

## A Study on “Smart City Pune”

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### ABSTRACT

According to the Smart City Mission, this project will drive economic growth and improve the quality of life of people and enable development of local areas. It will help connect technology which will lead to smart outcomes. The government aims to redevelop slums and convert them into better planned ones which will in turn improve the livelihood of the entire city. To accommodate expanding population of the country, new areas will also be developed around the already existing cities. A smart city will be the one which will be able to use technology, information and data to improve infrastructure and services. It will also focus on employment and that the poor and the disadvantaged have some source of income.

### INTRODUCTION – SMART CITY

Pune is the eighth largest city in India in terms of both population and GDP. Driven by rapid urbanization, Greater Pune's population will grow from 5.5 mn to 7.7 mn by 2030, putting severe strain on core urban infrastructure and impacting the liveability quotient of the city.

Cities are engines of growth for the economy of every nation, including India. Nearly 31% of India's current population lives in urban areas and contributes 63% of India's GDP (Census 2011).

With increasing urbanization, urban areas are expected to house 40% of India's population and contribute 75% of India's GDP by 2030. This requires comprehensive development of physical, institutional, social and economic infrastructure. All are important in improving the quality of life and attracting people and investments to the City, setting in motion a virtuous cycle of growth and development. Development of Smart Cities is a step in that direction.

In the approach to the Smart Cities Mission, the objective is to promote cities that provide core infrastructure and give a decent quality of life to its citizens, a clean and sustainable environment and application of 'Smart' Solutions. 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 light house to other aspiring cities**. The Smart Cities Mission of the Government is a bold, new initiative. It is meant to set

examples that can be replicated both within and outside the Smart City, catalysing

The creation of similar Smart Cities in various regions and parts of the country. Smart City Mission is a critical imperative for Pune to ensure that it becomes a liveable and sustainable city in spite of severe resource pressure and population growth. A set of smart initiatives, driven by “less is more” philosophy, will be the cornerstone of this transformation.

The **core infrastructure elements** in a Smart City would include:

- I. adequate water supply,
- ii. Assured electricity supply,
- iii. Sanitation, including solid waste management,
- IV. Efficient urban mobility and public transport,
- v. affordable housing, especially for the poor,
- VI. Robust IT connectivity and digitalization,
- vii. Good governance, especially e-Governance and citizen participation,
- viii. Sustainable environment,
- ix. Safety and security of citizens, particularly women, children and the elderly, and
- x. health and education.

### ➤ Features of a 'Smart City'

1. To make use of the land close to one another and make land use more efficient.
2. Housing opportunities will be expanded for all, basically a 'Housing for All' motive.

3. One interesting factor of the project is that the government plans to reduce congestion, air pollution and resource depletion to create walkable localities.
4. Public transport and road network will be enhanced but pedestrians and cyclists will also be given their space by providing services to them.
5. Parks, playgrounds and recreational spaces will be developed. This is to enhance the quality of life of citizens and to promote eco-balance.
6. Governance will be aimed to be citizen-friendly and cost effective. Online services will be provided to the citizens and they will get an opportunity to participate in the governance through e-Governance.
7. The city will be given an identity which will be based on the main economic activity and these include enhancing local cuisines, health and education facilities. Arts and culture, sports goods, furniture, textile and hosiery will also be enhanced.
8. The government plans to apply smart solution to the infrastructure by making areas less vulnerable to disasters and by providing cheaper services to its citizens.

➤ **Strategy of a 'Smart City'**

There are four main strategies to develop a city in the Smart cities Mission:

- 1. Retrofitting:** To achieve smart city objective the government has introduced this strategy to plan on existing built-up area which will make the place more liveable and efficient for the citizens. This strategy aims to be completed in a shorter time frame which will lead to a replication of another part of the city and is applicable for 500 acres of land.
- 2. Redevelopment:** This strategy is to replace an existing built-up area to enable creation of a new layout with enhanced infrastructure which will be made using mixed land use and increased density. 50 acres of land will be needed to fulfil this strategy.
- 3. Greenfield:** This strategy will introduce smart solutions in a previously vacant area which has to be more than 250 acres. Innovative planning, land reconstitution, affordable housing will be the main features of this strategy. The main aim of this strategy is to address the needs of the population which is expanding day by day.
- 4. Pan-city:** Pan-city is an additional feature to be provided which will lay out smart solutions to the already existing city-wide infrastructure, according to Smart City Mission report. This strategy includes providing smart solutions to the transport sector by reducing the travel time and cost of citizens which will in turn have positive effects on productivity and quality of life of the citizens.

