh inputs were received from the citizens across the city in addition to significant citizen involvement through the internet and social media.

**PROJECT OVERVIEW**

Citizen engagement values the right of citizens to have an informed say in the decisions that affect their lives. A sound citizen engagement can not only create ownership of plan, but also deliver a long term benefit of increased sense of responsibility and understanding for complex issues among citizens. Pune prepared a truly demand driven SCP with involvement of citizens in all stages- identifying thematic areas, identifying issues within thematic areas and developing solutions to the issues. These solutions were revisited by representatives, experts and citizens and the final proposals were shared with citizens for approval before submission. Pune’s citizen engagement followed a structured 5-phase approach for visioning exercise and development of pan city proposal and a 4-phase approach for development of area based proposal. These approaches were designed to engage maximum number of citizens efficiently within the short time frame. With its “Five-S” principle-speed, scale, structure, solutioning and social audit, Pune carried out one the most comprehensive exercises, touching almost all dimensions of citizen engagement. The overall activity was managed by five cells in a 24x7 war room. Each of these five cells supervised and conducted campaign management, response management, analytics, creative management and documentation management respectively. This reveals the deliberate attempt to involve citizens while also ensuring incorporation of citizen inputs. Pune identified themselves in advanced scenario (scenario 4) of citizen engagement in self assessment. The engagement process conducted towards preparing SCP reveals that Pune is indeed advanced in citizen engagement. The city is also proposing projects towards institutionalising citizen engagement to make sure that this does not end with SCP but is carried forward in the city. It is seen that Pune has not been very successful in inclusion of different sections in the city. Deliberate attempts may have been undertaken considering the effort across other aspects of citizen engagement; but the city has failed to represent it in their SCP.

**MODES**

**FACE-TO FACE:**
1. Door-to-door visits
2. Camps at institutions and slums
3. Crowd sourcing at Ganesh Chaturthi festival

**DIGITAL AND ONLINE:**
1. Pune smart city web portal
2. E-seva kendras and ward offices
3. Computer labs in schools open to public,
4. Social media

**COMPETITIONS:**
1. Essays
2. Logo
3. Mascot design
4. Area development competition in architecture schools
5. Digital Hackathon and Appathon in engineering colleges
6. Smart family and smart citizen initiatives

**PUBLICITY AND ADVERTISING:**
1. Hoardings
2. Banners
3. Interviews
4. Gallery walk in war room
5. Print and electronic media ads

**BUDGET HIGHLIGHT**

Pune has identified funds to the tune of 179% of its SCP budget. With a major part raised through land monetisation and improvements in revenue collection, Pune lacks diversity in its funding plan. Pune, with its good credit rating, has rightly proposed loans if necessary. The city proposes to pay back loans, if taken, through its own sources mobilisation plan.
MEASURABLE IMPACT

AREA BASED PROPOSAL

SOCIAL
- Schools
- Hospitals
- Fire station
- Slum free area

GOVERNANCE
- Citizen services
- Connected community
- Service delivery

SPATIAL
- Public spaces

ENVIRONMENTAL
- LED lighting
- Green buildings
- Non-motorised transport
- Water recycling
- Renewable energy

ECONOMIC
- Job creation
- Productivity

PAN CITY PROPOSAL

PUBLIC SERVICES
- Reliability and safety of public transport
- Efficiency and customer satisfaction in water services

GOVERNANCE
- Transport asset management
- Management of water based on accurate consumption
JAIPUR
Heritage Conservation for Economic and Social Development

Jaipur is the capital and largest city of Rajasthan. It was developed as a planned city in 1727 by Maharaja Jai Singh II, the ruler of Amer after whom the city is named. Known as the Pink City, Jaipur is the second most visited city in India by international tourists.

VISION
Jaipur Smart City aspires to leverage its heritage and tourism, and through innovative and inclusive solutions, enhance the quality of life for its citizens.

CITY SELF-ASSESSMENT

- Population: 30,46,163
- Area: 484.64 sq. km
- Density: 6285/sq.km
- Literacy rate: 83.33%
- SCP Budget: 2386 Crore INR
- Gender Ratio: 898
- % of Slum Population: 10.62%
- Unemployment: 4.09%
Jaipur’s smart city proposal is a heritage conservation plan which is expected to boost the city’s economy. The walled city has been selected for Jaipur’s area based proposal (ABP). It lends the city a unique character and is struggling with issues such as solid waste management and mobility.

Jaipur is a popular international tourist destination. Studies show that the average stay of international tourists in the city is 2.8 days. The area based proposal looks to tap into the potential for growth in this sector. It has a long term goal of economic progress through heritage conservation and improved quality of life which lead to an increase in tourism and eventually the city’s GDP. A three pronged approach is proposed to increase the average duration of an international tourists’ stay in the city from 2.8 to 3.5 days. It is expected to result in an increase in spending per tourist and increase in the contribution of tourism to city’s GDP from 13.68 % to 15%. The three parts of this are - Jaipur at night, Adaptive reuse and Heritage walks.

### STRATEGIC FOCUS
- Smart multi-modal mobility
- Smart solid waste management
- Smart heritage and tourism precinct
- Smart and sustainable civic infrastructure
- Overall development of city on fronts of sustainability and governance

### AREA BASED PROPOSAL RETROFITTING
2.4 sq. km (0.5% of city)
1537 Crores (64.39 % of SCP budget)

- Road and pedestrian infrastructure
- Carriageway improvements
- Public Bike share
- Intelligent IPT
- Multi-modal integration
- Intelligent traffic systems
- Intelligent parking
- Adaptive reuse of heritage structures
- Lake redevelopment
- Eco-friendly cool corridor
- Heritage walks
- Kiosks at heritage sights

- Façade improvement
- Night market
- Storm water reuse
- Water recycling
- Rain water harvesting
- Smart toilets
- Smart meters for water
- Water quality monitoring
- Wi-Fi network
- Air quality monitoring
- CCTV surveillance
- Incident alert apps
- Solar energy

### PAN CITY PROPOSAL
849 Crore INR
35.5 % of the Budget

- Common ticketing system
- Scheduling, depot management and maintenance systems for public buses
- Fleet management system
- Public transit information portal
- Journey planning apps
- PRTS
- Smart solid waste management
- C & D
- Waste to energy
- Fleet management for trucks

### HIGHLIGHTS
Jaipur’s smart city proposal is a heritage conservation plan which is expected to boost the city’s economy. The walled city has been selected for Jaipur’s area based proposal (ABP). It lends the city a unique character and is struggling with issues such as solid waste management and mobility.

Jaipur is a popular international tourist destination. Studies show that the average stay of international tourists in the city is 2.8 days. The area based proposal looks to tap into the potential for growth in this sector. It has a long term goal of economic progress through heritage conservation and improved quality of life which lead to an increase in tourism and eventually the city’s GDP. A three pronged approach is proposed to increase the average duration of an international tourists’ stay in the city from 2.8 to 3.5 days. It is expected to result in an increase in spending per tourist and increase in the contribution of tourism to city’s GDP from 13.68 % to 15%. The three parts of this are - Jaipur at night, Adaptive reuse and Heritage walks.

### BUDGET HIGHLIGHT
Jaipur has identified diverse sources to raise amounts to meet the SCP budget but it lacks clarity since amounts from some sources are not identified in the SCP. For instance, Commercial borrowing as well as loan from NCRPB is identified as a funding source but the loan amounts are missing in the SCP. Funding amounting to 71.74% of SCP budget is available in the SCP.
ADAPTIVE REUSE: Implementation of adaptive reuse as a city wide strategy for an area as large as the walled city of Jaipur is first of its kind in India. The walled city is the oldest and most beautiful part of Jaipur city, but it also has several dilapidated and under utilised buildings. The ABP proposes adaptive reuse of 2300 sq. m built up area of dilapidated buildings. In addition to creating assets, adaptive reuse is also sustainable as an alternative to traditional demolition and reconstruction which is energy intensive and generates unmanageable amount of waste. The city has prepared the structure of an adaptive reuse cell under the smart city SPV. With technical resource persons, including conservation architects, civil engineers, marketing and financial experts, this cell under the SPV is formed to facilitate conservation and marketing support and to partner with the building and land owners. Four buildings are clearly identified for adaptive reuse- Old police headquarters, Old town hall, Rajasthan school of arts and buildings at Jaleb chowk. In addition to these, other heritage buildings under public/private ownership are also proposed for inclusion under the scheme. Conservation support and partnership are offered to the owners to convert the dilapidated havelis and other buildings to tourist friendly economic drivers such as home stays, eateries, spas etc which will be promoted within the tourist circuits.

Adaptive reuse together with 'Jaipur at night' and heritage walks, is expected to improve the economy of the city. ICT enabled solutions that facilitate tourists as well as the residents of Jaipur will enhance the quality of life in the city. It is expected that together, all the projects in the walled city will create significant improvement across all facets, bringing about an increase in GDP, employment opportunities, heritage conservation, and local economic development.
MEASURABLE IMPACT

AREA BASED PROPOSAL

SOCIAL
- Prevention of accidents
- NMT for EWS
- Inclusion of street vendors
- Safety
- Social status

GOVERNANCE
- Increase in revenue
- Reduce approval time
- Integrated response from city administration
- Integrated transport operations

SPATIAL
- Create sites for performing arts
- Tourism zones and markets of international standards
- Reduce visual clutter
- Open spaces
- Streetscape improvement
- Reduce encroachment of road space

ENVIRONMENTAL
- Carbon savings
- Fuel saving
- Less energy and waste
- Renewable energy
- Resource efficient

ECONOMIC
- Savings in fuel
- New retail area
- Night market
- Employment opportunity in training of tourist guides
- Vending zones
- Savings from efficient resource management

Old Police Headquarters as Jaipur habitat centre and tourist interpretation centre (11,404 sq.m)
Old Town Hall as City museum and cultural performance area (8,200 sq. m)
Rajasthan School of Arts as Training school for tourist guides and tour operators (3,500 sq. m)
Buildings in Jaleb Chowk as Global arts square including arts and handicraft karkhanas, art gallery, retails shops and restaurants

PAN CITY PROPOSAL

PUBLIC SERVICES
- Improved use of public transportation
- Collection and disposal of waste

GOVERNANCE
- Public transportation
- Management of waste
Learning and Replicability
Through Area Based & Pan City Proposals

“The strategic components of Smart Cities Mission are city improvement (retrofitting), city renewal (redevelopment) and city extension (greenfield development) plus a pan-city initiative in which Smart Solutions are applied covering larger parts of the city. The focus is on sustainable and inclusive development and the idea is to look at compact areas, create a replicable model which will act like a lighthouse to other aspiring cities. It is meant to set examples that can be replicated both within and outside the Smart City.”
- Smart City Guidelines

The Smart City Proposal (SCP) is a document built upon a bold vision that reflects a city’s local context, resources and aspirations of its citizens. It includes a pan city proposal (PCP) and an area based proposal (ABP), along with the strategy for its implementation and finance. The ABP and PCP are based on the city’s SWOT analysis, citizens’ aspirations and other parameters of the city. The ABP proposes solutions for a specific area of the city, creating an example for others within the city and beyond to follow and adopt. The PCP majorly includes ICT enabled solutions which would touch the lives of many or potentially all citizens.

AREA BASED PROPOSAL
In case of the Area Based Proposal, the cities identify a developed area for urban transformation or a new un-developed area to build on in order to accommodate its expanding population. While the developed areas are retrofitted or redeveloped to improve service delivery and quality of life, the new areas are built up from scratch with the purpose of creating a sustainable greenfield development.

Even though a particular model has not been prescribed, it is expected that the cities in their SCPs will include all or most of the smart city features listed. In the SCP’s of the twenty lighthouse cities, retrofitting and redevelopment are the major ABP strategies. Fifteen out of the twenty cities have identified retrofitting as the model for their ABP. Four cities have combined retrofitting and redevelopment in their ABP. One city is engaging in complete redevelopment of area in ABP. ABPs across the twenty cities vary in size, model and investment, but many themes are repeated across these cities.

Open Space Management
Open space management is the most repeated theme in the ABPs of the twenty lighthouse cities. Realising threats of growing pollution and degrading quality of life, eighteen cities have proposed creating quality open spaces by rejuvenating existing parks, building new parks, connecting open spaces, developing green and eco-corridors etc. Ahmedabad, Belagavi, Bhopal, Bhubaneswar, Chennai, Coimbatore, Devanagere, Guwahati, Indore, Jabalpur, Jaipur, Kakinada, Kochi, Pune, Solapur, Surat, Udaipur and Visakhapatnam are engaging in open space management at different scales of different kinds.

Lake and river precinct development is another popular theme within the lighthouse cities. Fourteen cities - including Belagavi, Bhopal, Bhubaneswar, Coimbatore, Guwahati, Indore, Jabalpur, Jaipur, Kakinada, Kochi, Pune, Solapur, Surat and Udaipur - have identified urban water bodies as strategic areas of interest in their proposals. Revitalisation of water bodies and water front development are the most common among these

### NUMBER OF ABD PROJECTS ACROSS VARIOUS THEMES

<table>
<thead>
<tr>
<th>Key Component</th>
<th>Ahmedabad</th>
<th>Belagavi</th>
<th>Bhopal</th>
<th>Bhubaneswar</th>
<th>Chennai</th>
<th>Coimbatore</th>
<th>Devanagere</th>
<th>Guwahati</th>
<th>Indore</th>
<th>Jabalpur</th>
<th>Jaipur</th>
<th>Kakinada</th>
<th>Kochi</th>
<th>Lucknow</th>
<th>NDMC</th>
<th>Pune</th>
<th>Solapur</th>
<th>Surat</th>
<th>Udaipur</th>
<th>Visakhapatnam</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open Space Management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lake and River Precinct Development</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Affordable Housing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heritage Area Development</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CBD and Market Rejuvenation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Grand Total**: 18
- **Lake and River Precinct Development**: 14
- **Affordable Housing**: 13
- **Heritage Area Development**: 8
- **CBD and Market Rejuvenation**: 6
proposals. Guwahati’s complete ABP focuses on the rivers in the city so as to manage flood risk and to develop the areas adjacent to the rivers as major economic drivers.

