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Opportunity in **Smart Cities** of **Maharashtra**

A knowledge report by FICCI & MCAPL



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Foreword

FICCI in association with its knowledge partner Meghraj Capital Advisors Private Limited is pleased to present the handbook on opportunities emerging from the development of Smart Cities in Maharashtra.

Increasing urbanization in Maharashtra over the last few decades has led to greater pressure on existing infrastructure and highlighted the need for efficient delivery of urban services. Smart Cities seek to create usable urban spaces that leverage a city's inherent strengths, facilitate socio-economic development and enhance the quality of life of its citizens.

Pune and Solapur have already made it to the first list of 20 Smart Cities announced by the Government of India under the Smart City Mission. Kalyan-Dombivali, Thane, Nashik, Nagpur and Aurangabad have been selected for development as Smart Cities under the same scheme by Government of India in the third list announced recently. Mumbai, Navi-Mumbai and Amravati are to be taken up for development as Smart Cities by the State Government.

This handbook prepared by FICCI in association with its knowledge partner Meghraj Capital Advisors Private Limited seeks to provide an overview of recent developments pertaining to Smart Cities and villages in the state as well as highlight cross-sectoral investment opportunities that these initiatives provide for the private sector.

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Introduction



Source: in.nec.com (Smart cities shaping India's future)

1.1. Background and genesis of evolution of Smart Cities

A **smart city** is an urban development vision aimed at integrating multiple practical solutions with respect to infrastructure facilities and services to the citizens and also for efficient management of a city's assets. The goal of building a smart city is to improve quality of life by using urban informatics and technology to improve the efficiency of service delivery and meet residents' needs. Throughout history, a city's evolution has been driven by the needs of its residents and by its ability to integrate new innovations into its structure and way of life.

The concept of Smart City evolved over the last 20 years. Although Smart Cities have various applicable definitions, a Smart City may be broadly defined as a city that is able to respond to the needs of its citizens as promptly and efficiently as possible. Various aspects aimed at improving life in a city are typically examined in the context of a Smart City. These aspects include but are not limited to transportation, solid waste management, water supply, waste water treatment, planning, education, public administration, health care, energy efficiency and safety and security

Smart city solutions should be able

- To interact directly with the community and the city infrastructure
- To monitor what is happening in the city and ensure prompt corrective action in case of deviations from benchmarks
- To catalyze the city's evolution and future development through leveraging its strengths
- To ensure better quality of life for its citizens

A Smart City typically aims to:[1]

1. **Make more efficient use of physical infrastructure** (roads, built environment

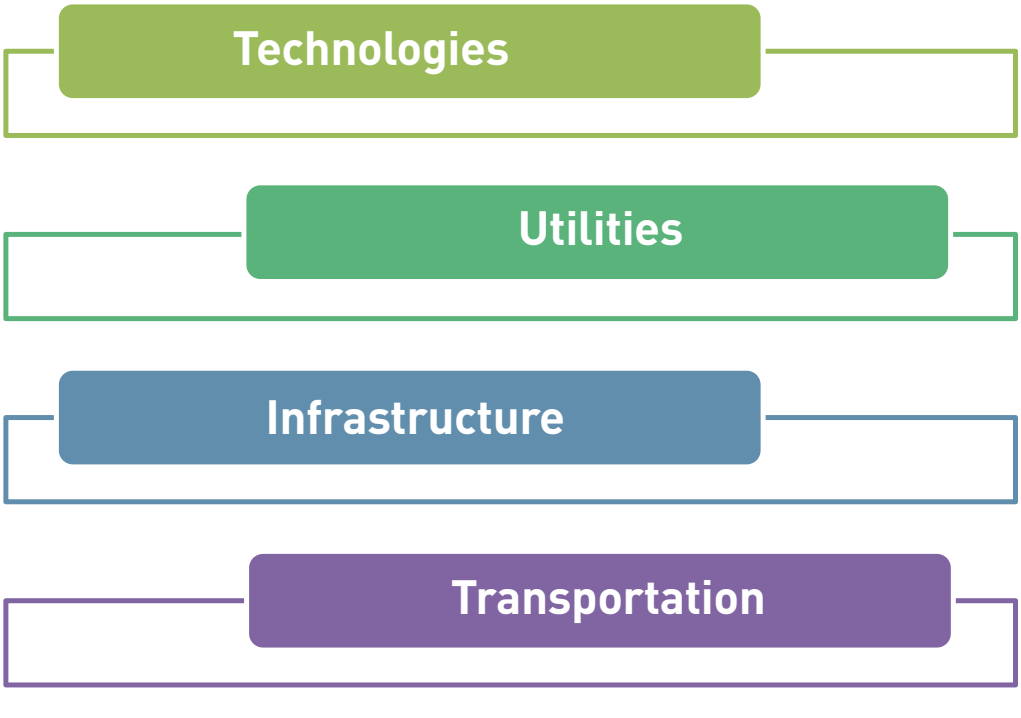
Source:
[1]Deakin, M; Allwinkle, S (2007). "Urban regeneration and sustainable communities: the role of networks, innovation and creativity in building successful partnerships". Journal of Urban Technology.

and other physical assets) through artificial intelligence and data analytics and thereby support strong and healthy economic, social and cultural development.
2. **Engage effectively with local people** in local governance and decision making by use of open innovation processes and e-participation, improving the collective intelligence of the city's institutions through e-governance, with emphasis placed on citizen participation and co-design.
3. **Learn, adapt and innovate** and thereby respond more effectively and promptly to changing circumstances by improving the intelligence of the city.

1.2. Smart Cities around the world

Since the days of the industrial revolution, cities have been the engines of economic growth. The revolution was effective in developing prosperity for many countries. Now with greater use of technology, a number of cities are accumulating data, delivering innovation, and enhancing lives of citizens.

Four essential components of a smart city[2]



Source:
[2]http://www.forbes.com/sites/peterhigh/2015/03/09/the-top-five-smart-cities-in-the-world/#4e33ca5e5a0e (by Peter High)

[3]http://freshome.com/2013/02/07/10-most-impressive-smart-cities-on-earth/



Examples of Smart Cities around the world:[3]

San Francisco (SF) is actively working on decreasing its carbon footprint by increasing use of power from renewable sources (41% renewable energy). The city has public electric vehicle charging stations at 110 locations. SF has also vastly improved the public transportation system that includes more buses and trains, as well as apps to show bikers and pedestrians the best routes through town. SF currently has a goal to achieve zero waste by the year 2020. The city's current waste diversion is 80%. There have been more than 60 software apps in public transportation with the help of city data soft

<- San Francisco

Amsterdam has partnered with companies like Phillips, Cisco and IBM to "go green" and make the city eco -friendly. Trash is collected by nonpolluting electric trucks. City bus stops, billboards, and lights are powered with solar energy. Thousands of households & businesses have had their roofs retrofitted with energy efficient insulation cutting down energy costs. Many homes have been upgraded with automatically dimming light switches, automatic shutting off appliances, smart meters connected to cell phones for real time analysis and ultra-low energy LED lights

Amsterdam ->



Tokyo started making the city green since 2006 and the goal is 1 million trees in the city. The city initiated the use of solar energy, renewable wind sources, and electric/hybrid cars for businesses and households that are going green. A few miles outside the main part of the city lies an eco-village built by Panasonic. This Zero carbon emission village focuses on using renewable energy & ultra-high efficient appliances. Home automation systems looks at weather forecasts & determines the best time to wash laundry, LED bulbs are installed throughout home and these use 1/6th of the energy that incandescent bulbs consume.

<- Tokyo

New York City (NYC) has created a vision to bridge the digital divide and provide Internet access to all of its residents. The city has launched an interactive platform which strategically places smart screens throughout the city to report news, events, and coupons and they are doing this by converting the old and underused public phone system. These smart hubs will have "Near Field Communication (NFC)" technology as well as Wi-Fi capability. NYC has also set up a challenge which offers 50,000 USD in cash and prizes to the best apps which utilize New York City's open data sets annually.

New York ->





Stockholm was named "Europe's Green Capital of 2010". The city has 1000 parks, seven nature reserves within the city, and residents annually recycle almost 100kg of waste per person. City has multiple ferries connecting various international destinations, high-speed trains connecting major cities, close to 2000 public buses & more than 1000 local trains and trolleys to move people around efficiently. Stockholm has implemented solutions like providing tax relief for companies who install motion sensors in their businesses in order to turn off lights when buildings are vacant.