➤ **Case study – Pune, India**

Pune is the eighth largest city in India in terms of both population and GDP. Driven by rapid urbanization, Greater Pune's population will grow from

5.5 MN to 7.7 MN by 2030, putting severe strain on core urban infrastructure and impacting the livability quotient of the city. Smart City Mission is a critical imperative for Pune to ensure that it becomes a Livable and sustainable City in spite of severe resource pressure and population growth.

This executive summary of the Smartcity proposal is divided into the following sections:

**1. Understanding critical imperatives based on Pune city profile**

Pune already has several strengths, which the smart city initiative should build on, following

■ **Strong human capital** - 2nd largest varsities, 811 colleges with a student population of 6 Lakhs, 30% graduate workforce.

■ **Strong delivery on core urban services** – 94% households with tap water (71% for urban India), 57% MSW segregation (highest in India), 97% population covered by sewage systems (63% for urban India), 220 lpcd water (highest in India among top 10 cities), 100% electricity coverage with no load-shedding

■ **Well-functioning municipal council** – 2nd highest per capita expenditure in India (INR 9461/ citizen in 2013-14), with ~50% on capex.

■ **Established business centre** – Pune has a diverse base of industries – IT, auto, and pharma and is the 2<sup>nd</sup> biggest software hub in India contributing to 9% of total software exports, also a top 5 FDI destination.

■ **Participatory democracy, with active corporate involvement** – First city in India to adopt participatory governance. Recently Pune City Connect was setup to bring corporates, eminent citizens together to work on CSR activities on city level issues.

■ **Natural resources** – Sufficient water at aggregate level (1250 MLD) which is sufficient till 2047, moderate climate with temperature ranging from 12 to 38 degrees Celsius

■ **Vibrant culture** – Pune is often called the cultural capital of Maharashtra with a thriving arts and culture centre. It was the seat of power of Deccan India during the Peshwas in the 17-18th Century, and has never looked back since then.

■ **Good connectivity:** Pune is close to Mumbai and has an international airport, with the new International airport in Navi Mumbai nearby However, there are also several areas where some urgent intervention is required

■ **Challenge around congestion and traffic speed:** Pune's traffic comes to grinding halt in peak times, with average speed of 18 kmph (2013). This is driven by several factors like – Low share of public transportation (18% vs. 40%) driven by limited public transportation options and

limited usage of existing bus options – Lack of by-pass roads leading to city centre having 30% by-pass traffic, Low number of roads (9.5 km per sq km area compared to 20 in Delhi) with narrow width (75% of roads less than 24 m wide), Lack of signal synchronization leading to more traffic jams, Average trip length of 10 km driven by lack of mixed use development – Limited NMT options for pedestrians and cycles (50% commute < 5 km) With population growth, the traffic problem will become worse with average speed coming down to 12 kmph in 2030.

■ **Inadequate public transportation system:** Share of public transport in Pune is low – 19% compared to urban India’s average of 30%, and ideal state of 50%. This is driven by: – No MRTS (Pune is the only city of its size without MRTS) – Small bus fleet with only 33 buses per Lakh of population compared to benchmark of 55

■ **Inequitable distribution on water:** While Pune has highest per capita water availability, 15% of citizens get less than 150 LPCD benchmark while 20% of citizens get >300 LPCD on 24X7 basis. This is driven by

– Significant leakages (35% NRW)  
 – Lack of metering leading to excessing consumption in some areas (75% of commercial meters are not working, domestic meters are non-existent) – Topographical challenges in certain areas due to saucer shape terrain.