Additionally, Chennai, Vishakhapatnam and Kakinada are looking at various interventions along the coastline for early warning systems and flood management.

**Affordable Housing**
Affordable housing is another recurrent theme among the ABPs of the lighthouse cities. Thirteen out of the twenty cities proposed construction of affordable housing units either as slum redevelopment or as housing for economically weaker section (EWS). Ahmedabad, Belagavi, Bhopal, Bhubaneswar, Coimbatore, Devanagere, Indore, Jabalpur, Kakinada, Kochi, Pune, Surat and Visakhapatnam are the cities who have proposed affordable housing. To make provide housing at affordable prices for the increasing number of the homeless people, the city Bhopal and Bhubaneswar propose construction of rental public housing and rental housing for construction workers with construction of market rate units.

**Heritage Area Development**
Yet another area of interest in the ABPs is heritage area development. Eight cities - including Belagavi, Devanagere, Indore, Jaipur, Kochi, NDMC, Solapur and Udaipur - with rich heritage propose to revitalize their historical heritage areas through various interventions such as development of heritage park, heritage block development, conservation of built heritage, heritage and tourism master plan, adaptive re-use of buildings, rejuvenation of historical area and architectural restoration of urban fabric.

**Central Business District and Market Area Rejuvenation**
As much as the plans are about improving quality of life, they also focus on improving the economy of the city. Six cities have proposed to engage in economic development for the city through revamp of existing industries, retrofit of old industrial units, upgradation of markets, open markets and retrofit of CBD. Belagavi, Bhubaneswar, Devanagere, Kakinada, Kochi and NDMC are the cities working on this. They look at markets and CBDs as areas of strategic intervention.

**Other Major Proposals**
Almost all the cities have proposed smart interventions for transportation, water and energy. In addition, some cities have unique proposals such as museums, mega projects like convention centre, sports complex and stadiums, incubation and business development centres and many more. Sustainability practices and green city initiatives such as smart LED street lighting, rain water harvesting, renewable energy initiatives, smart water and waste water management, integrated solid waste management and sanitation, pedestrian and bicycle infrastructure and non motorised streets are other major arenas of intervention in the ABPs of the lighthouse cities.

**PAN CITY PROPOSAL**
Pan-city development envisages application of selected Smart Solutions to the existing city-wide infrastructure. Application of Smart Solutions involves the use of technology, information and data to make infrastructure and services better. The lighthouse cities have proposed various pan city projects for different strategic areas in their smart city plans.

**ITS and Urban Mobility**
Cities are looking towards better quality of life by improving their urban mobility scenario through intelligent traffic and transportation systems (ITS) and improving reliability of public transportation. Twelve cities - including Ahmedabad, Belagavi, Bhubaneswar, Chennai, Devanagere, Guwahati, Indore, Jaipur, Ludhiana, Pune, Surat and Udaipur - have proposed various city wide projects following this theme. They include smart signalling, fleet management, GPS tracking, smart bus shelters, smart buses, traffic mobile apps, public transit and traffic operation systems, etc.

**e-Gov Services**
For improving government to citizen (G2C) services, ten cities- Belagavi, Bhopal, Devanagere, Kakinada, Kochi, NDMC, Solapur, Surat, Udaipur and Vishakapatnam - have proposed projects such as city dashboards, ICT and social media based two way communication platforms, city websites, app and call centres and GIS based mapping of utilities towards information dissemination and engagement with citizens.

**Smart Water and Sewerage Management**
Sustainable practices such as smart metering, water audits, water reuse and online water quality monitoring are proposed for improving water networks. Environment friendly
treatment and disposal methods of sewerage and reuse of treated water is proposed in ten cities: Belagavi, Chennai, Devanagere, Guwahati, Kochi, NDMC, Pune, Solapur, Udaipur and Vishakapatnam.

Command and Control Centre
Cities have recognised the need for integrated management of city services and this is reflected with six cities proposing control and command centre as one of their PCPs. These cities are Ahmedabad, Belagavi, Bhubaneswar, Indore, Jabalpur and Ludhiana. The proposed centres will act as the control rooms for operation and management of various urban systems such as traffic signals, water supply, power networks, communication channels etc. Additionally these centres in some cities function towards grievance redressal by registering complaints from citizens.

Smart Energy Management
Six cities - Belagavi, Bhopal, Coimbatore, Devanagere, NDMC and Udaipur - propose sustainable practices in energy for the whole city mostly through the use of renewable energy, intelligent LED street lighting and conversion of CFL to LED lights in household.

Smart Solid Waste management
Integrated solid waste management involving 100% waste segregation, GPS tracking and RFID tags on trucks, geo-fencing of waste bins, environment friendly treatment methods and waste to energy plants are proposed in five cities - Bhopal, Indore, Jabalpur, Jaipur and Kakinada.

Other Major Proposals
PCP’s also includes city wide surveillance using CCTV cameras to monitor safety, disaster management using early warning systems, incident response system, smart education and health, m-government services and several other projects which use ICT as a tool to improve the quality of life.
Citizen engagement values the right of a citizen to have an informed say in the decisions that affect their lives. It requires governments to share in agenda-setting and to ensure that policy proposals generated jointly will be taken into account in reaching a final decision. (OECD, 2001). The Smart Cities Mission has identified citizen engagement as an important activity within the strategic planning process. The mission has institutionalised it by making it mandatory and giving it 16% weightage in the scoring criteria for the selection of a city in Stage II of the challenge.

The strategies of citizen engagement vary largely based on local context. Among the twenty lighthouse cities, there are some which excelled in almost all aspects of citizen engagement, while others which have failed in some. Bhubaneswar and Pune are the two cities which carried out comprehensive citizen engagement throughout the preparation of their Smart City Proposals (SCP). Though the other eighteen cities could not match these two, there are aspects worth mentioning, which although may seem trivial, had a great impact, on the SCPs of cities. The inclusion strategy of Solapur, locally relevant means of sensitising citizens in Jabalpur, comprehensive use of MyGov platform in Udaipur are few of the noteworthy citizen engagement efforts.

I. THEORETICAL ASSESSMENT OF CITIZEN ENGAGEMENT IN SMART CITIES CHALLENGE

Citizen engagement in the smart cities challenge is assessed in three parts - self assessment of cities, preparation of SCP and future scenario of citizen engagement with the implementation of the SCP. In self assessment, the cities assessed the ongoing citizen engagement by identifying themselves in one of the four scenarios defined in the Smart City guidelines. Indicators of the ongoing citizen engagement were sought by means of the key performance indicators assessed listed under administrative efficiency of the city. The four scenarios as discussed in the guidelines are- scenario 1, called the ‘base’ and scenario 4, called the ‘advanced’. Four out of twenty cities identified themselves in the advanced scenario. Pune and Belagavi stands out in self assessment since they supported their claim in scenario 4 and scenario 3 respectively with various methods which the city has engaged and is still engaging its citizens with.

For preparing the SCP, the guideline mandates citizen engagement in three rounds. These are- in visioning the smart city, in identifying area based development and pan city solutions, and in implementation of the area based development proposal and pan city solution. It is required that the right method of engagement be deployed at the right time for the right people to harness the full benefit of citizen engagement in any smart city. The three rounds are defined by MoUD as-

- Round 1 includes profiling the city and defining its vision, determining city goals, identifying area based developments and pan city solution.
- Round 2 includes providing feedback on the pan city and area based proposals and their development through multiple iteration.
- Round 3 includes finalisation of the smart city proposal for the city in the proposal format.

While most of the cities adhered to the framework prescribed by SCP, some cities followed internationally accepted frameworks and some cities developed their own frameworks to bring out the best citizen engagement from their cities. International Association for Public Participation’s (IAP2) five stage framework was followed in Bhubaneswar. Pune developed its own strategy which included a 5-stage structured approach for pan city proposal and a 4-stage structured approach for area based development.

The cities during the exercise of self assessment also identified...
the level of citizen engagement they aspire to achieve after implementation of the SCP. This depends to a large degree on the citizen centric initiatives in the SCP. The ultimate aim of citizen engagement, explained as scenario 4 under self assessment of citizen engagement, is ‘to constantly conduct citizen engagement with people at each ward level to incorporate their views, and these shape priorities and development projects in the city. Multiple means of communication and getting feedback, both offline and online are to be utilised. The effectiveness of city governance and service delivery has to be constantly enhanced on the basis of feedback from citizens.’ All the cities aim towards achieving scenario 4 of citizen engagement after implementation of the SCP.

Guwahati shows clear intentions to engage citizens continuously in the implementation of the SCP as well. The city plans to undertake similar initiatives at stages of the detail proposal development as well as for future projects in the city.

II. PROCESS OF CITIZEN ENGAGEMENT IN PREPARATION OF SCP

The process of citizen engagement is guided by the three round framework in which cities are asked to engage citizens in visioning exercise for the city, collaborate with citizens in preparing the area based and pan city proposal and inform citizens of the final smart city plan. The score assigned to each activity in citizen engagement reveals the scope of engagement within the activity to the cities. 16 points out of 100 are assigned for citizen engagement, with 10 points in developing the city’s vision and the strategic plan, 5 points in developing proposal for the area based development and 1 point in developing proposal for the pan city solution.

Insights from various rounds of citizen engagement

1. City Visioning

With the maximum score being devoted to development of the city vision, cities underwent wide and intense engagement in this process. It involved creating an interest among citizens and engaging them so as to identify their aspirations which can define the city’s goals. The vision thus developed for the city is a result of many factors including an understanding of the strengths, weakness, opportunities and threats (SWOT) of the city, but most significantly it is the citizens aspiration for their city. The process of citizen engagement for development of the city vision involves three steps- informing citizens, engaging citizens and incorporating citizen aspirations.

Towards informing citizens, use of print media, in the form of advertisements in newspaper, and electronic ads on TV was conducted by all cities. City level talks by Mayors, Commissioners, Ministers etc. were delivered as TV interviews, live shows and radio talk shows to make citizens aware of the importance of their participation and to educate them about the means through which they can engage in the process. The outreach strategy was assessed in the SCP format. Solapur explained the smart city guidelines on all the engagement platforms to create a sense of ownership among the citizens and to foster responsible citizen engagement. The city further educated the entire staff strength of city administration and directed them to spread the positive aspects of the Smart City Mission among the citizens with whom they interact on daily basis.

Following the creation of the buzz around the smart cities mission, cities engaged citizens to identify their aspirations for the city. Most of the cities created online and offline platforms where citizens were invited to identify priority sectors. This was done both in an open ended manner, through several competitions and discussions, as well as in a close ended format by seeking citizens’ priorities from a set of predefined options identified by cities based on expert opinion. Different cities deployed different methods to capture the true essence of its citizens. Understanding the diversity of the population in the city, Kakinada Municipal Corporation (KMC) with the support of local MLAs formed three teams to effectively reach out to the maximum number of citizens. The first
team handled offline outward face of engagement through direct interactions with various groups across the city in the form of focus groups, interviews, and coordinated with media and also conducted several competitions and surveys. The second team handled the online outward face with ICT based citizen connect programmes. The third team called the ‘Janmabhoomi’ committees comprised of 5-6 local residents from each ward. These committees adopted method of participatory micro planning for incorporating smart proposals by meeting and interacting with citizens.

Citizens’ opinion were gathered from the engagement exercise in form of votes, rankings, survey forms, written submissions, drawings, essays etc. These aspiration were discussed with experts and other relevant stakeholders and analysed to develop the vision for the city. City visions are a manifestation of citizen aspirations. Coimbatore followed a structured approach to incorporate citizens’ inputs. It ensured a good mix of both participatory and representative decision making with its three-pronged approach.

i. Review of all crowd-sourced inputs for specific ideas and suggestions along with a key-word search to distil priorities,

ii. Identification of top vision themes and perceived performance on services through the citizen pulse poll

iii. Brainstorming with core group and city officials to crystallise vision, incorporating these inputs. Based on these three steps, the city obtained top vision themes and performance of services in the city. The priority themes from citizen pulse poll were comprehensively reflected in the vision statement and in the strategic focus areas.

2. Identifying Area Based and Pan City Proposal

Citizen engagement in area based proposal is given more weightage compared to the pan city proposal considering the challenge of seeking opinion of maximum citizens for development of one area in the city. The challenge was identifying area which creates maximum impact either in terms of population directly influenced, scope of replicability, addressal of critical issues of the city or any such parameter which makes the selected area the best choice for transformation to a smart area. Pan city solutions were more or less identified based on the city’s visioning exercise and hence given less weightage.