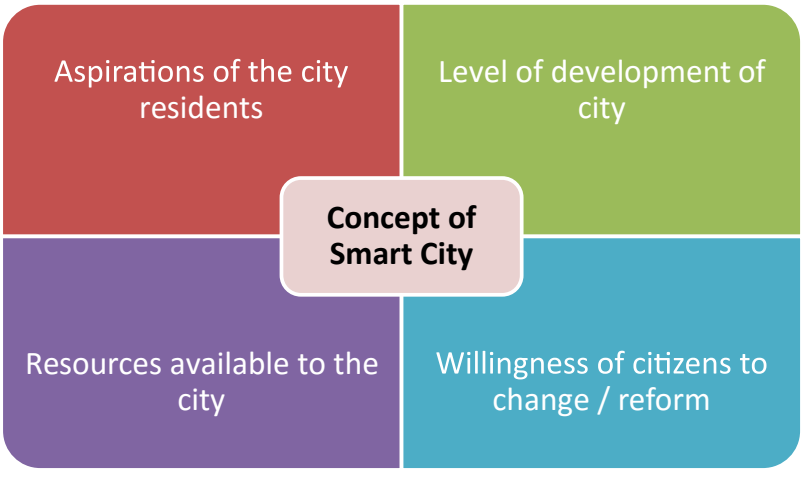
<- Stockholm

Copenhagen has attracted many innovative companies to use its city streets as a testing ground for green technology and these companies have created an eco-friendly smart neighborhood which houses 40,000 residents, created a similar amount of jobs for them, and is a model for green living. They have taken a practical approach to sustainable living as when there's no traffic on the streets the street lights turn off. The city has integrated air-quality meters in lamp posts throughout the city to monitor pollution trends along with intelligent street lighting and solar panel powered public areas.

Copenhagen ->



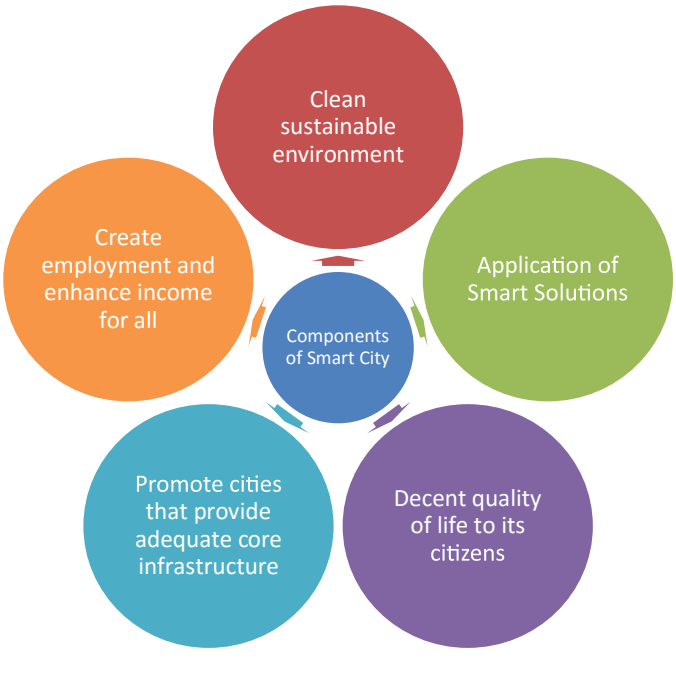
A Smart City means different things to different people and the definition of the concept also varies from place to place. The Smart City mission in India focuses on the following four aspects that a Smart City should address:



The entire urban ecosystem is represented by four pillars of Comprehensive Development which will also need to be addressed in the context of a Smart City

1. Physical Infrastructure
2. Social Infrastructure
3. Institutional Infrastructure
4. Economic Infrastructure

Key components of Smart Cities for sustainable and Inclusive development



Smart City development strategy[4]

- **Pan-city initiative** in which at least one Smart Solution is applied city-wide.
- **Develop Areas** step-by-step – three models of area-based developments
  a. Retrofitting,
  b. Redevelopment, and
  c. Greenfield

Retrofitting and redevelopment will transform existing areas into planned areas with the requisite infrastructure facilities improving the livability of the area and creating a developmental model that may be replicated citywide.

Greenfield development aims to develop 'Smart' infrastructure in new areas around the cities for accommodating and providing basic services and facilities for the expanding urban population of city. Greenfield developments aim at decongesting inner city areas and creating economic engines for cities with resultant employment opportunities.

Source:
[4]Smartcities.gov.in

[5]Smartcities.gov.in

The core infrastructure elements in a Smart City include:[5]

1. Adequate water supply
2. Assured electricity supply
3. Sanitation, including solid waste management
4. Efficient urban mobility and public transport
5. Affordable housing, especially for the poor
6. Robust IT connectivity and digitalization
7. Good governance, especially e-governance and citizen participation
8. Sustainable environment
9. Safety and security of citizens, particularly women, children, elderly
8. Health and Education

Integrated Smart City Development features

A

Promoting mixed land use in area based development

- Planning unplanned areas which contain a range of compatible activities and land use close to one another in order to make land use more efficient.
- States to enable flexibilities in land use and building bye-laws to facilitate change

B

Housing and inclusiveness

- Housing opportunities for all especially poor (affordable housing)

C

Creating walkable localities by

- Reducing congestion, air pollution and resource depletion
- Boost local economy
- Promote intersections and ensure security

D

Preserving and developing open spaces such as parks, playgrounds and recreational spaces to

- Enhance citizens' quality of life
- Reduce urban heat island (UHI)[6] effects
- Promote eco-balance in city

E

Promoting mobility services through

- Transit Oriented Development (TOD)
- Public Transport
- Last mile para-transit connectivity

F

Citizen-friendly and cost effective governance

- Online services to bring accountability and transparency
- Forming e-groups for complaints/ feedbacks of citizens

G

Establishing an identity for the city based on its main activity profile which could include:

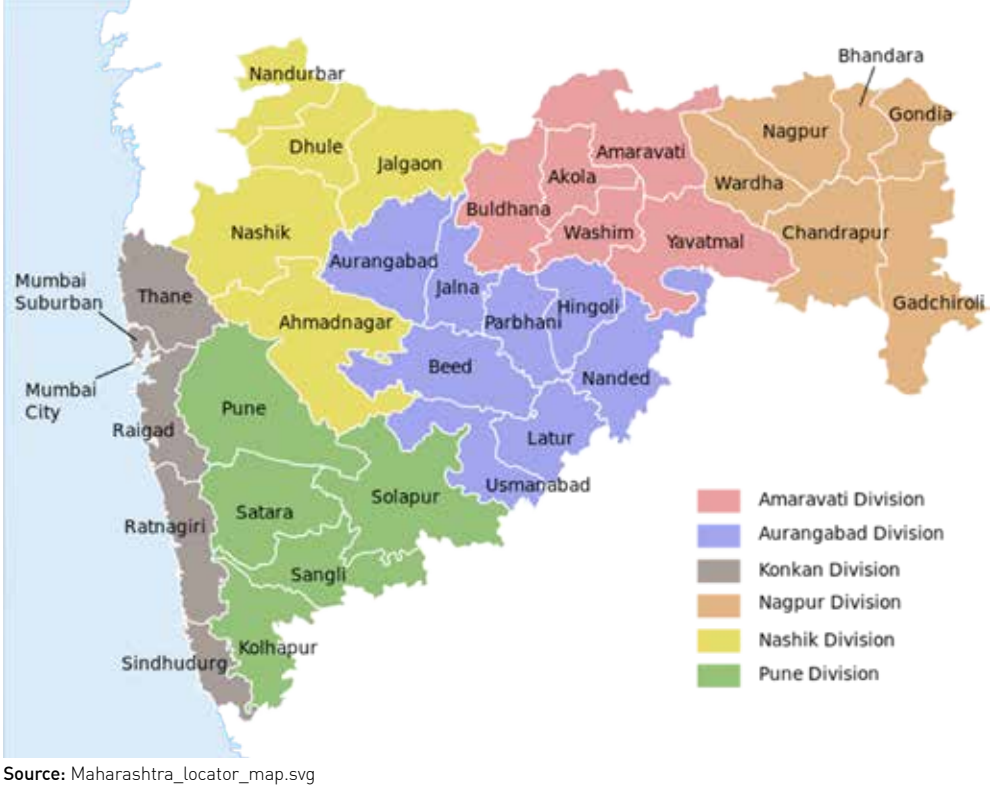
- Local cuisine
- Health and Education
- Arts and Craft
- Culture
- Games and Sports
- Furniture
- Hosiery
- Textile and Dairy

Developments related to Smart Cities in Maharashtra

2.1. About Maharashtra



Source: India grey.svg



Source: Maharashtra_locator_map.svg

Maharashtra is a state in the western region of India on the coast of the Arabian Sea and is India's second-largest state by area of 307,713 km² after Uttar Pradesh and second largest state in India in terms of population of 121.3 million (2016).