■ **Housing:** 60% of population can't afford bare minimum housing, and 28% of city's households live in slums (compared to 22% for national average)





■ **Environment and sustainability:** Once known for its dense tree cover, air quality (PM10 levels) in Pune stands at 91 compared to ideal state of 60. 355 MLD of untreated sewage is discharged into the Mula-Mutha River which has BOD levels of 50-80.

■ **Lack of model urban forms:** Since Pune is a historic city, the development has not been planned for most parts of the city. As such, it lacks the benchmark levels of open spaces (7% vs. 15%), uncluttered public places, walk ability, etc.

In summary, the Smart City initiative will be most beneficial for Pune, if it solves for core issues related to transportation, water and model urban forms.

**Different Phases of Ideas and Suggestions:-**

**CITIZEN ENGAGEMENT - Pune citizen engagement model' used a structured 5-phase approach is being used to maximize involvement of citizens**

Envision	Diagnose	Co-create	Refine	Share
<b>Phase – I</b> 17 <sup>th</sup> Sep-28 <sup>th</sup> Sep	<b>Phase – II</b> 29 <sup>th</sup> Sep-9 <sup>th</sup> Oct	<b>Phase – III</b> 9 <sup>th</sup> Oct-23 <sup>rd</sup> Oct	<b>Phase – IV</b> 23 <sup>th</sup> Oct-15 <sup>th</sup> Nov	<b>Phase – V</b> 15 <sup>th</sup> Nov-15 <sup>th</sup> Dec
<ul style="list-style-type: none"> <li>Ask citizens on inputs on creating a vision for the city</li> <li>Ask citizens the major areas of concern in the 12 sectors</li> <li>Playback results at the end of the phase</li> </ul> 	<ul style="list-style-type: none"> <li>Ask citizens about development opportunities &amp; issues in each core sector &amp; help identify most vital issues that need to be resolved</li> <li>Playback results at the end of the phase</li> </ul> 	<ul style="list-style-type: none"> <li>Ask citizens for detailed solutions to key pan-city issues</li> </ul> 	<ul style="list-style-type: none"> <li>Conduct delivery labs for extensive problem solving with key experts and citizens to refine solutions</li> <li>Open citizen discussion forums</li> </ul>	<ul style="list-style-type: none"> <li>Share the final set of solutions with citizens and open for suggestions and discussions</li> <li>Get acceptance of citizens through Pledge of support – Signature campaign</li> </ul> 

**1.2 Visioning and selection of Local-area for development**

A similar, comprehensive citizen engagement process was run for local area selection, with 2.81 lakh inputs for the area selection based on the criteria shared by the PMC. Citizen selection process, along with the discussions with the urban planners and elected representatives formed the basis for very objective local area selection.

**1.3 Phase 1 – Area evaluation and selection:** In this phase, 6 steps were followed to shortlist, evaluate and select area for local area development:

1. **Selection of development type:** Between the option of Greenfield, Redevelopment and Retrofit -Greenfield as unfeasible no continuous area of 500 acres is available in PMC limits (as required by smart city mission), similarly no continuous area of 50 acres was available order development. Retrofit was selected because of feasible and ease of replicability across Pune.

2. **Define assessment criteria for selection:** Based on discussion with city engineers, sector experts and architects, a 10 point assessment criteria was created to profile areas.

3. **Shortlisting of areas:** 11 continuous 500 acre areas were shortlisted based on ward data analysis and focus group discussions with urban planners.