Area Based Development: City vision guided the overall proposals in area based development too. Cities proposed to encompass maximum number of the essential features defined by smart city guidelines in their area based development. With some clarity on proposals from the essential features and the city vision, the challenge here was the selection of the right area and right model of development. While some cities sought direct citizen opinion in identifying the model and some other cities identified the model of development based on expert opinions, all the cities involved citizens directly in selecting the area for area based proposal. This was done in a close ended format after cities identified a list of potential areas. The involvement in some cities were limited to simple votes which citizens cast for areas based on their own understanding, some other cities took great care to make citizens take informed decisions by putting forth scenarios of each of the selected to citizens. Kochi predefined a four stage methodology for identifying the area development proposal. The stages were, Stage 1 – City profiling and citizen consultations, Stage 2 – Reconnaissance survey, Stage 3 – Identification of options for ABP and Stage 4 – Selection of the area. Three options were provided by the council based on extensive city profiling exercise. The final selection was based on multiple criteria's which include alignment with Citizen Priorities and City Vision (20%), Considerable Economic and livelihood impact (15%), Inclusiveness (15%), Maximum impact w.r.t number of beneficiaries (20%), Innovative and building on the unique strengths of the city ( 15%) and Readiness of plan/ projects (15%), along with citizens choice from the options for area for ABP.

While vision statements is defined as the overall strategy of SCP, area based proposal is the manifestation of the vision in form of projects in the selected area of the city. As mentioned earlier, the challenge in citizen engagement for the area based development was the selection of the area. Considering the possibility of all citizens choosing areas of their residence for area based development, cities engaged in multiple layers of

AHMADABAD’S CITIZEN CENTRIC PROJECTS IN AREA BASED DEVELOPMENT

- Affordable housing & Slum rehabilitation
- Water, Sewerage & Drainage Services
- Better Traffic & Parking Management
- Ready Access to Public Transport- BRTS & AMTS
- Efficient Healthcare
- Better Education Facilities - Smart Learning
- Safety & Surveillance - CCTV Coverage, Safe Roads, Central Center
- Core Infrastructure Delivery & City-wide Civic Services
- Connected Civic Centers - Points of Service Delivery
- Civic Services across online & mobile platforms
- Common Payment Platform across transport services
- Walkable Spaces & Widened Public spaces
- Faster Approvals for Businesses
- Faster Building Plan Approvals
- Green Energy
engagement to select the area. It included indirect engagement through discussion with stakeholders, urban planners, experts across various sectors and citizen representatives in addition to direct engagement with citizens. The area thus selected is found to be suitable to be transformed to a smart area for its replicability, impact, ease of execution in addition to citizens aspirations. Ahmedabad took care to incorporate the opinions of citizens in identifying projects within ABD in addition to selection of area for ABD. Based on the citizen interactions and development plan, the area was selected from four options. The projects in the area were chosen based on interactions with slum dwellers and NGOs in addition to other citizens. Elected representatives identified poverty alleviation, eradication of open defecation, improving health conditions and providing better education facilities as concerns of highest priority. The identified project in ABD targets the multiple issues of accessibility, public transit and solution of traffic issues in key parts of the city through transit oriented development as well as in-situ redevelopment of slum-areas utilising planning interventions such as high FSI, installation of smart features etc., all of which focus towards solving the issues identified by citizens and citizen representatives.

Pan City Proposal: The pan city proposal for the city is strongly related to the city’s vision and focus areas identified by citizens. Since they are meant to be ICT based, city authorities engaged with experts in the sectors to identify ICT solutions to the key issues highlighted by citizens. Multi-layered engagement strategy was deployed in identifying pan city proposal as well. Informed decision making was undertaken in Surat for selection of PCP. The city engaged its citizens in three webinars on eight topics and fourteen seminars on twenty topics related to smart city. This positively influenced the citizens decision making for selecting pan city proposals. A technology fair for five consecutive days was conducted exhibiting various smart solutions. This, in addition to educating the citizens, also enabled a lot of one-on-one interaction of citizens with providers of smart solution.

Cities selected PCP on the basis of the issues highlighted by citizens during the visioning exercise. From these major issues, cities identified the key ones and developed ICT based solutions for it. The two pan city proposals in Ludhiana are Smart E-rickshaws and GIS enabled integrated information system. These two were selected based on comprehensive engagement with citizens, elected representatives and urban planners and experts. E-rickshaw was proposed based on citizens’ aspirations to de-pollute Ludhiana. Though citizen participation in promoting e-governance got a low priority in citizen rankings, it emerged as a major requirement during focus group discussions.

3. Implementation Plan
The third round of citizen engagement is about informing the final plan to the citizens. This round required cities to publicise the SCP along with its implementation and financial plan. Cities shared their SCP through various means - on city websites, through MyGov portal etc. Some cities went back and revised the plan based on the comments they received. While many cities published their draft smart city plan online on MyGov portal and city websites, Jaipur in addition, conducted direct engagement in MyGov portal as well as indirect engagement through stakeholder meetings, informal discussions and ward councillors meetings even in round 3. It received 2107 suggestions on Draft Proposal from this round.

III. Qualitative Aspects in Citizen Engagement
Inclusion and outreach are two indicators that define the quality of an activity. Even when an excellent strategy and wide range of methods of engagement are deployed and citizen views are incorporated in preparation of a plan, success of the process depends on whether, captured as, the citizen’s voice is indeed the citizens’ aspiration. Inclusion in citizen engagement depends on whether all sections of the society have been represented in the engagement process and their concerns have been addressed appropriately. The profiling of the city is the basis for selection of appropriate techniques and the target groups for the engagement strategy. The detailed demographic profile of the city helps identify various groups of people whose aspirations for their city may
LOCAL EFFECTIVE MEANS TO SENSITISE CITIZENS IN JABALPUR

vary. This profiling is necessary so as to identify the target groups for engagement and also to ensure representation of these different groups in the different rounds of engagement process. Based on this, some cities took special care to involve all sections of population, individually and as a group. Most of the cities though are observed to have gone only for the obvious sections of society and thus have missed the pulse of the city. Inclusion of different sections of population was best done in Solapur. Focus group discussions in the city engaged Councillors, Members of Parliament, Members of Legislative Assembly, the elderly, women, engineers, architects, commercial and industrial associations, resident welfare groups - Rotary Club and lion’s Club, non-governmental organisation for disabled and blind, city police department, pilgrims walking to Tuljapur from city, tourists visiting Siddeshwar temple and its Management Trust, hawkers, road dwellers, street vendors, unemployed workers from closed textile mills, social group of Gujarati Mitra Mandal, Maheshweri Society, Kutchhi Samaj, slum residents of shashtri nagar and Gandhinagar slums, auto drivers, traffic police, industrialists, professors from MBA, B.ED college, builders association, chamber of commerce and social welfare foundations.

Outreach depends, to a great extent, on the modes engagement used by a city. Different modes are suited to different sections of population. It is therefore required of cities to understand its character and develop and deploy modes which can make their outreach efficient and effective. Some of the lighthouse cities have done this reasonably well. In Jabalpur, a city known as “Sanskardhani”, the different cultural activities are an integral part of the city. Towards sensitizing the citizens, a series of events such as “Narmada Maha Aarti”, “Havan”, Rock Show for youths, Concert by Rahat Indori, Smart Yoga, Bhajan Sandhya etc. were conducted. These helped people to know more and become partners in the process of making Jabalpur a Smart City.

CONCLUSION

The smart cities competition mandated and motivated the cities to engage its citizens in the planning process. Using traditional methods such as ward meetings, one-on-one interactions, focus group discussions, etc. and contemporary online methods such as use of social media and other online platforms, the cities made efforts to reach out to large segments of population. As discussed earlier, sustained and dedicated efforts by some cities by way of structured and thoughtful frameworks brought out the true essence of participatory planning in the lighthouse cities. It can be seen that all cities revisited their approach to involve citizens. Unlike in earlier exercises of planning where citizens were involved in the discussion very late and with no motivation to give suggestions, in preparation of smart city proposals, city leaders were able to create interest by engaging citizens right from the beginning to the end, thereby bringing out a dedicated participation.

Though within the small duration of four months, the first cycle of competition created an attitude shift towards involving citizens in planning. Going beyond citizen consultation as in previous approaches, cities actually engaged the citizens and prepared demand driven proposals. However, it is necessary that the engagement continue beyond preparation to implementation of proposals as well. With no mandates or scores assigned for implementation, it is at this stage that the true commitment of cities to their citizens can be seen. Along with engagement of citizens in implementation of SCPs in lighthouse cities, the second cycle of competition is also looked forward to with great expectations to continue the positive aspects while bridging the gaps in the first cycle.

References

BEST CASES OF CITIES MAPPED AGAINST CITIZEN ENGAGEMENT PROCESS IN SCP

The 20 lighthouse cities engaged citizens differently. Here, the best cases of cities are mapped against the steps in citizen engagement for preparing SCP.
The smart cities mission is a game changer in India’s urban development sector many ways. In addition to being a bottom-up approach with demand driven projects that are based on citizen aspirations, the mission pushes the participating cities to innovate by bringing various missions and schemes of the government to a unified platform.

The smart city guidelines direct the cities to seek convergence at the planning stage itself, with other programmes like AMRUT, Swachh Bharat Mission (SBM), National Heritage City Development and Augmentation Yojana (HRIDAY), Digital India, Skill India, Housing for All and other schemes. The smart city mission guidelines highlight the strong complementary relationship between the Atal Mission for Rejuvenation and Urban Transformation (AMRUT) and Smart Cities Mission in bringing about urban transformation. Though AMRUT follows a project-based approach and Smart Cities Mission follows an area-based strategy, convergence of the two missions enables AMRUT cities to implement the infrastructure projects (under AMRUT) with ease through the Special Purpose Vehicle (SPV) by including them in the Smart City Proposal (SCP). Similarly, the smart city mission presents an opportunity to converge other central and state government programs/schemes too.

The twenty lighthouse cities are very diverse with population lying between 0.2 to 5.5 million and the area ranging from 43 sq. km to 513 sq. km. They are port cities, market towns, tourist destinations, administrative cities and industrial cities. Their diversity also means that not all of the twenty cities are eligible for funding from all the same schemes. Some cities in addition to national and state schemes, have counted other forms of funding as converged funds. Funding from Asian Development Bank in Belagavi, World Bank and Development Authority funding in Jaipur and IT budget in Bhopal are three such modes of funding which are identified as convergence in their respective SCPs. Considering the idea of convergence as per smart city guidelines, this article excludes all modes other than national and state schemes from convergence. From different national and state schemes, the 20 lighthouse cities have converged amounts between 6 Crore to 1028 Crore. With a total of 7832 Crore INR raised, 16% of total budget of SCPs is converged from schemes other than smart city mission in the twenty lighthouse cities.

### PERCENTAGE OF CONVERGENCE FUNDS IN SCP BUDGETS

<table>
<thead>
<tr>
<th>Scheme</th>
<th>Amount (Crore INR)</th>
<th>Percentage</th>
<th>No of Cities</th>
<th>Cities</th>
<th>Major Themes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AMRUT</strong></td>
<td>2147</td>
<td>5.90</td>
<td>14</td>
<td>Pune, Jaipur, Surat, Ahmedabad, Jabalpur, Vishakapatnam, Devanagare, Indore, NDMC, Belagavi, Udaipur, Guwahati, Ludhiana, Bhopal</td>
<td>Water Supply, Water Recharge, Water Quality Monitoring, Water Metering, Sanitation, Community Toilets, Sewerage and Drainage, Road and NMT Infrastructure, Pedestrian Infrastructure, Bus Shelters, Parking Management, E-Rickshaws, Parks and Open Spaces, Shore Protection and Beach Beautification</td>
</tr>
<tr>
<td><strong>SBM</strong></td>
<td>153.85</td>
<td>0.42</td>
<td>9</td>
<td>Jaipur, Surat, Ahmedabad, Jabalpur, Vishakapatnam, Devanagare, Indore, NDMC, Belagavi, Chennai</td>
<td>Sanitation, Solid Waste Management</td>
</tr>
<tr>
<td><strong>PMAY</strong></td>
<td>526.24</td>
<td>1.45</td>
<td>6</td>
<td>Surat, Jabalpur, Vishakapatnam, Indore, Belagavi, Bhopal</td>
<td>Affordable Housing, Slum Rehabilitation and Redevelopment</td>
</tr>
<tr>
<td><strong>JNNSCM</strong></td>
<td>377.90</td>
<td>1.05</td>
<td>5</td>
<td>Surat, Vishakapatnam, NDMC, Chennai, Bhopal</td>
<td>Rooftop Solar Panels, Solar Street Lighting</td>
</tr>
<tr>
<td><strong>IPDS</strong></td>
<td>1057.55</td>
<td>2.91</td>
<td>7</td>
<td>Pune, Jaipur, Jabalpur, Vishakapatnam, Indore, NDMC, Ludhiana</td>
<td>Underground Electric Wiring, Smart Grid, Smart Energy Meters</td>
</tr>
<tr>
<td><strong>Digital India</strong></td>
<td>125.4</td>
<td>0.34</td>
<td>2</td>
<td>Jabalpur, Indore</td>
<td>Wi-Fi Hotspots, Software and Hardware of Area Command and Control Centre, OFC Networks</td>
</tr>
<tr>
<td><strong>Skill India</strong></td>
<td>172.2</td>
<td>0.47</td>
<td>2</td>
<td>Jabalpur, Indore</td>
<td>Incubation Centre, Open Learning</td>
</tr>
<tr>
<td><strong>FAME</strong></td>
<td>91.5</td>
<td>0.25</td>
<td>2</td>
<td>Pune, Belagavi</td>
<td>Electric busses, Electric Rickshaws</td>
</tr>
<tr>
<td><strong>Other National Schemes</strong></td>
<td>269.82</td>
<td>0.95</td>
<td>5</td>
<td>Pune, Jaipur, Jabalpur, Indore, NDMC</td>
<td>River cleaning, Common Payment Card, Small Solar Power Projects, E-vehicles</td>
</tr>
<tr>
<td><strong>State schemes</strong></td>
<td>567.56</td>
<td>1.01</td>
<td>2</td>
<td>Surat, Devanagere</td>
<td>Smart Street Lighting, Housing, Wind Power Generation, Creek Reconstruction, Slum Redevelopment</td>
</tr>
</tbody>
</table>