Maharashtra occupies the western and central part of the country and has a long coastline stretching nearly 720 km along the Arabian Sea. The Sahyadri mountain ranges provide a physical backbone to the State on the west, while the Satpuda hills along the north and Bhamragad-Chiroli-Gaikhuri ranges on the east serve as its natural borders. The State is surrounded by Gujarat to the northwest, Madhya Pradesh to the north, Chhattisgarh to the east, Andhra Pradesh to the south east, Karnataka to the south and Goa to the south west.

Maharashtra accounts for 9.3 per cent of the total population of India and the state is highly urbanized with 45.2 per cent people residing in urban areas, which is higher than the national average of 31.16 per cent. The State has 36 districts which are divided into six revenue divisions viz. Konkan, Pune, Nashik, Aurangabad, Amravati and Nagpur for administrative purposes, with the institutional framework for overall planning at the district level.

Source:
[6]An urban heat island (UHI) is a city or metropolitan area that is significantly warmer than its surrounding rural areas due to human activities and his temperature discrepancy is known as urban heat island effect. The phenomenon was first investigated and described by Luke Howard in the 1810s

2.2. Economic drivers for Maharashtra

Maharashtra's capital, Mumbai, has a population of approximately 18 million. It plays a key role in the economic development of India as it houses the headquarters of almost all major financial institutions, major banks, insurance companies and mutual funds. Maharashtra's and more importantly Mumbai's business opportunities along with its potential for higher economic standards attract migrants from all over India.

India's largest stock exchange Bombay Stock Exchange, which is also the oldest in Asia, is located in Mumbai. More than 41 per cent of the S&P CNX 500[7] conglomerates have corporate offices in Maharashtra.

Maharashtra is India's leading industrial state contributing 13% of national industrial output. 64.14% of the people are employed in agriculture and allied activities. Almost 46% of the GSDP is contributed by industry. Considerable progress made in the textile industry in Solapur, Ichalkaranji, Malegaon and Bhiwandi. It is also known for the co-operative sugar industry, where the farmers acquire the share in sugar mills. Pune is emerging as one of the largest automobile hubs in the nation.

The Government of Maharashtra established Maharashtra Industrial Development Corporation (MIDC) in 1962 to attract industries to different areas of the state. To date 233 areas have been developed around the state with emphasis on different sectors such as Industrial, IT, Pharmaceutical, and Wine.

Maharashtra accounts for approximately 18 per cent of the country's output of pharmaceuticals. Maharashtra is the top contributor with 35.04 per cent share of the total biotech revenues. The petrochemical industry has had significant growth in the state after the installation of India's offshore oil wells near Mumbai, in 1976. The state contributes 27.4 per cent to the country's chemicals, petrochemicals, oil and gas output.



MIDC in Butibori, an industrial suburb of Nagpur (Source: www.butiboriindustries.in)

Major Petrochemical and Chemical Hubs	
Petrochemical hubs	Chemical hubs
Mumbai	Thane
Nagothane	Mumbai
Rabale	Pune
Patalganga	Wardha

Source: Economy of Maharashtra @ webindia.com

Source:
[7]The **S&P CNX 500** is India's first broad-based stock market index of the Indian stock market. The **S&P CNX 500** represents about 96% of total market capitalization and about 93% of the total turnover on the National Stock Exchange of India (NSE).

Maharashtra accounts for approximately 33 per cent of the country's output of automobile by value.

The major automobile centers in the state include



- **Pune**
- **Nashik**
- **Aurangabad**
- **Nagpur**

Pune is the largest auto hub of India with over 4,000 manufacturing units only in Pimpri-Chinchwad region. Pune is home to large players like Bajaj Auto Limited, Daimler Chrysler Limited, Tata Motors, etc. Nashik is home to one of India's largest multi-utility vehicle manufacturer, Mahindra & Mahindra Limited.

Maharashtra occupies an important place in both the production and export of engineering goods from the country. The engineering industry in the state is highly diversified and produces a large range of machine-parts, from industrial machinery to industrial castings and forgings. The industry, which was initially concentrated in the Mumbai-Pune belt, has spread all over the state with the major production centers in Nagpur, Aurangabad, Nashik and Kolhapur.

The major engineering items of production and export in Maharashtra are

- Textile mill machinery
- Machinery for sugar
- Cement and chemical plants
- Food processing machinery
- Construction machinery
- Tractors
- Electric power machinery
- Transmission line towers
- Automobiles
- Ship-building

Maharashtra has also set up software parks in

- Mumbai
- Navi Mumbai
- Pune
- Nagpur
- Nashik
- Aurangabad
- Latur

Maharashtra is the second largest exporter of software with annual exports of ₹ 18 000 crores and accounts for more than 30 per cent of the country's software exports, with over 1,200 software units based in the state.[8] Maharashtra ranks first nationwide in coal-based thermal electricity as well as nuclear electricity generation with national market shares of over 13% and 17% respectively.

The share of agriculture and allied activities sector was 11.3 per cent in GSDP at current prices in 2013-14 while its share in employment was 52.7 per cent as per Census 2011.[9] Agricultural credit is an important input for improving agricultural production & productivity and reducing farmer distress. Crop insurance schemes are also implemented as a part of risk management and risk mitigation in agriculture.

Irrigation facilities are being extended so that agriculture could be made less dependent upon rain water. Maharashtra has by far the largest number of Dams in India and the net irrigated area totals only 33,500 square kilometres or about 16% of cultivable land.[10] Principal Monsoon crops include Rice, Jowar and Bajra. Other crops include wheat, pulses, vegetables and onions. The main cash crops include cotton, sugarcane, turmeric, and several oil seeds including groundnut, sunflower and soyabean. Most of the sugar production in Maharashtra takes place at mills owned by local cooperative societies. The members of the society include all farmers, small and large, supplying sugarcane to the mill.



Source:
Sugarcane weighing at a Cooperative Sugar mill in Maharashtra, India

Sugarcane weighing at a Cooperative Sugar mill in Maharashtra, India

Source:
[8]http://www.ibef.org/download/Maharashtra_060710.pdf

[9]Economic survey of Maharashtra (2014-15)

[10]Sengupta, S.K. "NATIONAL REGISTER OF LARGE DAMS – 2009" (PDF). Central Water Commission - An apex organization in water resources development in India. Central water Commission. Retrieved 14 January 2015.

2.3. Developments related to urban infrastructure in Maharashtra

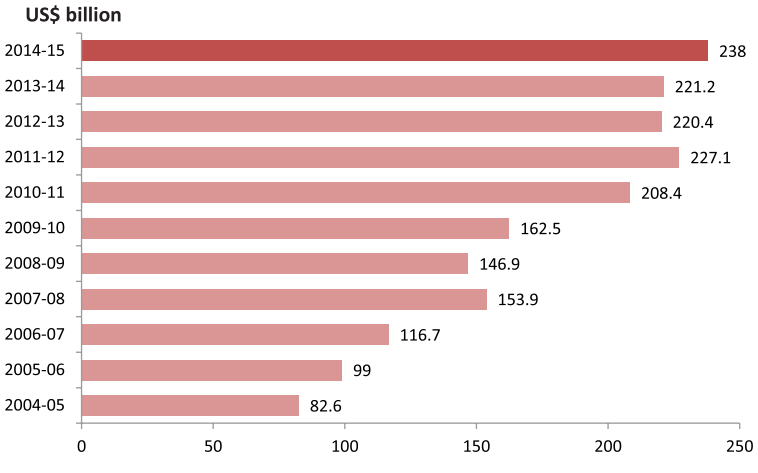
Maharashtra is one of the most advanced industrial states in country. It accounts for almost 15 per cent of the total industrial output of the country.

Major industries in Maharashtra include:

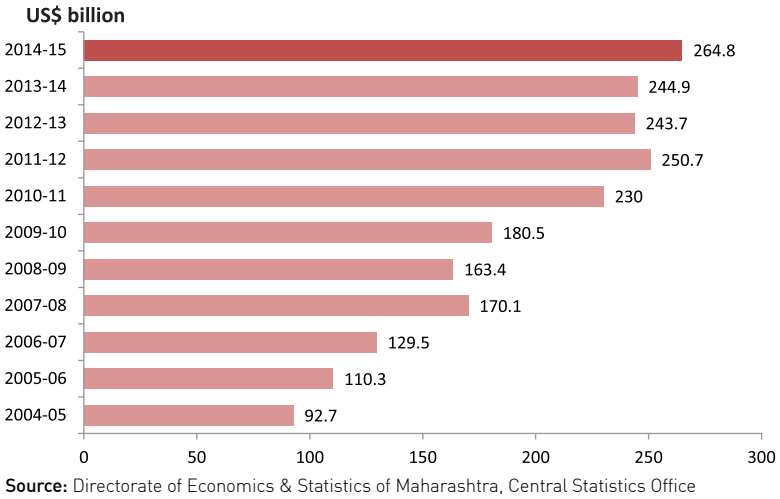
• Petroleum	• Metal products	• Engineering goods
• Chemicals	• Pharmaceuticals	• Steel
• Textiles	• Machine tools	• Iron castings

Maharashtra is known for its small scale industries and is a larger platform for the skilled and industrial labour. The industry oriented features and availability of skilled human resources makes the state an ideal destination for knowledge based and manufacturing sectors.