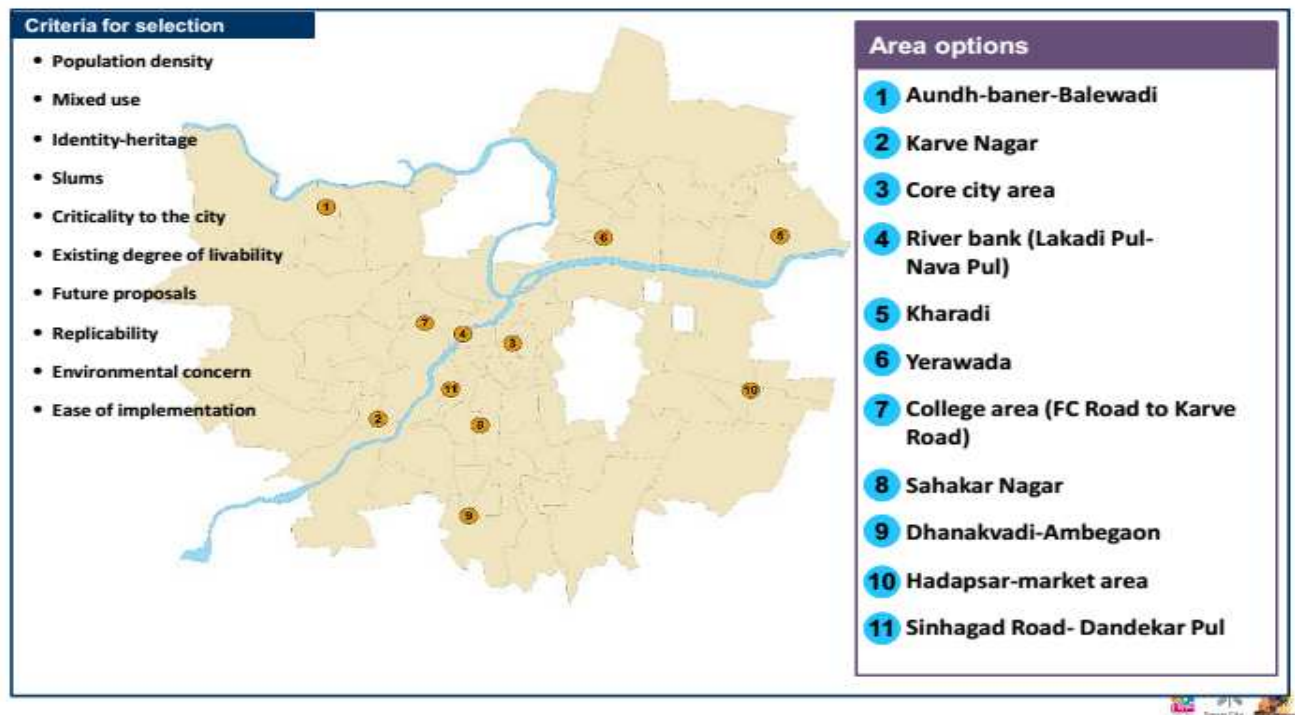
4. **Evaluation by citizen engagement:** 23,393 citizens were engaged over 6 days and provided 1.40 lakh inputs which formed the basis for regional assessment, Aundh-Baner-Balewadi (ABB) was the choice. In addition to this, Socio Economic Survey conducted for 700 families residing in notified slum areas by taking 1.41 lakh inputs

5. **Evaluation by sector experts:** Expert panel evaluated each of the shortlisted areas, ABB was the choice - scoring highest points

6. **Evaluation by elected representatives:** Municipal Commissioner of Pune engaged with 40 elected representatives across all political parties over 3 days and common consensus was achieved for ABB

■ **Phase 2 – Area-based competitions and profiling:** 50+ teams from architecture colleges across Pune participated in the ABB local area. Development competition and did extensive profiling of the area through walkthroughs and workshops.

### Eleven areas across Pune were initially considered as potential options for local area development based on 10 assessment criteria








■ **Phase 3 – Engagement with residents of ABB:** Extensive citizen engagement was done for 10,194 citizens with 2.14 lakh inputs (60% of total ABB households) and citizens were asked the issues in basic services they face and further their vision of the area and the smart features that it should have.

■ **Phase 4 – Sharing and acceptance:** Final proposal is being shared with the citizens before and citizens are pledging acceptance of the solutions and the Smart City proposal, goal is to 60% of households of ABB.