*National River Conservation Programme, National Electric Mobility Plan, Swadesh Darshan, Grid Connected Roof-Top Small Solar Power Programme, National Common Mobility Card. **Swamim Jayanthi Mukhya Mantri Shahari Vikas Yojana, State scheme. **Excluding 5 cities - Bhubaneswar, Coimbatore, Kakinada, Kochi & Solapur where complete breakdown of convergence is not available. *Excluding funding from Asian Development Bank in Belagavi, World Bank and Development Authority funding in Jaipur and IT budget in Bhopal, all three of which were identified as convergence in their respective SCPs. Note: All data in this article is from Part E: Financial Plan of the SCPs.
Beyond Converging Funds

The SCPs of cities extend the definition of convergence beyond converging funds. The section on measurable impact extends the definition of convergence by extending the definition of convergence beyond converging funds. The section on measurable impact shows that projects within each of the impact themes are connected and reinforce the cross-cutting nature of the projects. The measurable impact section summarises the expected changes in the city as a result of the projects. By mapping out the projects and their measurable impacts, we can draw a clear picture of the projects' roles in breaking down the notion of silos. Success of each project is dependent on various factors, including governance, economic, social, and environmental factors. The projects are points of convergence for finance, collaboration, and the city's goals. The simplest example of this is the common card payment system for transportation and various services in Bhubaneswar. The successful implementation of this system has led to better experiences for users of public transport, reduced revenue losses for the transit operators, increased accessibility for the city, and subsidies for those who need them. These are only some of the direct measurable impacts of one project.
Strategic Plan and Smart City Proposal
As envisaged in Mission Guidelines, the Strategic Plan part of Smart City Proposal (SCP) varies from city to city within the cohort of 97 cities that competed in the round one of the Smart City Challenge. In case of the light house cities, similar to Strategic Plan the level of detailing in formulation of plan with specific projects proposed under both Area Based Development and Pan City Solutions varied. For example, Bhubaneswar the top rank city of round one challenge listed 75 projects and Bhopal the 20th ranked city listed only 9 projects in total under Area Based Development and Pan City Solutions together.

The process of interlinking the projects conceptualized and resources available to achieve the expected outcomes and create a replicable model which will act like a light house to other areas within the city and also other aspiring cities is a challenging task. City level authorities which include urban local bodies, urban development authorities, parastatal agencies, municipal administration and urban development department are in existence performing a specific set of functions. To ensure timely and efficient execution of this wide variety and range of projects, it is mandated in the mission guidelines to create a Special Purpose Vehicle (SPV) for implementation of Smart City Proposal at the city level.

Special Purpose Vehicle and Smart City Proposal
The SPV will be a limited company incorporated under the Companies Act, 2013 at the city-level and will be promoted by the State/UT and the ULB jointly, both having 50:50 equity shareholding. Concept of SPVs is not new in Indian context but the approach and delivery model attached to Smart Cities Mission SPV model is unique. Smart Cities SPVs can be envisaged as the city laboratories where the resource institutions/networks within the eco-system of city development lend themselves to achieve the objective of revitalizing existing cities through a systematic improvement of entire urban living environments. Objective of this institutional framework and financial mechanism is to

1. Sustain the urban transformations triggered with launch of new urban missions and
2. Ensure operational independence and autonomy in decision making and mission implementation.

Convergence of funds at city level which is the underlying theme across the national missions in various ministries in India should be the primary spin-off of this new institution. For example

A Municipal Commissioner as a Chief Executive Officer of the Urban Local Body in traditional set-up might be keen on pursuing funds available under the national level sectoral schemes like Digital India by Ministry of Information and Communication Technology or Construction of Museums by the Culture Department or any other similar social/cultural infrastructure programmes. Administrative approvals and standard operating procedure for accessing these additional sources of funding is challenging within a definite timeline. Smart City Mission SPVs are expected to fast track this process and facilitate the mobilization of resources.

Some of the concerns related to introduction of Special Purpose Vehicle (SPV) at the city level are -

Will it be a parallel system to urban local bodies or municipal administration?
How to safeguard the public interest?
What level of authority does SPVs have in imposing user charges especially in area based development project area?

The process of SPV formation and SPV organizational model as mentioned below would largely addresses the ambiguity around these kind of questions.

As part of Smart City Proposal citizen engagement initiatives, most of the cities were successful in disseminating the message SPVs role in the implementation of SCPs. As per the mission guidelines, a Smart City Advisory Forum needs to be established at the city level to advise the SPV and enable collaboration between citizenry and city officials and other stakeholders. The CEO of the SPV will be the convener of the Smart City Advisory Forum with representations from resident welfare associations, tax/rate payers association, slum dwellers association, youth organizations and civil society organizations.

Some of the 20 lighthouse cities have been organizing extensive elected representatives consultation to deliberate on the proportion and level of powers to be shared. Representation of city level officials from various departments within the general body of the proposed SPVs is also encouraging and landmark initiative considering the task at hand cannot be achieved by anyone agency, this needs to be done collectively and collaboration. This emphasizes the fact that SPV should be seen as executing agency donning the role of facilitator or moderator whenever required for smart city development collaboration at city level. The primary stakeholders of this implementation process being citizens with resource institutions as the eco-system.
Factsheet of SPVs in 20 Light House Cities
Similar to Smart City Proposals submitted during the round 1 of Smart City Challenge, the SPV models presented in SCP and incorporated by light house cities vary from city to city. Currently 14 of the 20 light house cities have incorporated Smart City SPVs which is the pre-requisite for release of first installment of Rs.200 Crore by central government. Unique models include Surat and Ahmedabad from Gujarat in which Municipal Commissioner is the Chairman of Board of Directors whereas the city of Bhubaneswar has Municipal Commissioner as the Vice-Chairman of the SPV. These SPV models are expected to evolve based on city’s own experience and learning’s from other mission cities.

Light House Cities SPV factsheet is based on information submitted as part of SCP and Company Incorporation Certificate/Government

<table>
<thead>
<tr>
<th>City</th>
<th>Municipal Commissioner</th>
<th>Mayor</th>
<th>Date of Incorporation</th>
<th>SPV Incorporated Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bhubaneswar</td>
<td>Vice Chairman of Board of Directors</td>
<td>-</td>
<td>8th March 2016</td>
<td>Bhubaneswar Smart City Limited</td>
</tr>
<tr>
<td>Pune</td>
<td>Member Board of Directors</td>
<td>Member Board of Directors</td>
<td>23rd March 2016</td>
<td>Pune Smart City Development Corporation Limited</td>
</tr>
<tr>
<td>Jaipur</td>
<td>Chief Executive Officer</td>
<td>Vice Chairman</td>
<td>12th March 2016</td>
<td>Jaipur Smart City Limited</td>
</tr>
<tr>
<td>Surat</td>
<td>Chairman of Board of Directors</td>
<td>-</td>
<td>31st March 2016</td>
<td>Surat Smart City Development Limited</td>
</tr>
<tr>
<td>Kochi</td>
<td>-</td>
<td>Member Board of Directors</td>
<td>16th March 2016</td>
<td>Cochin Smart Mission Limited</td>
</tr>
<tr>
<td>Ahmedabad</td>
<td>Chairman of Board of Directors</td>
<td>Member Board of Directors</td>
<td>28th March 2016</td>
<td>Smart City Ahmedabad Development Limited</td>
</tr>
<tr>
<td>Jabalpur</td>
<td>Executive Director, Convenor of interdepartmental taskforce</td>
<td>Convenor of Advisory Forum</td>
<td>14th March 2016</td>
<td>Jabalpur Smart City Limited</td>
</tr>
<tr>
<td>Visakhapatnam</td>
<td>Member Board of Directors</td>
<td>-</td>
<td>11th March 2016</td>
<td>Greater Visakhapatnam Smart City Corporation Limited</td>
</tr>
<tr>
<td>Solapur</td>
<td>Chairman of Governing Board</td>
<td>Member of Governing Board</td>
<td>23rd March 2016</td>
<td>Solapur City Ahmedabad Development Limited</td>
</tr>
<tr>
<td>Davanagere</td>
<td>Member Board of Directors</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Indore</td>
<td>Executive Director, Convenor of interdepartmental taskforce</td>
<td>Convenor of Advisory Forum</td>
<td>11th March 2016</td>
<td>Indore Smart City Development Limited</td>
</tr>
<tr>
<td>NDMC</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Coimbatore</td>
<td>Member Board of Directors</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Kakinada</td>
<td>Managing Director</td>
<td>-</td>
<td>7th March 2016</td>
<td>Kakinada Smart City Corporation Limited</td>
</tr>
<tr>
<td>Belagavi</td>
<td>Member Board of Directors</td>
<td>Member of the Board</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Udaipur</td>
<td>CEO, Director</td>
<td>Vice Chairman, Director</td>
<td>12th March 2016</td>
<td>Udaipur Smart City Limited</td>
</tr>
<tr>
<td>Guwahati</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Chennai</td>
<td>Chairman</td>
<td>Member, Smart City Advisory Forum</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ludhiana</td>
<td>Member Board of Directors</td>
<td>Member Board of Directors</td>
<td>28th March 2016</td>
<td>Ludhiana Smart City Limited</td>
</tr>
<tr>
<td>Bhopal</td>
<td>Executive Director</td>
<td>Member Advisory Panels</td>
<td>14th March 2016</td>
<td>Bhopal Smart City Development Corporation Limited</td>
</tr>
</tbody>
</table>
Spatial Extent of Area Based Development: Lighthouse Cities

**Datasheet**

<table>
<thead>
<tr>
<th>City</th>
<th>Size Sq Km</th>
<th>Type of ABD</th>
<th>ABD as % of city area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coimbatore</td>
<td>16.8</td>
<td>Retrofitting</td>
<td>15.91%</td>
</tr>
<tr>
<td>Belagavi</td>
<td>10.652</td>
<td>Retrofitting</td>
<td>10.69%</td>
</tr>
<tr>
<td>Surat</td>
<td>8.668</td>
<td>Retrofitting</td>
<td>2.58%</td>
</tr>
<tr>
<td>Kochi</td>
<td>6.916</td>
<td>Retrofitting</td>
<td>6.46%</td>
</tr>
<tr>
<td>Chennai</td>
<td>6.868</td>
<td>Retrofitting</td>
<td>3.92%</td>
</tr>
<tr>
<td>Vishakapatnam</td>
<td>6.6</td>
<td>Retrofitting</td>
<td>1.29%</td>
</tr>
<tr>
<td>Kakinada</td>
<td>5.5</td>
<td>Retrofitting</td>
<td>9.59%</td>
</tr>
<tr>
<td>Solapur</td>
<td>4.16</td>
<td>Retrofitting</td>
<td>2.33%</td>
</tr>
<tr>
<td>Bhubaneswar</td>
<td>3.94</td>
<td>Retrofitting and Redevelopment</td>
<td>2.92%</td>
</tr>
<tr>
<td>Pune</td>
<td>3.6</td>
<td>Retrofitting</td>
<td>1.30%</td>
</tr>
<tr>
<td>Udaipur</td>
<td>3.2</td>
<td>Retrofitting</td>
<td>5.62%</td>
</tr>
<tr>
<td>Ludhiana</td>
<td>3.16</td>
<td>Retrofitting</td>
<td>1.98%</td>
</tr>
<tr>
<td>Devanagere</td>
<td>3.14</td>
<td>Retrofitting</td>
<td>4.07%</td>
</tr>
<tr>
<td>Indore</td>
<td>2.968</td>
<td>Retrofitting and Redevelopment</td>
<td>1.72%</td>
</tr>
<tr>
<td>Jabalpur</td>
<td>2.972</td>
<td>Retrofitting and Redevelopment</td>
<td>1.95%</td>
</tr>
<tr>
<td>Guwahati</td>
<td>2.784</td>
<td>Retrofitting</td>
<td>1.27%</td>
</tr>
<tr>
<td>Jaipur</td>
<td>2.4</td>
<td>Retrofitting</td>
<td>0.50%</td>
</tr>
<tr>
<td>Ahmedabad</td>
<td>2.36</td>
<td>Retrofitting and Redevelopment</td>
<td>0.50%</td>
</tr>
<tr>
<td>NDMC</td>
<td>2.2</td>
<td>Retrofitting</td>
<td>3.15%</td>
</tr>
</tbody>
</table>

Data source: SOUTH ASIA KNOWLEDGE HUB, NIUA

AREA FOR DIFFERENT ABPS IS SHOWN AS A MULTIPLE OF THE AREA FOR BHOAPAL ABP

Least count: BHOAPAL
Breakdown of SCP Budget to Area Based and Pan City Budget: Lighthouse cities