Net State Domestic Product (NSDP)



Gross State Domestic Product (GSDP)



Source: Directorate of Economics & Statistics of Maharashtra, Central Statistics Office

Between 2004-05 and 2014-15, Gross State Domestic Product (GSDP) expanded at a Compound Annual Growth Rate (CAGR) of 12.98 per cent to US$ 264.8 billion and Net State Domestic Product (NSDP) expanded at CAGR of 11.2 per cent to US$ 237.8 billion. State contributes 40 per cent of national fiscal receipts & 8.17 percent to total GDP of the Country's total investment, state accounts for 20 per cent of the proposed total investment under FDI in India, Maharashtra is at the top position.

FDI approved projects are mainly in the field of

• Services (24 per cent)	• Infrastructure (12 per cent)
• IT (21 per cent)	• Automobiles (10 per cent)

Policy	Purpose
Maharashtra IT/ITES Policy	To attract IT investments across the state, and incentivize IT industry
Maharashtra Renewable Energy Policy 2015	To increase power production from renewable sources by 16400 MW and from solar power by 7500 MW
Industrial Policy of Maharashtra 2013	To retain Maharashtra as the leader in industrial Investment in the country
Maharashtra Tourism Policy	To ease the land allotment process and also provide tax exemptions at the industrial rates.
Special Economic Zone (SEZ) Policy	To promote business friendly regime and rapid industrial development along with employment generation
Textile Policy of Maharashtra 2011-17	To lay special emphasis on raising processing units at various levels, from cotton to manufacturing textiles

Source: ibef.org.in

Physical Infrastructure:

Airport

The busiest airport of the country is located at Mumbai and an additional airport has been proposed at Navi-Mumbai as Navi Mumbai International Airport (NMIA). The Navi Mumbai airport will be developed through public-private partnership financial model, wherein CIDCO will have a 26% stake, & the rest will be held by the private developer.[11] The cost of the project has been estimated at ₹ 16,000 crore. There is also a proposal to set up a green field airport near Pune. Chikalthana Airport at Aurangabad has been upgraded recently to serve as an international airport.

Source:
[11]http://www.dnaindia.com/mumbai/report-navi-mumbai-airport-set-to-get-environ-nod-this-week-2228799



The state has 10 domestic airports with prime ones located at

• Mumbai	• Nagpur
• Pune	• Aurangabad

MIDC to execute setting up new international airport in Pune:

The state Government of Maharashtra has handed over the responsibility of executing the work of setting up a new international airport at Pune to Maharashtra Industrial Development Corporation (MIDC). This airport is planned to cover a large area of over 2428 hectares (6,000 acres), which will make it the largest airport in India post completion. The airport is planned to have two runways and once it is constructed there will be greater number of international flights.



Rail

The rail transport system of Maharashtra is very well developed. The state is well connected to other parts of the country with a railway network spanning 5,983 km. The Central Railways and the Western Railways, two of the zones of the Indian Railways, have their headquarters in Mumbai, at the Chhatrapati Shivaji Terminus and Churchgate respectively.

Maharashtra also has an intra-city/sub-urban network of railways. The sub-urban railways carry around 6.4 million passengers every day. The railway network in coastal Maharashtra is a part of the Western Railways that spreads across Gujarat, Rajasthan, Madhya Pradesh and Maharashtra. The Western Railways also serves some of the ports on the country's Western coast including the Mumbai port. Konkan railway connects Mumbai with Mangalore in Karnataka. Mumbai Metropolitan Region Development Authority (MMRDA) has undertaken mono rail, metro rail projects in Mumbai.



Roads

Maharashtra has a total road length of over 2,67,000 Km. The total length of its national highways is 4,176 Km and state highways is 33,705 Km. Under the on-going National Highway Development Programme (NHDP), 721 Km. is being converted into four to six lane highways. Mumbai-Pune Expressway of length 93 kms provides excellent connectivity between the key cities of the state.



Ports

There are basically two main ports located in the capital city of Mumbai i.e., Jawaharlal Nehru Port (JNP) and Mumbai Port. There are also several ports in the state that handle the export of ores mined in Maharashtra.

Jawaharlal Nehru Port

- Largest container port in India
- Handles over 56% of the container traffic in India[12]
- The port is currently ranked 31st among the top 100 container ports in the world
- Terminal of Western Dedicated Freight Corridor proposed by Indian Railways (section is from Sachin which is near Surat to Jawaharlal Nehru Port comprising of Sachin-Valsad-Vasai Road-Jawaharlal Nehru Port and construction bid is awarded in January 2016)
- Development of Fourth Container Terminal At JN PORT On DBFOT Basis -Project Schedule Development of Fourth Container Terminal At JN PORT On DBFOT Basis -Project Schedule and it will complete in the end of year 2017[13]

Mumbai Port

- The private sector participation in the Mumbai port has been through leasing out cargo berths for container handling and construction of a captive Coal Jetty by Tata Electric Company

Maharashtra Maritime Board has identified six ports for development during the next 10-15 years to cater to the needs of automobile and manufacturing industries as well as special economic zones being set up in the state and all the ports are being constructed on a Built-Operate-Transfer (BOT) basis. These include:

- Rewas-Aware Port
- Dighi Port
- Jaigad Port (Dhamankhol Bay)
- Jaigad Port (Lavgan)
- Vijaydurg Port
- Redi Port

Health Infrastructure:

There are 212 medical institutes and 136 nursing colleges with an annual intake of over 13,000 and 3,500 students respectively. The number of beds in various public and government aided health institutions in the state is 92,106, which is 930 beds per million population.

Government aided health care services include

Government aided health care services	Total (number)
Hospitals	964
Dispensaries	2081
Primary Health Centers	1806

Source:
[12]http://www.dnaindia.com/money/report-jnpt-to-build-rs-600-crore-container-terminal-on-ppp-model-1967125

[13]http://www.jnport.gov.in/future_plan.aspx

Educational Infrastructure:

Maharashtra has the second highest literacy rate in the country next only to Kerala.

Educational Institutions	Total in (number)
Primary Institutions	67800
Secondary Institutions	17530
Higher Institutions	1800
Industrial training Institutes (ITIs)	612
Engineering Colleges	344
Universities	10

The state houses some of the reputed national Research and Development institutes such as Centre for Development of Advanced Computing (C-DAC), National Chemical Lab, Tata Institute of Fundamental Research, National Environmental Engineering Research Institute and Bhabha Atomic Research Centre. Internationally reputed firms including Intel, Texas Instruments and Analog Devices have collaborated with IIT, Mumbai, to set up world-class laboratory facilities in areas of digital signal processing and microprocessors.

Power:

Maharashtra has the largest installed electricity generation capacity all over India. Its capacity to generate electricity has increased from 37,311 million kWh to 73,129 million kWh between 1990-1991 and 2006-2007. It has a captive power producing capacity of 704 MW. The state's industrial sector is the largest consumer of power and then comes the domestic agricultural sector. There has been a sharp rise in not just the production but also in the consumption of electricity. From the period between 1990-91 to 2006-07, the total level of consumption has increased from 29,971 million kWh to 62,085 million kWh. . Maharashtra is one of the states with significant presence of private sector players in the electricity generation and distribution business.