## These initiatives will improve key metrics of livability in the ABB area (1/2)

Sector	Metric	From	To	Benchmark
<b>1</b>  <b>Transport and mobility</b>	• Public transport usage (% of trip share)	• 18%	• 40%	• >50%
	• Number of buses (# per Lakh population)	• 46	• 79	• >55
	• Non-motorized vehicles (NMT) usage (%)	• 33%	• 50%	• >50%
	• Average traffic speed (km/hr)	• 18	• 22-23	• -
<b>2</b>  <b>Water and Sewage</b>	• Average water supplied (lpcd)	• 90-120	• 150	• >135
	• Water deficient areas (%)	• 60-70%	• 0%	• 0%
	• Sewage discharged into the river without treatment (%)	• 30%	• 0%	• 0%
	• Leakage and Non-revenue Water (%)	• 30%	• 15%	• <15%
	• Households with rain water harvesting	• 0%	• 100%	• 100%
<b>3</b>  <b>Sanitation and waste</b>	• Door-to-door garbage collection coverage (%)	• 0%	• 100%	• 100%
	• Waste segregated at source (%)			
	• Public toilets (number per lakh of population)	• 55% • 23	• 100% • 50	• 100% • >50
<b>4</b>  <b>Energy and Solar</b>	• Energy from renewable sources (0%)	• 0%	• 15-20%	• 20%
	• Energy efficient street-lights (% of total)	• 0%	• 100%	• 100%
<b>5</b>  <b>Amenities</b>	• Open spaces (% of total area)	• 3%	• 15%	• 10%
	• Number of pedestrian roads	• 0	• 1	• -
	• Roads with adequate footpaths (>2 m footpath)	• 40%	• 0%	• 0%

### Discussions

A brief review on recent projects in Pune.

In recent decade the development that have taken place are many, few of those notable projects were, BRT, Proposal for metro, Construction of flyovers, Provision for cycle tracks. These projects could have made a large impact in the development of pune as a smart city but due to improper planning and execution, these are considered as projects that have failed. The view on this projects is discussed briefly here.

1.**BRT:** (Bus Rapid Transport) the name itself gives the purpose of BRT which is not fulfilled by the punekar's, which doesn't fulfill its intended purpose of BRT.

2.**Proposal for metro:** The final action on construction proposal for metro is not done. As

the pune city is concern there will be huge cost on construction of metro and will not give the desired outputs due to its topography.

3.**Construction of flyovers :** The improper planning , delay in construction period, lack in alignment of flyover, & failure in diversion of traffic during construction of flyover causes traffic conjunction as well as delay in transportation. This can be minimized by overcoming the above requirements.

4.**Provision for cycle tracks:** This tracks are not used by the punekar's, as the pune city is concern there is no use on cycle track by the punekar's, as per the survey the cycle used by the punker's is 10 % and the cycle track constructed occupies about 25 % space of the

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road which can be used by the road if this tracks are leveled to the road surface by minimizing 40% of traffic, will effect in faster transportation.

**5. Water Supply:** Application of water meter is the only way to minimize the wastage of portable water.

**6. Drainage Arrangements:** Improper construction, poor maintenance cause the sewage water to flow over the road surface which cause accidents, odor and nuisance to the citizens.

By proper planning & decisions on the above mentioned points, pune city can become much faster in transportation and well in water supply and drainage too. Which will help partly the pune to become as as Smart City.

#### **CONCLUSION**

With a vibrant cultural heritage, a strong human capital and strong business environment as key strengths, Pune aspires to become one of the most livable cities in India by making its infrastructure world class & future proof, and by transforming its neighborhoods on key dimensions of livability like mixed use, open spaces and sustainable energy usage.

#### **REFERENCES**

- [1] Swachh Bharat Mission 2014 -2019, Ministry of Urban Development, India.
- [2] Ministry of Urban Development Government of India, Smart city Guidelines, 2015.
- [3] Pune Smart City – Making It a Reality 2015, Pune Municipal Corporation.