Data source: SOUTH ASIA KNOWLEDGE HUB, NIUA

Least count: LUDHIANA

Budget for different Smart City Proposals is shown as a multiple of the budget for Ludhiana’s proposal which is 1049.28 crore INR.
<table>
<thead>
<tr>
<th>City</th>
<th>Type</th>
<th>Population</th>
<th>Area (sq km)</th>
<th>Per Capita Income (2004-2005 constant price iNR)</th>
<th>Gender Ratio</th>
<th>Unemployment (%) of Urban Population</th>
<th>Literacy Rate (%)</th>
<th>Total SCP Project Cost (Core INR)</th>
<th>PCP Budget (Core INR)</th>
<th>Area of ABd as % of total Area</th>
<th>ABd Budget as % of Total Budget</th>
<th>Expenditure per capita (iNR)</th>
<th>Funding from Convergence (Core INR)</th>
<th>Funding from Loans (Core INR)</th>
<th>Funding from PPP (Core INR)</th>
<th>Funding from own sources (Core INR)</th>
<th>Funding from other sources (Core INR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bhubaneswar</td>
<td>Capital</td>
<td>840834</td>
<td>135</td>
<td>62284</td>
<td>2.99</td>
<td>20.4</td>
<td>81.9</td>
<td>4095</td>
<td>442</td>
<td>3.94</td>
<td>2.92</td>
<td>90.26</td>
<td>54158</td>
<td>525</td>
<td>2563</td>
<td>300</td>
<td>184</td>
</tr>
<tr>
<td>Pune</td>
<td>Business and industrial centre</td>
<td>3124458</td>
<td>276</td>
<td>895</td>
<td>2.99</td>
<td>20.4</td>
<td>81.9</td>
<td>4095</td>
<td>442</td>
<td>3.94</td>
<td>2.92</td>
<td>90.26</td>
<td>54158</td>
<td>525</td>
<td>2563</td>
<td>300</td>
<td>184</td>
</tr>
<tr>
<td>Jaipur</td>
<td>Capital</td>
<td>3048163</td>
<td>484</td>
<td>62854</td>
<td>2.99</td>
<td>20.4</td>
<td>81.9</td>
<td>4095</td>
<td>442</td>
<td>3.94</td>
<td>2.92</td>
<td>90.26</td>
<td>54158</td>
<td>525</td>
<td>2563</td>
<td>300</td>
<td>184</td>
</tr>
<tr>
<td>Surat</td>
<td>Business and industrial centre</td>
<td>1447750</td>
<td>355</td>
<td>898</td>
<td>2.99</td>
<td>20.4</td>
<td>81.9</td>
<td>4095</td>
<td>442</td>
<td>3.94</td>
<td>2.92</td>
<td>90.26</td>
<td>54158</td>
<td>525</td>
<td>2563</td>
<td>300</td>
<td>184</td>
</tr>
<tr>
<td>Kochi</td>
<td>Port city</td>
<td>602024</td>
<td>17</td>
<td>6520</td>
<td>2.99</td>
<td>20.4</td>
<td>81.9</td>
<td>4095</td>
<td>442</td>
<td>3.94</td>
<td>2.92</td>
<td>90.26</td>
<td>54158</td>
<td>525</td>
<td>2563</td>
<td>300</td>
<td>184</td>
</tr>
<tr>
<td>Ahmedabad</td>
<td>Business and industrial centre</td>
<td>5577940</td>
<td>468</td>
<td>62854</td>
<td>2.99</td>
<td>20.4</td>
<td>81.9</td>
<td>4095</td>
<td>442</td>
<td>3.94</td>
<td>2.92</td>
<td>90.26</td>
<td>54158</td>
<td>525</td>
<td>2563</td>
<td>300</td>
<td>184</td>
</tr>
<tr>
<td>Jabalpur</td>
<td>Business and industrial centre</td>
<td>1055525</td>
<td>152</td>
<td>62854</td>
<td>2.99</td>
<td>20.4</td>
<td>81.9</td>
<td>4095</td>
<td>442</td>
<td>3.94</td>
<td>2.92</td>
<td>90.26</td>
<td>54158</td>
<td>525</td>
<td>2563</td>
<td>300</td>
<td>184</td>
</tr>
<tr>
<td>Visakhapatnam</td>
<td>Port city</td>
<td>1728228</td>
<td>511</td>
<td>62854</td>
<td>2.99</td>
<td>20.4</td>
<td>81.9</td>
<td>4095</td>
<td>442</td>
<td>3.94</td>
<td>2.92</td>
<td>90.26</td>
<td>54158</td>
<td>525</td>
<td>2563</td>
<td>300</td>
<td>184</td>
</tr>
<tr>
<td>Solapur</td>
<td>Business and industrial centre</td>
<td>951558</td>
<td>171</td>
<td>62854</td>
<td>2.99</td>
<td>20.4</td>
<td>81.9</td>
<td>4095</td>
<td>442</td>
<td>3.94</td>
<td>2.92</td>
<td>90.26</td>
<td>54158</td>
<td>525</td>
<td>2563</td>
<td>300</td>
<td>184</td>
</tr>
<tr>
<td>Dhanbad</td>
<td>Business and industrial centre</td>
<td>343971</td>
<td>771</td>
<td>62854</td>
<td>2.99</td>
<td>20.4</td>
<td>81.9</td>
<td>4095</td>
<td>442</td>
<td>3.94</td>
<td>2.92</td>
<td>90.26</td>
<td>54158</td>
<td>525</td>
<td>2563</td>
<td>300</td>
<td>184</td>
</tr>
<tr>
<td>Indore</td>
<td>Business and industrial centre</td>
<td>1964086</td>
<td>172</td>
<td>62854</td>
<td>2.99</td>
<td>20.4</td>
<td>81.9</td>
<td>4095</td>
<td>442</td>
<td>3.94</td>
<td>2.92</td>
<td>90.26</td>
<td>54158</td>
<td>525</td>
<td>2563</td>
<td>300</td>
<td>184</td>
</tr>
<tr>
<td>New Delhi (NDMC)</td>
<td>Capital</td>
<td>257803</td>
<td>42.7</td>
<td>62854</td>
<td>2.99</td>
<td>20.4</td>
<td>81.9</td>
<td>4095</td>
<td>442</td>
<td>3.94</td>
<td>2.92</td>
<td>90.26</td>
<td>54158</td>
<td>525</td>
<td>2563</td>
<td>300</td>
<td>184</td>
</tr>
<tr>
<td>Coimbatore</td>
<td>Business and industrial centre</td>
<td>1050721</td>
<td>105</td>
<td>62854</td>
<td>2.99</td>
<td>20.4</td>
<td>81.9</td>
<td>4095</td>
<td>442</td>
<td>3.94</td>
<td>2.92</td>
<td>90.26</td>
<td>54158</td>
<td>525</td>
<td>2563</td>
<td>300</td>
<td>184</td>
</tr>
<tr>
<td>Kakinada</td>
<td>Port city</td>
<td>312538</td>
<td>57.3</td>
<td>62854</td>
<td>2.99</td>
<td>20.4</td>
<td>81.9</td>
<td>4095</td>
<td>442</td>
<td>3.94</td>
<td>2.92</td>
<td>90.26</td>
<td>54158</td>
<td>525</td>
<td>2563</td>
<td>300</td>
<td>184</td>
</tr>
<tr>
<td>Belagavi</td>
<td>Business and industrial centre</td>
<td>488557</td>
<td>99.6</td>
<td>62854</td>
<td>2.99</td>
<td>20.4</td>
<td>81.9</td>
<td>4095</td>
<td>442</td>
<td>3.94</td>
<td>2.92</td>
<td>90.26</td>
<td>54158</td>
<td>525</td>
<td>2563</td>
<td>300</td>
<td>184</td>
</tr>
<tr>
<td>Udaipur</td>
<td>Culture and tourism</td>
<td>451100</td>
<td>56.9</td>
<td>62854</td>
<td>2.99</td>
<td>20.4</td>
<td>81.9</td>
<td>4095</td>
<td>442</td>
<td>3.94</td>
<td>2.92</td>
<td>90.26</td>
<td>54158</td>
<td>525</td>
<td>2563</td>
<td>300</td>
<td>184</td>
</tr>
<tr>
<td>Guwahati</td>
<td>Business and industrial centre</td>
<td>957352</td>
<td>219</td>
<td>62854</td>
<td>2.99</td>
<td>20.4</td>
<td>81.9</td>
<td>4095</td>
<td>442</td>
<td>3.94</td>
<td>2.92</td>
<td>90.26</td>
<td>54158</td>
<td>525</td>
<td>2563</td>
<td>300</td>
<td>184</td>
</tr>
<tr>
<td>Chennai</td>
<td>Capital</td>
<td>4646732</td>
<td>175</td>
<td>62854</td>
<td>2.99</td>
<td>20.4</td>
<td>81.9</td>
<td>4095</td>
<td>442</td>
<td>3.94</td>
<td>2.92</td>
<td>90.26</td>
<td>54158</td>
<td>525</td>
<td>2563</td>
<td>300</td>
<td>184</td>
</tr>
<tr>
<td>Ludhiana</td>
<td>Business and industrial centre</td>
<td>1638878</td>
<td>159</td>
<td>62854</td>
<td>2.99</td>
<td>20.4</td>
<td>81.9</td>
<td>4095</td>
<td>442</td>
<td>3.94</td>
<td>2.92</td>
<td>90.26</td>
<td>54158</td>
<td>525</td>
<td>2563</td>
<td>300</td>
<td>184</td>
</tr>
<tr>
<td>Bhopal</td>
<td>Capital</td>
<td>1796218</td>
<td>285</td>
<td>62854</td>
<td>2.99</td>
<td>20.4</td>
<td>81.9</td>
<td>4095</td>
<td>442</td>
<td>3.94</td>
<td>2.92</td>
<td>90.26</td>
<td>54158</td>
<td>525</td>
<td>2563</td>
<td>300</td>
<td>184</td>
</tr>
</tbody>
</table>

*DATA FOR URBAN AGGLOMERATION; **PROVISIONAL POPULATION TOTALS CENSUS OF INDIA 2011; DATA SOURCE: SOUTH ASIA KNOWLEDGE HUB, NIUA.*
Financial Resource Management

As the 20 lighthouse cities begin to embark on their smart city adoptions, they have to consciously plan their financial resources. The current resource restrained times require the cities to adopt multiple approaches in their financial planning: improve the efficiency of user fee and property tax collection, explore newer ways of raising revenues such as local municipal bonds and global finance mechanisms such as clean development mechanism (CDM) and reform institutional barriers to attract private sector to finance urban infrastructure. Deployment of ICT enabled sensors on existing and new infrastructure will help to monitor water and energy usage and price the resources to match the demand. Yet, additional resources will have to be raised to cover the operations and maintenance (O&M) costs of these technological interventions. A preliminary analysis of the 20 SCPs shows varying preferences of the cities to tap possible avenues for urban infrastructure financing.

- The cities have identified 6 main types of funding- grants under the smart cities mission, convergence with other missions, public private partnerships (PPPs), borrowing from lending banks, increase in own source revenue and others such as corporate social responsibility.

- Overall, the 20 lighthouse cities will raise Rs. 64,000 crores, thereby leveraging an additional Rs. 44,000 crores against the 20,000 crores investment by the central and state governments.

- Indore, Bhopal and Jabalpur have the most financially ambitious proposals. For every rupee that is funded through the mission, these cities aim to leverage Rs. 5.29, Rs. 4.56 and Rs. 3.64 respectively through a combination of public private partnership, augmentation of own source revenues, long term borrowing and others (corporate social responsibility, state finance grants etc).

- Aside from the central and state grants, own sources accounting for 33% of the planned investments are the biggest source of revenues. These are followed by public private partnerships and convergence funds, both estimated around 13%.

- Land monetisation is the most widely used tool, understandably by cities seeking to leverage funds using the improved level of infrastructure in the identified areas. Borrowing long term debts to finance capital infrastructure is definitely the least preferred option, possibly due to lack of good credit ratings of the municipalities.

- Per capita expenditure inversely influence financial efficiency. From an efficiency point of view, the cities of Ahmedabad (Rs. 3401), Chennai (Rs. 2940) and Surat (Rs. 5812) exhibit the most cost effective smart city proposals. These cities have the lowest per capita proposed expenditures for their smart city plans.

- Cities need to assess capital financial needs of their smart city plans against the annual municipal revenues they generate. The higher the ratio of resources needed to the municipal income, the greater is the need to improve the income the cities can generate while the opposite case is strictly not true. Bhubaneswar, Belagavi and Jabalpur need resources multiple times their annual municipal incomes and consequently need to look at increasing their revenues over the duration of the SCP. This revenue capacity needs to be continually augmented.

![FINANCIAL PLAN: LIGHT HOUSE CITIES (in crore INR)](image-url)
to sustain the smart city effort and to scale it from a specific area to the entire city.

- Alongside the revenue capacity, equally important is the expenditure capacity. This indicator represents the city’s capacity to execute the smart city proposal based on the recent municipal expenditure. It is calculated by dividing the proposed annual SCP expenditure by latest available actual municipal expenditure. A resultant number less than 1 indicates that the Smart City Proposal is well within the city’s existing capacity. A number greater than 1 indicates that the city has not executed a project of this scale previously and needs to focus on capacity building to ensure its successful implementation. Amongst the 20 lighthouse cities, Pune, Surat, Ahmedabad, New Delhi Municipal Council and Chennai exhibit sufficient financial experience in implementing projects proposed in their SCPs.