Major urban centres across the state and Infrastructure initiatives:

Overview of infrastructure initiatives	
Mumbai Urban Transport Project (MUTP)	• Mumbai Urban Transport Project (MUTP) aims to improve the transport infrastructure and services in Mumbai through investment in suburban railway projects, local bus transport, new roads, bridges, pedestrian subways and traffic management activities. • MUTP is estimated to cost approximately US$ 943 million. • The World Bank has sanctioned a loan of US$ 542 million for the project.
Mumbai Urban Infrastructure Project (MUIP)	• Mumbai Urban Infrastructure Project (MUIP) is a US$ 600 million project aimed at improving the road network in the Greater Mumbai region to facilitate efficient traffic management. • The project funded by the Mumbai Metropolitan Region Development Authority (MMRDA), envisages construction/improvement of over 450 km of the road network during the next three years.
Urban centres	
Navi Mumbai	• Located adjacent to Mumbai, Navi Mumbai comprises 14 self-contained nodal townships that are strung along the mass rapid transport corridors. • It is the only city in India to be featured on the well-known National Geographic Channel as one of the super cities across the globe. • Navi Mumbai provides a well-planned and laid out urban area suited to meet the needs of a services economy. • It also has adequate provision for establishment of industrial units in a planned manner. • Future development plans for Navi Mumbai include an IT Park, commuter rail project, golf courses, amusement park, international convention centre and international sports complex, among others.
Mumbai	• It is the financial and commercial hub of India with headquarters for most Indian and multinational banks, financial institutions and insurance companies including Reserve Bank of India, Merrill Lynch, Goldman Sachs, JP Morgan, Barclays, Duetsche Bank etc. • Most of the top Indian business houses as well as some of the world's top multinationals such as AT&T, General Motors, Daimler Chrysler, P&G, Shell, etc. have headquarters in Mumbai. • The city is also the main centre for capital market-related activities and home to the country's two largest stock exchanges. • The major industries in and around Mumbai are chemicals, textiles, financial services and IT/ITES.
Pune	• Pune is a prominent hub for automobile and IT industries. • The city houses a large number of national and international players including Tata Motors, Bajaj Auto, Daimler Chrysler, Fiat, Bharat Forge, Tata Consultancy Services, Infosys and Wipro, among others. • It is also a prominent education centre with a presence of over 100 colleges and institutions. • It has 12 industrial areas dedicated to automobiles, chemicals, consumer durables, engineering and Information Technology. • Pune is a major destination for automobiles and auto components, engineering, food processing, leisure & entertainment and biotechnology industries located in the state.
Nashik	• It has a significant presence of automobile and auto-components, engineering and grape processing industries. • The major players in Nashik include Mahindra and Mahindra, Schneider Electric, Siemens and Crompton Greaves. • It has seven industrial areas facilitating the industrial growth in the region, with a focus on engineering and automobiles. • Nashik is a potential destination for engineering, food processing and biotechnology industries in the state.

Nagpur	• Its unique location in the Indian sub-continent makes it a viable passenger and cargo hub. • It is a growing industrial centre and has 10 industrial areas. • It is home to reputed companies including Indo-Rama Synthetics, Electrolux and Voltas. • It is a potential destination for food processing, chemicals and engineering industries.

Given the relatively advanced stage of Maharashtra's economic development, the state is in a position to develop its strength to increase the growth of economic development. While the state's dominance in the industrial sector is increasing, its relatively well-developed infrastructure and the existing upstream and downstream industrial linkages provide an edge. Maharashtra is also well placed to significantly benefit from the on-going boom in the services sector, with its high per capita income and large urban population.

2.4. Developments related to Smart Cities

The Smart Cities Mission was launched by Prime Minister Narendra Modi in June 2015 and it is an urban renewal and retrofitting program by the Government of India with a mission to develop 100 cities all over the country making them citizen friendly and sustainable.

The 100 potential smart cities were nominated by all the states and union territories based on Stage 1 criteria, prepared smart city plans which were evaluated in stage 2 of the competition for prioritizing cities for financing.

In the first round of this challenge, 20 top scorers were chosen for financing support for a period of 5 years commencing from FY 2015-16.

The Smart cities are projected to be equipped with basic infrastructure that will offer a good quality of life through smart solutions and some of the requisite attributes of these smart cities include[14]

- Assured water and power supply
- Sanitation and solid waste management
- Efficient urban mobility and public transport
- Robust IT connectivity
- E-governance and citizen participation
- Safety of its citizens

A total of ₹980 billion (US$15 billion) has been approved by the Indian Cabinet for development of 100 smart cities and rejuvenation of 500 others.

This includes ₹48,000 crore (US$7.1 billion) for the smart cities mission and ₹50,000 crore (US$7.4 billion) Atal Mission for Rejuvenation and Urban Transformation (AMRUT).

Source:
[14]Narendra Modi launches smart city projects in Pune", Live Mint, 25 June 2016

S. No.	Name of State/ UT	Cities Shortlisted
1	Odisha	Bhubaneswar
2	Maharashtra	Pune
3	Rajasthan	Jaipur
4	Gujarat	Surat
5	Kerala	Kochi
6	Gujarat	Ahmedabad
7	Madhya Pradesh	Jabalpur
8	Andhra Pradesh	Visakhapatnam
9	Maharashtra	Solapur
10	Karnataka	Davangere
11	Madhya Pradesh	Indore
12	New Delhi	New Delhi
13	Tamil Nadu	Coimbatore
14	Andhra Pradesh	Kakinada
15	Karnataka	Belagavi
16	Rajasthan	Udaipur
17	Assam	Guwahati
18	Tamil Nadu	Chennai
19	Punjab	Ludhiana
20	Madhya Pradesh	Bhopal

The Urban Development Ministry had earlier released ₹2 crore (US$300,000) each to the mission cities for preparation of Smart City Plans.

Pune and Solapur are the two cities in Maharashtra among the 20 cities selected in the first list of 20 Smart cities and Jaipur, Surat, Kochi, Ahmedabad, Jabalpur, Visakhapatnam, Davanagere, Indore, Coimbatore, Kakinada, Belagavi, Udaipur, Guwahati, Chennai, Ludhiana and Bhopal are the other cities.

List of 20 Smart Cities Selected in 1st Round



20 Smart Cities[15]

The second list of 13 smart cities include Lucknow, Warangal, Dharamshala, Chandigarh, Raipur, New Town Kolkata, Bhagalpur, Panaji, Port Blair, Imphal, Ranchi, Agartala and Faridabad.

Second list of 13 smart cities

S. No.	Name of State/ UT	Cities Shortlisted
1	Uttar Pradesh	Lucknow
2	Telangana	Warangal
3	Himachal Pradesh	Dharamsala
4	Chandigarh	Chandigarh
5	Chhattisgarh	Raipur
6	West Bengal	New Town, Kolkata
7	Bihar	Bhagalpur
8	Goa	Panaji
9	Andaman & Nicobar	Port Blair
10	Manipur	Imphal
11	Jharkhand	Ranchi
12	Tripura	Agartala
13	Haryana	Faridabad



13 Smart Cities[16]

Each of the cities in Maharashtra selected under the Smart Cities Mission of the Govt of India will get funding support of ₹ 1000 crores over a period of five years (₹ 500 crores from the Centre and ₹ 500 crores from the State govt/ULB)

The Maharashtra Government initially proposes to take up other 8 cities for development as Smart Cities and has appointed nodal government agencies for the purpose. These cities include:

- Mumbai
- Thane
- Kalyan-Dombivali
- Pimpri-Chinchwad
- Nashik
- Amravati
- Nagpur
- Aurangabad

However, the Govt of India has now come out (on 20th September 2016) with a third list of 27 more cities to be supported for development as Smart cities. Five cities in Maharashtra namely Thane, Kalyan-Dombivali, Nagpur, Nashik and Aurangabad have been selected in the third list for development as Smart Cities under the Smart Cities Mission of the Govt of India and will be provided funding support from the Centre as well.

Source:
[15]SmartCities.gov.in". smartcities.gov.in. Retrieved 10 May 2016.

[16]SmartCities.gov.in". smartcities.gov.in. Retrieved 10 May 2016.

Smart Cities selected in Maharashtra under Smart Cities Mission and initiatives proposed

3.1. Pune Smart City

Pune is one of the six cities in Maharashtra that has been selected for development as a Smart City by the Government of India in the first list of twenty Smart Cities. Pune is ranked second among the twenty cities in the first list and is second only to Bhubaneshwar. Pune is the ninth-most populous city in India and also the second largest city in state of Maharashtra after the state capital of Mumbai. The city is known for its manufacturing and automobile industries, as well as for educational institutions offering courses in information technology (IT), education, management and training, which attract students, and professionals from India, South East Asia, the Middle East and Africa. Pune is also one of fastest growing cities in Asia-Pacific region. Pune has also emerged as a new start up hub in India with IT start ups setting up base in Pune.[17]

Strengths of Pune City



Source: MCAPL

[17]"Quality of Living City Rankings". Mercer Information Solutions business.

Main features of Pune Smart City:

Physical Infrastructure

- **Development in Aundh Baner Balewadi (Area Based Development-ABD)**
- Road widening
- Street Redesigning
- Bus stops
- BRTS
- Adequate water supply
- Fire Stations



Affordable Housing

- Making Pune slum-free by 2025 by constructing 20,000 affordable houses every year, for the next 10 years.
- In Aundh Baner Balewadi area, 300-400 affordable houses will be built at the cost of Rs. 40 Crore by December, 2020.



World Class customer Care

- Services proposed for water consumers - Online billing, website, IVR, smart metering etc will come together in the consumer center.
- This will be a single point of contact for grievances, enquiries and payment.



River Water Cleaning

- **Three pronged approach:**
- Massive cleaning effort to remove weeds and garbage
- Building sufficient sewage treatment capacity
- Use of river cleaning technologies such as root-zone technology.