- A mobilisation diversity index, similar to the Herfindahl-Hirschman index was calculated to test the diversity of the funding sources (other than the national mission grant) as identified in the Smart City Proposals. The value of HHI is between 0 and 1. A number close to 0 indicates that the funding sources are less diverse, i.e. most funding is from a single source. A number closer to 1 indicates greater diversity of the funding sources, i.e. the funds are coming from a variety of sources. Diversity in funding indicates resilience of the financial plan. Interestingly despite not having any credit rating and therefore low borrowing capacities, the cities of Solapur, Belagavi and Kakinada have the most diversified portfolio for resource mobilisation.

### Definitions of Financial Indicators

- **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

### Note: $1 = Rs. 66.48

<table>
<thead>
<tr>
<th>City</th>
<th>Budget (Crore INR)</th>
<th>Budget Efficiency</th>
<th>Funding Leverage</th>
<th>Mobilization Diversity</th>
<th>Revenue Capacity</th>
<th>Expenditure Capacity</th>
<th>JnNURM Property Tax Reform</th>
<th>Credit Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ahmedabad</td>
<td>2290</td>
<td>3401</td>
<td>1.28</td>
<td>0.4304</td>
<td>0.4</td>
<td>0.12</td>
<td>✓</td>
<td>A+</td>
</tr>
<tr>
<td>Belgaqi</td>
<td>3534.5</td>
<td>72404</td>
<td>1.51</td>
<td>0.5499</td>
<td>13.2</td>
<td>6.04</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Bhopal</td>
<td>3092.71</td>
<td>17198</td>
<td>4.56</td>
<td>0.0063</td>
<td>2.6</td>
<td>0.91</td>
<td>✓</td>
<td>BBB-</td>
</tr>
<tr>
<td>Bhubaneswar</td>
<td>4537</td>
<td>55998</td>
<td>2.08</td>
<td>0.2779</td>
<td>18.9</td>
<td>3.22</td>
<td>✓</td>
<td>BBB</td>
</tr>
<tr>
<td>Chennai</td>
<td>1366.24</td>
<td>2940</td>
<td>0.39</td>
<td>0.2830</td>
<td>0.2</td>
<td>0.12</td>
<td>✓</td>
<td>BBB+</td>
</tr>
<tr>
<td>Coimbatore</td>
<td>1570</td>
<td>14992</td>
<td>0.38</td>
<td>0.4816</td>
<td>0.7</td>
<td>0.43</td>
<td>✓</td>
<td>BBB+</td>
</tr>
<tr>
<td>Devanagere</td>
<td>1307.18</td>
<td>30052</td>
<td>0.10</td>
<td>0.3259</td>
<td>1.7</td>
<td></td>
<td>In Progress</td>
<td></td>
</tr>
<tr>
<td>Guwahati</td>
<td>2161</td>
<td>22572</td>
<td>0.28</td>
<td>0.0000</td>
<td>1.3</td>
<td>0.20</td>
<td>✓</td>
<td>BB</td>
</tr>
<tr>
<td>Indore</td>
<td>5099.6</td>
<td>25964</td>
<td>5.29</td>
<td>0.8650</td>
<td>4.9</td>
<td></td>
<td>BBB</td>
<td></td>
</tr>
<tr>
<td>Jabalpur</td>
<td>3998.5</td>
<td>37881</td>
<td>3.64</td>
<td>0.3406</td>
<td>8.5</td>
<td>2.39</td>
<td>✓</td>
<td>BB+</td>
</tr>
<tr>
<td>Jaipur</td>
<td>2341.54</td>
<td>7686</td>
<td>0.38</td>
<td>0.3502</td>
<td>1.7</td>
<td>0.67</td>
<td>✓</td>
<td>BBB+</td>
</tr>
<tr>
<td>Kakinada</td>
<td>1993.03</td>
<td>63769</td>
<td>0.28</td>
<td>0.6622</td>
<td>3.2</td>
<td>5.42</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Kochi</td>
<td>2076</td>
<td>34482</td>
<td>0.31</td>
<td>0.4998</td>
<td>1.5</td>
<td>1.72</td>
<td>✓</td>
<td>BBB-</td>
</tr>
<tr>
<td>Ludhiana</td>
<td>1049.28</td>
<td>6481</td>
<td>0.00</td>
<td>0.0000</td>
<td>0</td>
<td>0.33</td>
<td>✓</td>
<td>BBB-</td>
</tr>
<tr>
<td>NDMC</td>
<td>1897.27</td>
<td>88827</td>
<td>0.26</td>
<td>0.3951</td>
<td>0.3</td>
<td>0.12</td>
<td>AA</td>
<td></td>
</tr>
<tr>
<td>Pune</td>
<td>2380</td>
<td>7617</td>
<td>1.51</td>
<td>0.2452</td>
<td>0.2</td>
<td>0.24</td>
<td>AA</td>
<td></td>
</tr>
<tr>
<td>Solapur</td>
<td>2247</td>
<td>26613</td>
<td>0.43</td>
<td>0.6660</td>
<td>1.9</td>
<td>2.22</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Surat</td>
<td>2597</td>
<td>5812</td>
<td>0.90</td>
<td>0.5186</td>
<td>0.9</td>
<td>0.17</td>
<td>AA</td>
<td></td>
</tr>
<tr>
<td>Udaipur</td>
<td>1221</td>
<td>27067</td>
<td>1.48</td>
<td>0.4460</td>
<td>1.3</td>
<td>1.55</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Vishakapattanam</td>
<td>1601.87</td>
<td>9269</td>
<td>0.68</td>
<td>0.3258</td>
<td>0.7</td>
<td>0.40</td>
<td>✓</td>
<td>A</td>
</tr>
</tbody>
</table>

The table below/above captures the financial sustainability indicators for the twenty lighthouse cities. The cities are divided into four quartiles (dark green, light green, pink and orange in descending order) for each of the indicators. This table is intended as a guidance for the cities to improve upon their finance gaps by looking at the peer group of cities that lie within their quartile or the quartile above and map out their financial planning to achieve the intended financial indicator.
BACKGROUND

Understanding the need to manage the growth in private vehicle (two and four wheeler) ownership, Government of India in 2006 formulated the National Urban Transport Policy that prioritised greater use of public transport and non motorised modes and advocated integration of land-use and transportation to minimise travel distance. The first emphasis on improving mobility in Indian cities was provided by the Jawaharlal Nehru National Urban Renewal Mission (JnNURM) which allocated approximately 11 percent (or $2 billion) of the mission budget ($20 billion) to urban transportation. This was primarily a recognition of the range of mobility problems that Indian cities faced - a lack of reliable, affordable and extensive public transportation network thereby forcing people to rely on private two wheelers and four wheelers for commuting needs and a low density of road network for this increased private mode of commuting.

Under the JnNURM, approximately 138 projects were undertaken with 33 percent of the funding being allocated to Mass Rapid Transit System (MRTS) and about 57 percent allocated to road/highway construction (EMBARQ India and Shakti Foundation, 2012). Cities such as Delhi, Pune, Bangalore, Chennai, Mumbai, Hyderabad have implemented Metro rail based (up to 30,000 pphpd - passengers per hour per direction) systems based on the funding from JnNURM. In addition, 9 cities (Ahmedabad, Rajkot, Surat, Bhopal, Indore, Pune/Pimpri Chinchwad, Vijaywada, Vishakapattanam and Jaipur) (Center of Urban Equity, 2013) have implemented or are implementing road based Bus Rapid Transit Systems, with capacities up to 15,000 pphpd. Very low allocation (about 4%) (Ibid) to other projects besides parking, road construction and MRTS has led to the unfortunate exclusion of pedestrian and bicycle users, who constitute 40 percent of total mode split in India. Non motorised modes (bicycle and pedestrian) are feasible as main commuting modes for fulfilling trips in small and medium sized cities, both of which have trip lengths less than 7 kms in average.

Thus the mobility options in Indian cities increased during the JnNURM but a lack of comprehensive approach to integrated mobility left large gaps, especially in the last mile connectivity needs of public transit users.

SMART CITIES MISSION ON INTEGRATED MOBILITY

The Smart City Mission acknowledged the role of integrated mobility, primarily through public transport for longer commuting and non motorised transport for shorter trips and last mile connectivity. Creating walking communities, reducing the need for commuting, developing compact communities, investing in transit oriented developments and preserving and developing open spaces were ascribed as prescribed features of a smart city by the mission. Similarly projects involving construction of highways, parking lots were left out of the Smart City Mission and instead retained in AMRUT (Atal Mission for Rejuvenation and Urban Transformation).

Preliminary analysis of the 20 lighthouse city proposals has endorsed this renewed emphasis on public transport and non motorised commuting within the strategic planning process undertaken by the cities. Adoption of information and communication technology (ICT) to improve the efficiency, ease of use and reliability of public transportation operations also has emerged as a significant proposal by the cities. Some of the highlights regarding integrated mobility planning within
the broader SCPs by the lighthouse cities are:

- The total allocation towards solving mobility problems is 1.8 million USD or 25% of the total proposed smart city expenditures (7.2 Billion USD) by the cities. This is doubling and significant change from the 11% allocation towards transportation made by the previous JnNURM mission.

- While expressway (flyover) construction, bus rapid transit (BRT) and road improvements were the significant components in the previous mission, emerging global concepts of public bike sharing, ITS/ICT adoption, clean fuel technologies in fleet operation, non motorised transport (NMT) augmentation, urban design and open spaces and even universal access are the new paradigms proposed by the lighthouse cities.

- Solapur (56%), Ludhiana (51%), Pune (48%) and Devanagere (41%) are unique because of their higher allocations to mobility planning than compared with other lighthouse cities. Bhopal and Jabalpur both have the lowest allocations (< 10%).

- Non motorised transportation (bicycle and pedestrian) accounts for the biggest allocation of about $350 million followed by bus based systems at $200 million. Kochi has uniquely proposed ferry based transportation systems leveraging the city’s water network.

- 17 cities have proposed specifically investments in bicycle networks and public bike sharing systems at a total cost of about $90 million. Majority of the bike sharing and bicycling has been proposed in area based projects suggesting the willingness of the cities to implement comprehensive bike sharing systems at neighbourhood levels and then scaling them up in future, to the city level.

- All cities have expressed wider adoption of ITS and ICT for mobility planning, especially for the purposes traffic management, smart parking and smart bus shelters and integrated fare collection systems. The allocation for ITS and ICT based mobility projects is about $550 million.

- 11 cities have proposed some form of transit oriented mixed use compact neighbourhood planning in their area based approaches. These neighbourhoods will have high densities to support the public transit infrastructure investments while including office centres, open spaces and priority to NMT.

Thus the lighthouse cities have addressed the immediate need for integrated mobility by focusing on bus systems, ferry systems, bicycle sharing systems and augmenting of pedestrian networks. These sustainable modes of transportation are now mainstreamed within the smart city proposals and their success will provide momentum to scaling up to the city and regional levels.

References


(n.d.). Ibid.
BACKGROUND
Given that cities now house majority of the world’s population and contribute significantly to the global GDP, they inherently assume responsibility for most of the world’s carbon emissions. Although cities occupy less than 2% of the Earth’s surface, they consume roughly 78% of the world’s primary energy and produce more than 60% of all carbon dioxide and significant amounts of other greenhouse gas emissions, mainly through energy generation, vehicles, industry, and biomass use. In India, cities generate two-thirds of GDP, 90% of tax revenues, and the majority of jobs, with just a third of the country’s population. It is projected that by 2030, while the urban population of India shall grow to 40.76% of the total population, the share of GDP contributed by urban areas shall touch approximately 70%. However, while the urban sector contributions to the country’s GDP increase, at the same time, the domestic power consumption in urban areas was three times that of the domestic power consumption in rural areas. There is a strong two-way relationship between economic development and energy consumption. Energy, regardless of the source, is a primary need for development. City-related production, mobility and transport, infrastructure and urban density, as well as private households, lead to a substantial increase in urban energy demand. However, this in turn leads to increased economic prosperity required for fueling urbanisation.

Yet, as the global climate change concerns rise with increased frequencies of unnatural weather occurrences, cities assume a greater role in moving towards sustainable resources of energy and utilisation patterns of those resources. In the business as usual scenario, cities become increasingly vulnerable to exposure to degrading air quality and susceptibility to natural hazards. Indian cities have begun to experience these effects especially with the variations in rainfall patterns. Over the last ten years, significant occurrences of high intensity rain and flash flooding has been seen in coastal cities of Mumbai (2005), Chennai (2015), Vishakhapatnam (2014), Srinagar (2014) and Surat (2006, 2013). While the coastal cities are most vulnerable to flooding and cyclonic winds, the hill cities experience landslides. The landlocked cities such as Delhi and Indore are now estimated to suffer from droughts and heat waves. Delhi also has the dubious distinction of the most polluted city in the world especially for air quality.

Thus, cities have to adopt multiple strategies, firstly invest in climate resilient infrastructure to mitigate the risks of human and capital loss if and when climate change events occur, secondly incentivise urban infrastructure of housing, waste management, sewage and sanitation and power supply to move to a reduce, recycle and reuse model and finally introduce behavioural change to sustainable modes especially in transportation. The National Smart Cities Mission provided a perfect vehicle for integrating these sustainability objectives of climate resilience and green growth within the national development strategy. The core infrastructure elements of Smart Cities include assured electricity supply and efficient urban mobility and public transport. Access to affordable and reliable electricity is critical for the development of the cities. For example, e-mobility is a critical aspect of a smart city which can be implemented by providing uninterrupted power.

SUSTAINABILITY PLANNING IN SCPs
The Smart City models support compact urban growth thereby reducing the environmental impacts of sprawl and focus on the development of dense, socially mixed neighbourhoods that promote human-scale urban environments and healthy public green spaces to maintain livability. They also promote transit oriented development (TOD) and focus on smarter transport systems including Bus Raid Transits (BRTs), bicycle and car...
sharing, smarter traffic management systems, electric vehicles and are complemented by smarter urban utilities including efficient energy using renewable energy sources, waste and water management systems, street lighting technology, smart grids and more efficient buildings, both via retrofitting and redevelopment.

A preliminary glance at the self assessment evaluation process which the cities had to undertake to establish their existing condition reveals 11 criteria of a possible 24 having a direct positive relation with sustainability. These factors are listed as compact, mixed use, public open spaces, transport, walkable, energy source, energy efficiency, water management, air quality, solid waste and waste water management. The mission also challenged the cities to look at convergence with other sustainability initiatives of Government of India such as the National Solar Mission. The acknowledgement by the cities of the importance of sustainability planning is reflected in the proposed projects by the 20 lighthouse cities selected in the first round. Some highlights from the proposals are:

- Overall 256 projects have been identified by the 20 cities for sustainability. The targeted investments for these 256 projects amount to $1.7 Billion or about 25% of the total smart city investments of the 20 cities.

- The projects were classified into four main priority areas,
  - Green city design and resilient infrastructure - 153 projects amounting to $968 million. Projects vary across greenway and open space design, water recycling, solid waste management systems, rainwater harvesting, dual piping systems and air-quality monitoring etc.
  - Energy efficient public transport - 39 projects amounting to $118 million, varying across bicycle sharing systems, electric/hybrid buses, pedestrian networks and ICT applications for bus route, travel planning etc.
  - Energy efficient and sustainable buildings - 24 projects amounting to $307 million. Projects primarily targeting rooftop solar panel systems and LED lighting for municipal and private buildings.
  - Smart energy systems and grids for cities - 40 projects amounting to $339 million. City level projects ranging from solar power generation, wind based energy, energy efficient water pumps, smart grid implementation etc.

Thus the 20 lighthouse cities have recognised the environmental, social and economic benefits of mainstreaming projects geared towards climate adaption and air quality improvements. The successful implementation will require knowledge diffusion within the city agencies, partnerships with communities and businesses and institutional commitments to scale up these innovations to city scales.

INTEGRATED APPROACH TOWARDS ENVIRONMENTAL SUSTAINABILITY - CASE OF GUWAHATI

Guwahati is introducing sustainability into the city by emphasizing on retrofitting of contiguous area of 696 acres of connected water bodies of the city. Objective of this strategic plan is to design and implement projects which can mitigate floods, improve access, and manage recreational, cultural and ecological assets in the proposed area and reconnect the city to its riverine ecosystem. Transformation of degraded water bodies which include the Deepar Beel wetland, Morabharalu stream, Bharalu river, Borsola Beel and the Brahmaputra riverfront into performing ecological landscapes and further into tourist attractions is the key component of this strategic plan.

This ecological place making approach adopted by Guwahati is a visionary thought to showcase the linkages between environmentally sustainable development and economic growth of cities. With the aim of recapturing the spirit of Cheonggyecheon Stream Restoration Project in Seoul and Transformation of La Rambla in Barcelona, the city has proposed a sustainability project of higher order which can boost economic development and the quality of life.

The environmental sustainability strategy of Guwahati is a unique contribution to Smart City Development in India. As such, it is a story that needs to be documented and analyzed as it unfolds during the implementation. The various touchpoints of Guwahati Smart City Proposal and Environmental Sustainability Practices followed by cities around the globe are:

- Strategic Plan based on aspirational goals of the citizenry and priority areas of the city
- Eco-restoration project
- Planning for Ecological, Sustainable and Resilient Infrastructure
- Introducing renewable energy as the primary source through projects like Solar Ribbon
- Evidence based planning through introduction of Hydrological Information Systems
- Planning for Eco-Mobility Projects
- Formalizing the informal Sector by allowing informal sectors to be recognized and integrated in special vendor markets within the project area.
- Public Realm Strategy
Role of ICT: From Governance to Planning and Beyond

BACKGROUND

The National Smart City Mission has been unique from other global smart city movements especially in defining the role of ICT in smart cities. The mission has attempted to converge both the ICT driven governance model (mostly in North American cities) with the ICT driven city planning and city operations model (mostly in East Asian cities such as Seoul, Singapore) thereby expanding the benefits of ICT.

The ICT driven governance or e-Governance model has been entrenched within India’s public service delivery and public administration for some time now.

The National Telecom Policy (1994), the New Telecommunication policy (1999) and the Information and Technology Act (2000) provided for the enabling policy frameworks to address the role of telecom connectivity and information technology both as export services and integral components of India’s infrastructure growth story. The National e-Governance plan of 2006 was the first comprehensive approach for making governments services available to the people through electronic media. The plan identified 27 mission mode projects to be implemented at center and state through deployment of common backbone infrastructure and making the services public accessible through Common Service Centers (CSCs).

The Jawaharlal Nehru Urban Renewal Mission (JnNURM) of 2005 provided similar mandate and momentum for the urban local bodies to provide government services through use of ICT technologies. The e-Governance Reforms formed one of three main strategic reform areas that had to be undertaken at the ULB levels. The idea was to bring about changes in traditional methods of management, administration and operation of the Urban Local Bodies (ULBs) with respect to service delivery by simplifying the process of interaction between the internal and external stakeholders. This reform area identified six areas of intervention for implementing ICT platforms for delivery of government services. These were basic services such as birth and death registration, revenue earning services such as property tax and licenses, development services such as water supply and other utilities and building plan approvals, efficiency improvement services such as procurement and monitoring of projects and finally for monitoring the citizen grievance redressal process. Of the 65 cities that reported the status of JnNURM reforms, 32% (21 cities) achieved all and 58% (38 cities) achieved at least 75% of the stated e-Governance reforms. Cities such as Nasik performed exceedingly well by implementing about nine modules dealing with property and water tax, accounting, birth and death, online citizen grievance, solid waste tracking etc. The JnNURM mission was partly yet importantly successful in establishing and developing the administrative capacities of the ULBs to adopt ICT driven governance.

Globally during the same period (mid 2000s onwards), cities such as Barcelona, Rio De Janeiro, Singapore, Amsterdam, Seoul, Tokyo started experimenting with wider adoption of ICT technologies to manage city operations such as traffic management, water and energy metering, public transport integration and solid waste management. There was a definite and conscious acceleration towards being counted amongst various typologies of the connected cities - knowledge cities, broadband cities, digital cities, eco cities, ubiquitous cities etc. Whatever the final notional ambition, the ponderance of ICT technology in every day urban planning and urban operations demand management was evident. Entire new cities such as Masdar and Songdo were developed on this paradigm of ICT to plan urban infrastructure and manage the demand for these urban resources.

ICT IN SMART CITIES MISSION

The National Smart City Mission too aimed to combine ULBs’ already existing capacities to leverage ICT technologies, till now limited to e-Governance and expand them to the planning and managing of Indian cities. Transportation management, metering of water, energy and air quality and disaster management allowed for quick learning from global examples and adoption to Indian cities. Moreover, the cities were challenged to learn the ‘beyond’ implications of ICT penetration within the city infrastructure, ranging from innovation hubs and disaster response to knowledge based entrepreneurship to social media outreach. The benefits accrued by integrating ICT within city development planning now expanded beyond transparency and accountability, ICTs were now being deployed for resource and resource utilization mapping (water and energy), for mitigating climate change risk (early warning systems), for altering citizen’s role in urban problem solving (through open data and mapping systems) and facilitating shared economies (AirBnB, car and ride sharing such as Uber, public wifi sharing).

The 20 lighthouse cities have recognised the important components required for successful integration of ICT within the urban fabric; the need for ubiquitous broadband networks (11 cities), the deployment of sensor based systems to reside on existing and new infrastructure (20 apps), the
development of city apps, city dashboards and open data to facilitate the understanding of everyday city operations (20 cities), the provision of spaces (innovation hubs, public spaces, command and control centers) for stakeholder collaboration and collective problem solving (15 cities) and finally the need for local government policy to leverage the use of ICT through capacity building and public outreach (6 cities). As expected, government policy to leverage ICT has the smallest number of takers currently and a wider formulation of government policy will occur only on a living and breathing ecosystem of ICT in everyday city operations.

Mobility and climate change mitigation has emerged as the primary beneficiary program areas of ICT interventions in the first round of the Indian Smart City Mission. The 20 lighthouse cities have proposed to invest $900 million and $550 million in ICT based technologies for climate change and mobility respectively over the next 5 years. The cities are more inclined to invest in smaller areas for ICT interventions for climate change adaption; 60% of the investments are identified for area based developments. On the contrary, mobility projects dictate city wide adoptions to achieve efficiencies of scale. Pan city proposals therefore have 72% of the investments targeted for ICT based solutions for mobility. The climate change adaption projects use ICT technologies predominantly for street lighting, extreme weather response and disaster management, solid waste management and renewable energy production using rooftop solar panels. As seen in the previous section, traffic management through intelligent signaling, common ticketing systems, smart bus shelters, web based apps are some of the wider applications proposed by the cities for ICT based mobility solutions.

In summary, the national smart cities mission has been able to help cities in visualising the usefulness of ICT adoption in areas beyond governance. As cities begin to integrate ICT within their urban infrastructure and urban planning systems, they will have to adopt a flexible (scalable in components) yet an integrated (resources needed for ICT deployment) approach to address emerging issues of digital inclusion, data privacy and collective decision making.
Comparison of Smart City Programs in India and the US

INTRODUCTION
In September 2015 the Obama Administration announced its smart cities initiative. It is part of the Administration’s overall commitment to target federal resources to meet local needs and support community-led solutions. (Office of Press Secretary, White House 2015). Starting only a few months after the announcement of the Indian Smart Cities Mission in June 2015, this initiative presents us with a unique opportunity to compare and contrast the difference in the two programs, highlighting the context specific characteristics of both. As we look at both these cases, it is essential that we remember the differences in the planning processes, level of decentralization and urbanization.

In 1992, the government of India passed the 74th Constitutional Amendment Act (CAA), which formally recognized urban local bodies. With this local-level empowerment came the opportunity to transform not only the way that citizens engaged with their government, but also the way that public services were delivered. But while this constitutional amendment was enacted over twenty years ago, only within the last decade has there been any real effort to implement these reforms in the urban sector (MAHIN 2015).

The Standard State Zoning Enabling Act (SZEA) of 1926 and the Standard City Planning Enabling Act (SCPEA) of 1928 are what set the American planning process apart. Text on the APA website calls the two laws -- known together as the Standards Acts -- “the basic foundation for planning and zoning.” In an interview Mitchell Silver of AICP discusses how the Acts have “allowed the orderly growth and development of cities in the United States” and offers that they help explain America’s more orderly transformation from agricultural to industrial economy as compared to the transformations currently in progress in less-zoned China and -- in particular -- India. He also talks of their significance discussing the late 19th and early 20th centuries, “people were flocking to the cities in massive quantities. Cities weren’t equipped for mobility. People were getting sick and dying. So the reason why this is so significant is that it put in place model legislation that states could adopt, which could in turn enable cities, counties, towns and villages to put these mechanisms in place that helped manage and plan for growth.” It is important to note that these words can easily be applicable to not so distant past in India’s context.

US SMART CITIES INITIATIVE
According to the White House Press Release, the American smart cities initiative pledges to invest over $160 million in federal research and to leverage more than 25 new technology collaborations to help local communities tackle key challenges such as reducing traffic congestion, fighting crime, fostering economic growth, managing the effects of a changing climate, and improving the delivery of city services. The document states that an emerging community of civic leaders, data scientists, technologists, and companies are joining forces to build “Smart Cities” – communities that are building an infrastructure to continuously improve the collection, aggregation, and use of data to improve the life of their residents – by harnessing the growing data revolution, low-cost sensors, and research collaborations, and doing so securely to protect safety and privacy. (Office of Press Secretary, White House 2015)

The White House also announced more than $35 million in new grants and over $10 million in proposed investments to build a research infrastructure for Smart Cities by the National Science Foundation and National Institute of Standards and Technology. Nearly $70 million has been identified in new spending and over $45 million in proposed investments to unlock new solutions in safety, energy, climate preparedness, transportation, health and more, by the Department of Homeland Security, Department of Transportation, Department of Energy, Department of Commerce, and the Environmental Protection Agency. It also states that more than 20 cities participating in major new multi-city collaborations that will help city leaders to effectively collaborate with universities and industry. Key Strategies of the initiatives - as press stated by the press release - are: creating test beds for “Internet of Things” applications and developing new multi-sector collaborative models, collaborating with the civic tech movement and forging intercity collaborations, leveraging existing Federal activity and pursuing international collaboration. (Office of Press Secretary, White House 2015)

COMPARISON WITH THE INDIAN SMART CITIES MISSION
India’s Smart Cities Mission is a $15 Billion urban development scheme, largest of its kind in scale of expenditure and number of citizens affected. As world’s greatest democracy, India’s urban development agenda is in the spotlight for the widespread impact it will have on generations to come and on this stage, the Smart Cities Mission is the flagship scheme which is meant to drive the nation towards a sustainable and inclusive future.