Start up Zone

- Favorite destination for IT start-up (>400 local start-ups)
- Proposal of 8 acres start-up zone in Aundh-Baner-Balewadi, which will create at least 40,000 to 45,000 jobs
- PMC has collaborated with NASSCOM to help bring incubators and accelerators



Transit Hub

- Proposal of a multi-modal transit hub at the entry point to Pune in Aundh-Baner-Balewadi
- This will have capacity to accomodate 100 buses
- Will be developed by the SPV on a PPP model by November, 2018



Pan City Proposal: Transport

Mobility was identified as one of the critical areas requiring intervention during citizen engagement and stakeholder consultations at the time of preparation of the Smart City Proposal.

The pan city proposal related to transport aims at increasing public transportation usage from 15% to 30% by adding options of public transport like metro, BRTS[18], etc. Mobility enhancements also include increase in trip share of Non-Motorized Transport (NMT) to at least 30% with bicycles and walking as preferred mode of transport. Interventions related to public transportation and NMT seek to help Pune in improving mobility by increasing average speed from 18 kmph to 30 kmph.

The following key project interventions were identified through stakeholder consultations as pan city proposals aimed at enhancing mobility in Pune:

a. Smart Pune Public Transport System
b. Smart Pune Traffic Management System

a. "Smart Pune Public Transport System" to improve availability, reliability and passenger comfort

- Vehicle health monitoring system (VMS) across around 1080 buses with intelligent kits and back-end maintenance management system
- Real-time tracking of 100% buses (VTS) by installing GPS and setting up a central control room, to monitor driving quality and service levels
- CCTV surveillance and panic buttons on 510 buses to improve security
- Public information system (PIS) comprising of bus guides and LED screens depicting ETA and other critical information across all 190 bus-stops and ~510 buses, along with mobile app and website providing real-time information
- In-bus entertainment through Wi-Fi in 510 buses

b. "Smart Pune Traffic Management System" to reduce congestion

- Adaptive traffic signals across 295 signals with central command center (using sensors to count number of vehicles, based on traffic levels to reduce travel and fuel time)
- Smart parking across 7 Multi-level-car-parks, with PIS and real-time mobile app
- Private bus aggregators as bus and Shuttle to provide premium bus options
- Intelligent road asset management to improve road condition (using GIS)
- Traffic mobile apps and online portal with live and forecasted traffic
- Traffic analysis using CCTV feed and mobile GPS

Pan City Proposal: Water

The overall water supply in Pune City is adequate, although the distribution is not equitable and about 14% of population presently gets less than 135 lpcd due to issues such as topography, water supply for only couple of hours a day and lack of piped network facilities at household level.

A major part of the city receives intermittent water supply and many areas have water supply only for two to five hours each day. In view of the fact that Pune's water availability is adequate, one of the key goals is to ensure 24X7 water supply of at least 150 lpcd to 100% citizens.

The specific goals for water and sewage sector are 100% of citizens receiving 24X7 150 lpcd water, reduction in leakage and NRW from 30% to 15%, increase in reservoir storage capacity from 23% to 33%, 100% of city covered by sewage network compared to 91.3% now, 100% of waste water treated up from 73% and use of recycled water by industries, railways and the construction.

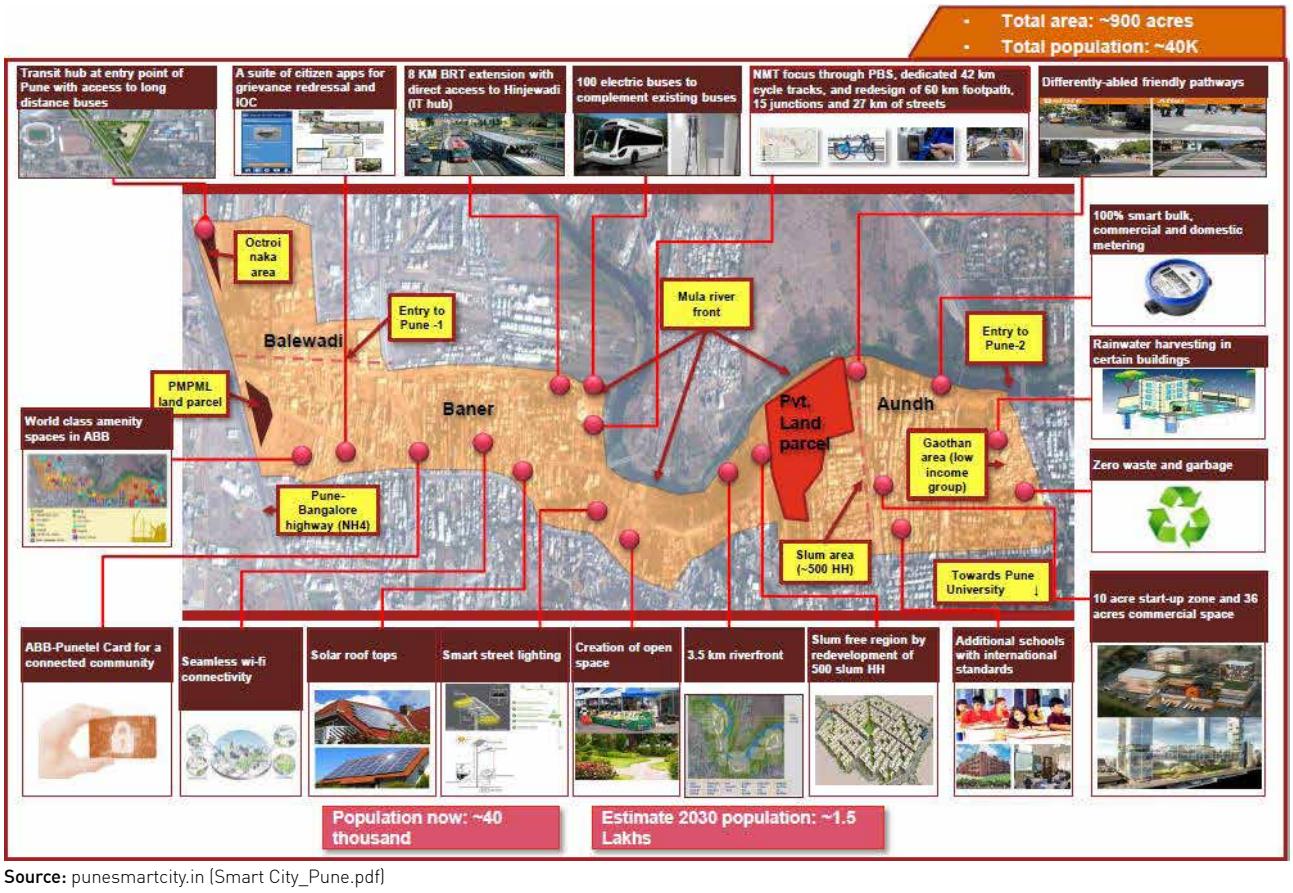
To achieve 'Smart Water' solutions to ensure equitable 150 lpcd water to 100% citizen on 24x7 basis, citizens and government authorities together came up with key strategies such as:

- Smart bulk metering at 8 WTP's, 58 elevated reservoirs and 328 DMA's across 6 zones with SCADA, followed by water audit across 2500 km pipeline
- Helium leak identification system to reduce internal water leakage drastically

Source:
[18]http://indianexpress.com/article/pune/smart-city-innovation-hub-to-be-functional-by-june-2017-pune-civic-chief-3012277/

- 100% smart metering across 42,650 commercial connections
- Smart meters for domestic consumption along with revised telescoping tariffs through "give-up-water subsidy" campaign to accept smart metering and revised telescoping tariffs
- 24x7 water supply to the city through 5 pilot DMA's which includes 2000 domestic, 300 commercial and 2000 slum connections
- Comprehensive GIS-based customer survey to increase the number of recorded connections from 150,000 to 400,000
- Develop a suite of web, app and call-centre based solutions to address 37,000 grievances annually
- Setup an ICT enabled separate billing and recovery department for water with world class customer service and improved collections

Area Based Development



Source: punesmartcity.in (Smart City_Pune.pdf)

Area Based Development (ABD) is one of the key elements of the proposal. This segment identifies the area of the city which is selected by the process of desk research, analysis, meetings, public representation and this is developed into smart area. To make ABD a model neighbourhood, 36 components will be developed along 6 themes.