Indian and American Smart Cities programs have many differences including budget, timeline, implementation plan, recipients of funds, method of engagement of the cities and citizens, role of government department, role of states and involvement of private, non-profit partners and educational institutes among others. However, what truly sets them apart is their approach and this is a result of the different stages of urbanization both the countries are in. 80% of Americans live in an urban area as compared to the 31% of Indians. There is a vast service delivery infrastructure gap that India needs to cover. And while the number of Indians in urban settlements is expected to increase rapidly, the scale of urbanization defines...
the goals we see taking shape in each of the countries. India’s smart city mission focuses on capacity building and evolution of planning and management of city for implementation of smart solutions. While the main focus of the program are the IT based solutions for the city, the mission is also an exercise on strategic planning. American Smart Cities Initiative on the other hand is purely based on the search for smart solutions to urban problems. This effectively defines the term smart cities in context of these two countries.

The Indian Smart Cities mission is a city driven exercise. It is managed by the Ministry of Urban Development along with the coordination of respective states. Its focus is on development of smart city plans for 100 cities which are comprehensive and informed by extensive citizen engagement in solving the urban problems. It engages with a wide range of government agencies and departments, and works with multiple urban schemes currently being implemented including AMRUT, Swachha Bharat and HRIDAY. It works with a horizontally integrated and bottom up planning and management approach.

The American Smart Cities Initiative is driven through various agencies and organizations - public, private, academic and non-profit. The key word here is adaptability. With many cities already engaged in comprehensive planning in some form at the local level, this mission is bringing innovation and technology closer to the ground. With a total of $160 million grant from the government, different departments and government agencies such as Department of Transportation, Department of Homeland Security and the Environmental Protection Agency are proposing their specific schemes. Each has their own set of goals and agendas and agencies have also identified non-government partners in some cases. For example, US Department of Transportation has pledged up to $40 million, under the competition titled Smart Cities Challenge. (funding subject to future appropriations) to one city to help it define what it means to be a "Smart City" and become the country's first city to fully integrate innovative technologies – self-driving cars, connected vehicles, and smart sensors – into their transportation network. (US DDOT 2016). Vulcan will contribute $10 million, as well as technical assistance and guidance for the seven finalist cities to help improve their proposals for final consideration. (Vulcan n.d.) Many cities and organizations have already been working on projects related to smart cities for a while. Collaboration between City of Chicago, University of Chicago, Urban Center for Computation and Data of the Computation Institute, Argonne National Laboratory on Array of Things is one such project. Array of Things has recently secured $3.1 Million from the National Science Foundation. (DAN CORREA, White House 2015)

The smart cities mission is part of India's broader urban agenda which aims cover the gap in service delivery infrastructure. Working with missions such as AMRUT and Swaccha Bharat, it is meant to provide ICT enabled solutions for improving quality of life. AMRUT, the largest program of all covers 500 cities and second largest Swaccha Bharat covers 476 cities. Complementary to the area based comprehensive planning driven Smart Cities Mission, both these programs are infrastructure heavy and are implemented through specific projects.

References
Ahluwalia, Isher Judge. Planning for Urban Development in India. ICRIER.
District Heating and District Cooling Systems in France

INTRODUCTION

District heating, also known as heat network, is a system for distributing heat generated in a centralised location for multiple residential and commercial heating requirements. District heating plants provide higher efficiencies, lower costs and better pollution control than localised boilers, reducing carbon emissions. District cooling on the other hand, working on broadly similar principles, delivers chilled water to buildings which require cooling. The source for the cooling can be sea water, which is cheaper and more sustainable than using electricity to run air conditioners for cooling.

Today in France, there are over 500 district heating district heating and 17 district cooling systems. The heat networks serve approximately an equivalent of 2 million residential units, including 2/3 in the residential sector. This represents 6% of national heating needs. Present in dense urban areas, 40% of these networks are powered by renewable energy sources. The French government has set the ambitious goals of increasing the share of renewable energy to 75% and tripling the number of connected residential units by 2020. (Syndicat national du chauffage urbain et de la climatisation urbaine, 2014)

DISTRICT HEATING

A district heating system includes one or more heat generating units, a primary distribution system wherein heat is transported by a heat transfer fluid, and a set of exchange substations, from which the buildings are serviced by a secondary distribution network. Heat can be obtained from several sources such as a fossil fuels, waste incineration, biomass incineration (essentially wood), geothermal heating, heat pumps, solar power or nuclear power. Some heat production units operate also in cogeneration mode, simultaneously producing electricity and heat.

The primary distribution network is a loop which leads the heat transfer fluid from the heat generating unit to the exchange sub-station. This fluid can be water or steam, conveyed by pipes made of a jacketed system: an outer sheath steel inside which there is another steel sheath surrounded by a insulation thickness and carrying the heat transfer fluid.

Generally located at the foot of buildings, exchange sub-stations consist of a heat exchanger that transfers heat between the two circuits. Substations also have smart heat meters which enable to know the building’s energy consumption.

DISTRICT HEATING: EXAMPLE OF THE PARISIAN HEAT NETWORK

In Paris, the district heating was widely developed during the 20th century, even though its origins can be traced back to the 14th century. It is operated by the Parisian Urban Heating Company (Compagnie Parisienne de Chauffage Urbain or CPCU) which produces heat as a vapour in eleven production sites from multiple energy sources. The network operates in closed circuit: once the hot fluid (steam) has delivered its calories, it returns in the form of chilled water (condensate) to heating stations which reprocess it.

Composition of the energy mix:

- Solid waste incineration: 41%
- Natural gas: 30%
- Coal: 16%
- Biomass: 10%
- Bio-fuel: 2%
- Geothermal: 1%

The network is 480 km long, has a total power of 300 MW and serves 17 municipalities of the Paris metropolis. In 2014 it delivered to customers 4.4 TWh of heat.

DISTRICT COOLING

The functioning of a district cooling system is the exact opposite of that of a district heating system: the cooling network collects heat in served buildings and evacuates it at a cooling station including a heat discharge point. Heat is transported by a cooling fluid (usually water, whose temperature is between 1 and 12 °C in the first leg, and between 10 and 20 °C return). Although less common, the cooling networks have advantages over individual air conditioning systems: lower environmental impact, reduction emissions of greenhouse gases, ability to use diverse sources of energy including renewable ones, lower costs, etc. France has 17 district cooling systems, the difference between the numbers of heating and cooling networks being of course explained by the climate. The dominant technology in cooling networks being the compressor (95%), which is
basically the same technology as individual air conditioning systems or fridges, but at a larger scale. However, some other technologies do exist to power district cooling systems, such as exploitation of deep water or underground coldness.

**DISTRICT COOLING: SEA WATER AIR CONDITIONING PROJECT IN RÉUNION ISLAND**

Réunion Island is an overseas region of France located in the Indian Ocean. This small volcanic island (2,500 km²) is situated about 900 km east of Madagascar and 175 km southwest of Mauritius, the nearest islands. As of 2014, its population numbered about 850,000 inhabitants. The climate there is tropical, which explains the need for cooling systems.

Sea Water Air Conditioning (SWAC) project is an urban scale infrastructure project for cold production from deep marine waters alongside with a distribution network providing air conditioning to Saint-Denis, the main city of Réunion Island. The project consists of offshore pipes, a pumping station and a distribution network, which will be designed to deliver a power of 40 MW. The cost of this project is estimated at about €150 million. Once approved, its implementation could be as early as February 2018.

The cold source will be provided by seawater collected at a distance of about 6 km from the coast and at a depth of 1,100 m by offshore pipes. Thanks to a deep polar marine current coming from the South, the water temperature at this depth is 5°C all year round. The cold water distribution network will consist of 23 km of insulated pipes, serving over 60 sites including large consumers, such as the hospital centres, the university, the airport, several state departments, the Regional Council’s headquarters, residential buildings, etc. In total, over 400,000 m² of floor surface could be supplied. Servicing points will be equipped with smart meters enabling real-time adjustment of supply to demand.

This technology, using a renewable source of energy, needs up to 90% less electricity compared with conventional cold production systems. Eventually, the network will remove up to 40 MWh/year from the island electric consumption, which is equivalent to the greenhouse gases emissions of 16,000 vehicles.

This innovative project will allow Réunion Island to significantly reduce its carbon footprint and generate jobs. Moreover, it will be a global showcase, opening the way for other similar projects in the intertropical belt.

**References**

Enquête annuelle nationale sur les réseaux de chaleur et de froid, Syndicat national du chauffage urbain et de la climatisation urbaine, 2014

Les réseaux de chaleur à Paris et en petite couronne, Atelier Parisien

d’Urbanisme, 2006

http://reseaux-chaleur.cerema.fr/

http://www.cpcu.fr/
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABD/ABP</td>
<td>Area Based Development/Area Based Proposal</td>
</tr>
<tr>
<td>AICP</td>
<td>American Institute of Certified Planners</td>
</tr>
<tr>
<td>AMRUT</td>
<td>Atal Mission for Rejuvenation and Urban Transformation</td>
</tr>
<tr>
<td>APA</td>
<td>American Planning Association</td>
</tr>
<tr>
<td>BRT</td>
<td>Bus Rapid Transit</td>
</tr>
<tr>
<td>CAA</td>
<td>Constitutional Amendment Act</td>
</tr>
<tr>
<td>CCTV</td>
<td>Closed Circuit Tele-Vision</td>
</tr>
<tr>
<td>CBD</td>
<td>Central Business District</td>
</tr>
<tr>
<td>CDM</td>
<td>Clean Development Mechanism</td>
</tr>
<tr>
<td>CFL</td>
<td>Compact Fluorescent Light</td>
</tr>
<tr>
<td>CPCU</td>
<td>Compagnie Parisienne de Chauffage Urbain</td>
</tr>
<tr>
<td>CSC</td>
<td>Common Services Centre</td>
</tr>
<tr>
<td>C &amp; D</td>
<td>Construction and Demolition</td>
</tr>
<tr>
<td>DOT</td>
<td>Department of Transportation</td>
</tr>
<tr>
<td>EWS</td>
<td>Economically Weaker Section</td>
</tr>
<tr>
<td>FAME</td>
<td>Faster Adoption and Manufacturing of Hybrid and Electric Vehicles</td>
</tr>
<tr>
<td>FSI</td>
<td>Floor Space Index</td>
</tr>
<tr>
<td>GZC</td>
<td>Government to Citizen</td>
</tr>
<tr>
<td>GCRSSPPP</td>
<td>Grid Connected Small Solar Power Plant Programme</td>
</tr>
<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
</tr>
<tr>
<td>GIS</td>
<td>Geographic Information System</td>
</tr>
<tr>
<td>GPS</td>
<td>Global Positioning System</td>
</tr>
<tr>
<td>HHI</td>
<td>Herfindahl Hirschman Index</td>
</tr>
<tr>
<td>HRIDAY</td>
<td>Heritage City Development and Augmentation Yojana</td>
</tr>
<tr>
<td>IAP2</td>
<td>International Association for Public Participation</td>
</tr>
<tr>
<td>ICT</td>
<td>Information and Communication Technology</td>
</tr>
<tr>
<td>ITS</td>
<td>Intelligent Traffic and/or Transportation Systems</td>
</tr>
<tr>
<td>JNNSCM</td>
<td>Jawaharlal Nehru National Solar City Mission</td>
</tr>
<tr>
<td>JnNURM</td>
<td>Jawaharlal Nehru National Urban Renewal Mission</td>
</tr>
<tr>
<td>KMC</td>
<td>Kakinada Municipal Corporation</td>
</tr>
<tr>
<td>LED</td>
<td>Light Emitting Diode</td>
</tr>
<tr>
<td>MLA</td>
<td>Member of Legislative Assembly</td>
</tr>
<tr>
<td>MoUD</td>
<td>Ministry of Urban development</td>
</tr>
<tr>
<td>MRT</td>
<td>Mass Rapid Transit</td>
</tr>
<tr>
<td>NCRPB</td>
<td>National Capital Region Planning Board</td>
</tr>
<tr>
<td>NDMC</td>
<td>New Delhi Municipal Council</td>
</tr>
<tr>
<td>NEMP</td>
<td>National Electric Mobility Plan</td>
</tr>
<tr>
<td>NMT</td>
<td>Non Motorised Transport</td>
</tr>
<tr>
<td>O&amp;M</td>
<td>Operation and Maintenance</td>
</tr>
<tr>
<td>PCP</td>
<td>Pan City Proposal</td>
</tr>
<tr>
<td>PMAY</td>
<td>Pradhan Mantri Avas Yojana</td>
</tr>
<tr>
<td>PPP</td>
<td>Public Private Partnership</td>
</tr>
<tr>
<td>SBM</td>
<td>Swachh Bharat Mission</td>
</tr>
<tr>
<td>SCP</td>
<td>Smart City Proposal</td>
</tr>
<tr>
<td>SCPCEA</td>
<td>Standard City Planning Enabling Act</td>
</tr>
<tr>
<td>SPV</td>
<td>Special Purpose Vehicle</td>
</tr>
<tr>
<td>SZEA</td>
<td>Standard State Zoning Enabling Act</td>
</tr>
<tr>
<td>SWAC</td>
<td>Sea Water Air Conditioning</td>
</tr>
<tr>
<td>SWOT</td>
<td>Strength-Weakness-Opportunity-Threat</td>
</tr>
<tr>
<td>TOD</td>
<td>Transit Oriented Development</td>
</tr>
<tr>
<td>ULB</td>
<td>Urban Local Body</td>
</tr>
</tbody>
</table>

For any comments/suggestions please contact Siddharth Pandit, Chair, CIDCO Smart City Lab at spandit@niua.org