Theme 1: Fix hard infrastructure (across mobility, water, SWM and security) and make it future ready as the population grows 4 times

- Theme of providing infrastructure will consist of an elevated BRT extension of 26 Kmswith direct access to Hinjewadi which is an IT hub.
- Overhaul of 54 regular bus-stops with ICT solutions
- 100 electric buses to complement existing buses for Aundh-Baner-BalewadiHinjewadi connectivity
- Express airport service
- 46km of road improvement
- Access to mass public transport through 100 e-rickshaws
- NMT focus through PBS with 40 stations, dedicated 42 km cycle tracks, and redesign of 60 km footpath, 15 junctions and 27 km of streets
- Transit hub at entry point of Pune with access to long distance buses
- 100% differently-abled friendly pathways
- Increasing water availability from 90 lpd to 150 lpd to pilot 24x7 water
- 100% smart bulk, commercial and domestic metering
- Cleaning 4 km of river stretch to replicate across Pune
- Rainwater harvesting through creation of 4 sumps
- 10% waste water recycling in the Aundh-Baner-Balewadi region
- Zero waste and garbage in Aundh-Baner-Balewadi region through garbage truck augmentation, RFID tracking of vehicles, RFID based attendance system and monitoring of garbage areas
- Centralized command and control center with camera feed from critical areas, emergency services through 5 SWAT vehicles

Theme 2: Create social infrastructure as per benchmark standards

- Additional 3 multi-specialty hospitals beds in the region
- Additional 3 schools in the region with international standards
- Additional 76 public toilets created and maintained to global standards
- State-of-art fire stations for high rise cum compact development
- Smart parking for 750 cars

Theme 3: Enhance livability quotient considerably on top of fixing infrastructure

- Drive open space innovation: garden with 5 min for each resident, open space increase from 4% to 10% of total area; open vegetable market.
- 3.5 km riverfront with walking promenade, recreation zone and entertainment zone
- 8 acre start-up zone and 36acres commercial space to create 45,000+ jobs by 2030 to promote mixed use development and walk-to-work
- Make area look better through 100% underground wiring and vehicle free road

Theme 4: Drive socially inclusive growth in the region

- Make Aundh-Baner-Balewadi region slum-free by redevelopment of 500 slum households
- Drive socio-economic transformation of slums by focusing on 4 problem areas – sanitation, healthcare, education and skill building

Theme 5: Improve sustainability quotient of the region

- Smart street lights with 85% LED lamps to bring 30% energy savings – lampposts also fitted with air pollution sensors, panic button, Wi-Fi access point and CCTV camera
- Smart grid in Aundh-Baner-Balewadifor 100% power supply and 3% reduction in AT&C losses
- Solar roof tops to contribute 15% of energy requirements

Theme 6: Leverage ICT solutions for citizen convenience and e-governance

- Seamless Wi-Fi connectivity at 1Mbps+ speed – 100+ access points for 10,000 simultaneous logins
- Aundh-Baner-Balewadi-Pune Smart "DigiTel" Card for a connected community
- Intelligent operations centre with integrated data across utilities, transport and public safety
- Citizen app for grievance redressal and multiple functions integrated with the intelligent operations center (IOC)
- Digital Special Purpose Vehicle (SPV) to improve SPV functioning with Geo enabled city operations for multiple activities such as Land management, Tax assessment
- E-SPV: Comprehensive Aundh-Baner-Balewadionline portal with multiple activities across all departments with citizen desk for physical verification

Formation of SPV:

A 15 member special purpose vehicle for Pune Smart City Development Corporation (PSCDC), to oversee and implement Pune's smart city plan, was formed on March 23, 2016, with a 50:50 partnership between the state government and Pune Municipal Corporation (PMC).

The incorporation of the SPV has enabled Pune to receive Rs. 200 crore in this financial year, out of a total amount of Rs. 1,000 crore allocated to Smart City Pune over a period of five years.

The 15 membered PSCDC includes six members from Municipal Corporation, four from the state government and one from the central government. There will be two independent directors at the central and state government levels.

15 projects under Pune Smart City (also known as QUICK WIN PROJECTS)[19]

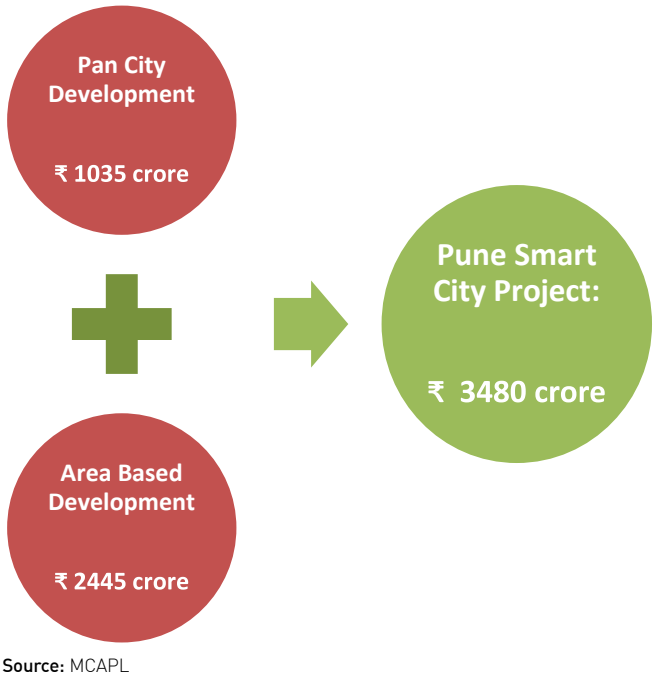
Pune Smart City Development Corporation Limited (PSCDCL) in its first board meeting approved processes to undertake15 projects under the programme with eight of them focusing on the local area development for Aundh-Baner-Balewadi and seven as pan city proposals.

The eight projects under local area development (Aundh-Baner-Balewadi) include:

1. Pilot project of redesigning streets,
2. Footpath retrofitting,
3. Making place on roads for social activity,
4. Junction redesigning,
5. Rainwater harvesting,
6. Low income skill development and health care,
7. Led lighting and solar roof top and
8. E-governance centre to provide single-point place to enable citizens to avail various civic facilities

The seven projects under pan-city include:

1. Public transport with installation of GPS and real time tracking of PMPML buses through mobile app,
2. Vehicle health monitoring system for PMPML,
3. Intelligent road asset management,
4. Traffic map using mobile GPS and
5. E-challan to penalize those violating traffic rules.
6. Implementation of project of 100 per cent smart commercial metering in the city and grievance redressal and
7. Smart customer services through mobile and web-based apps



Source: MCAPL

Source:
[19]http://indianexpress.com/article/cities/pune/pune-smart-city-company-gives-nod-to-15-projects-2759638/)

PMC has estimated the investment required to implement the smart city plan at ₹ 3,480 crores. According to the plan, the city requires ₹ 1,035 crore for pan-city development and ₹ 2,445 crore for the development of Aundh-Baner-Balewadi under the ABD.

3.2. Solapur had the World's second largest and Asia's largest spinning mill.

Solapur is a city located in the southeastern region of Indian state of Maharashtra. The city has good connectivity through road and rail. Solapur is the fourth-largest district in Maharashtra in terms of land area, and seventh largest in terms of population and 43rd largest populated district in India.[20] Solapur district has the highest number of sugar factories (total 33) in India.[21] "Solapuri Chadars" are famous in India and at the global level and they are the famous and first product in Maharashtra to get a Geographical Indication tag. It has been a leading centre for cotton mills and power looms in Maharashtra. Solapur had the World's second largest and Asia's largest spinning mill.[22]

In Strengths of Solapur city graphic, space required between Plant and through in 'Waste to energy (WTE) plan through PPP mode at Tuljapur Road. Spelling of Important and Mixed Urban Form to be rectified



Source:

[20]"Demography" (PDF). solapur.gov.in. 2013.

[21]Ketaki Ghoge (22 June 2015). "In a first Solapur decides to give up on sugarcane cultivation". Hindustan Times. Mumbai.

[22] "कुशल प्रबंधन व उन्नत तकनीक अपनाने की सलाह" [Kuśal Prabandhan Vā Unnatā Taknīk Apnānē kī Salāh]. Dainik Bhaskar (in Hindi).Balotra,

Main features of Solapur Smart City:

Clean & Efficient Infrastructure

- Assured water supply: leak detection system, improved network & 100% waste water recycling & reused for industrial estates and landscaping
- Uninterrupted power supply: underground cabling and renewable energy sources

Inclusive Mobility

- Creating centralized system of public transport through online % mobile based applications
- Smart bus Stops with interactive maps and information system
- ATV machines and barrier-free features to improve accessibility

Business and Job Opprtunites

- Provide good infrastructure and streamlining the process for establishing new businesses
- SMC will support upcoming industries; creating more jobs
- Solapur is central point of tourism sector to improve economic base

Clean & Sustainable ENV

- 100% segregation, collection and treatment of waste
- Energy efficient buildings & clean urban mobility (eg. CNG)
- Connected footpaths for pedestrians & landscaping along roads to mitigate dust pollution

Preserve Historical & Cultural Heritage

- Revive historical area as important landmark and activity centre and introducing different activities for night/day to increase dwelling time of visitors
- Special services for pilgrims during festivals and events to promote religious tourism

Improve resources efficiency

- Promote city stadiums and historical areas as major activity zone
- To increase the efficiency of governance in managing resources and funds for project planning and appropriation of resources in future

Vision of Solapur Smart City:

"Develop Solapur as a

- Religious centre
- Textile centre
- Medical hub
- Education hub
- Improving quality of life for citizens of Solapur by improving public service delivery and governance through smart and sustainable solutions"

Pan City Proposal: ICT based solution towards a responsive governance and a progressive economy

The ICT based solution aims to

- Improve the government's
- Transparency
- Accountability
- Responsiveness
- Empower the governing body to strengthen their service delivery for the city to progress

ICT based solutions will be used in sectors such as:

- Vehicle tracking and monitoring (Trasnportation)
- Leak Identification System by SCADA and AMR system[23] (Water)
- Smart Metering in water supply (Water)
- Institutionalizing Service Level Benchmarks (SLB)
- Mapping of Utilities
- Data analytics centre

The strategic objectives are:

- Enhancing transparency and accountability of the processes involved in services delivery
- Improving efficiency of the basis service delivery
- Creating a business-friendly environment initiative by providing good infrastructure and streamlining the process for establishing a new business

The key components of the ICT proposal are:

- Institutionalizing service level benchmarking initiative by using technology to create
  - Reliable data systems as a decision support tool for performance monitoring
  - Indetifying intervention for planning and service level improvements
- Demand management measures put in place to incentivise conservation
  -Adopt telescopic tariffs for incentivizing conservation
  - Linking tariffs to volume of water consumed

Source:
[23]http://smartcities.gov.in/writereaddata/Smart_Solutions_Components.pdf

The physical components for the pan city solution are:

- **SCADA systems (Supervisory Control and data acquisition)**
  - The energy generated by Photovoltaic panels will be metered and sent to the main grid for SCADA system to monitor on street lights
  - SCADA systems will allow remote monitoring of water flows zone-wise and check pressure levels and identify points of intervention on real time basis
  - Integration of underground cable network with SCADA system to MSEDCL (Maharashtra State Electricity Distribution Company Limited), currently in test run phase
- **AMR Meters (Automatic Meter Reading)**
  - Installation of smart AMR metering on all the water connections
  - Installation of AMR will improve the efficiency of billing and collection which will lead to enhancement of revenue.
- **GIS-based asset management systems**
  - Implementing a GIS based property tax management and collection system
  - Will enable mapping of utilities like various land use, soils, agriculture, recreation, wildlife, water bodies, forestry, etc.
  - GIS database with the automated database management system for the service sector would enable timely reporting of the "Service Level Benchmark (SLB)" indicators with highest reliability factor.

Area Based Development: Core area of City (Central Business District)



The strategy adopted for area based development shall focus on retrofitting an area which demonstrates a high impact, reflects the city's identity and culture and benefits a wider base of people.

SCADA systems (Supervisory Control and data acquisition)

- Area about 3 sq. km. comprise of old Gaothan area and the Gaothan extension (covering around 60% of the population[24]).

Source:
[24]http://www.hindustantimes.com/mumbai/maharashtra-to-boost-development-in-6-cities-vying-for-smart-city-tag/story-eQHVSlH1b4ad4m1c4rALxN.html

The above area was chosen for ABD was based on the following factors:

a. Presence of the CBD of the city

b. Major government offices

c. Historical core

d. Siddheshwar Temple and Lake

e. High usage area of the city

f. Annual festival of Gadda Yatra in January

g. Historical building of Bhuikot Fort built during 14th century

h. Century old Indra Bhavan now serves as Municipal Corporation

i. High population density (2.3% of city area houses 17% city)

j. Presence of major transit nodes of railway station and major bus stations

The components of the area based development are divided into 7 sections which are as follows

Theme 1: 100% waste management

- Focus on improving the complete value chain of waste water
  - Segregation
  - Collection
  - Treatment
  - Disposal

Theme 2: Reduction in Pollution (Clean Environment)

- Paving on all the footpaths of streets to create connected obstruction-free footpaths
- Pedestrianization of commercial streets in Navipeth area (CBD)
- Use of clean modes of transport by
  - Cycle tracks
  - Free bike racks at bus shelters
  - Public bike sharing system

Theme 3: Clean and efficient energy

- Use of clean technologies to generate energy
- Installation of solar panels on (aggregated power generation of 975 KW)
  - Indira Gandhi Cricket Stadium,
  - Government buildings
  - All bus shelters
- Using solar based street lights with net metering
- Operationalization of Waste-to-Energy (Bio-Methanation) plant at full capacity

Theme 4: Efficient water supply system

- Reduce the leakages followed by installation of smart meters at household level
- NRW losses shall be reduced from 57% to 15%

Theme 5: Efficient waste water recycling and reuse

- 100% waste water recycling
- Tertiary treatment to be done
- Focus on waste water recycling and reuse of upcoming industries
- Treated water to be supplied to the upcoming MIDC textile mega-cluster

Theme 6: Efficient use of open spaces

- Rejuvenating historical areas of the city as a major activity centre by introducing
  - Night-bazaar
  - Promoting culture and history through light and sound show (Bauikot Fort)
- Vibrant spaces should be carved out on the streets through place making.
- Walkways with
  - Parks
  - Open gyms
  - Street furniture
  - E-Toilets at regular intervals

Theme 7: Efficient transport

- Smart junctions including CCTV cameras
- Vehicle number plate recognition systems
- Smart bus shelters with PIS and ATV machines
- Railway station redevelopment
- Construction of by-pass and grade separator to ease congestion

Formation of SPV

Solapur's SPV currently has 11 members, of which seven are bureaucrats and other government officials, and four are from political parties.[25] This includes the mayor, the leader of the House, the standing committee chairman and the leader of opposition.

Source:
[25]http://indianexpress.com/article/cities/mumbai/special-purpose-vehicles-congress-bjp-solapur-municipal-corporation-spv-board-2823878/

Smart Cities related initiatives in Maharashtra including those in the third list and those beyond the Smart Cities Mission

4.1. Cities from Maharashtra to be developed as Smart Cities in third list

The Government of India has recently declared the third list of 27 cities to be developed as Smart cities and five of these are from the state of Maharashtra.

The five cities are

- Kalyan-Dombivali
- Thane
- Nagpur
- Nashik
- Aurangabad

4.1.1. Mumbai Smart City

The smart city proposal of Greater Mumbai Municipal Corporation (MCGM) focuses on six key areas

Specific areas for development

- Lower Parel– CBD
- Andheri West – IT Hub
- Malad- Bio diversity tourism
- Nariman Point & Kala Ghoda- Commerce & Tourism Development

Mobility/ BEST

- Passenger Information System (PIS)
- Rapid traffic management systems
- Advanced transportation controller (ATC) controlled traffic light for real time traffic monitoring

Public Health

- Citizen medical record monitoring system
- IT enabled services for the 100 dispensary project
- E-delivery of services

Solid waste management & Sanitation

- 100% garbage collection and segregation at source leading to significant recycling
- Smart monitoring for sewerage management

Storm water management

- Plan for storm water management for railway track flooding

E-services

- Superior engagement with citizens
- Wi-fi zone
- Enhance mobile led citizen services

4.1.2. Navi-Mumbai Smart City

The smart city proposal of Navi-Mumbai Municipal Corporation (MCGM) focuses on key areas such as

Water Supply & Sanitation

- To increase the coverage of 24 X 7 Water supply to all areas in the city
- Provision of smart metering for all service connections
- Treated waste water recycle and reuse to the extent of 50%

Housing and Inclusiveness

- Encourage Redevelopment and cluster development to include affordable housing options
- Promote the development of Rental housing to accommodate new residents

Energy Source

- To meet power demand for streetlights through Renewable sources
- To develop a grid connected rooftop solar systems on public infrastructure
- To incentivize the generation and use of renewable energy by all citizens

Transport

- To establish separate cycle lanes, cycle parking facilities, cycle sharing facilities which encourages people to use Non-Motorized, clean & Green Transport
- To encourage development of parking as a part of public transit access

Safety & Security

- Adopt technology such as surveillance cameras, Advanced transportation controller (ATC) for continuous surveillance and monitoring of the city.
- Establish a central command centre with data analytics

4.1.3. Thane[26]

Source:
[26]Information based on the smart cities proposal sent by State Government to centre in June 2016 i.e., before the declaration of third list of 27 Smart Cities on 20th September 2016

The smart city proposal of Thane Municipal Corporation (TMC) focuses on key areas such as

Develop Thane City Centre as Area Based Development (Area: 1070 acres land parcel; 1000 acres retrofitting and 70 acres redevelopment)

- **Waterfront Development and lakefront development in City Centre**
  - Protecting mangroves along the creek side
  - Waterways & waterfront
  - Biodiversity
- **Soft mobility: Rent-a-cycle concept, Walkways & FOBs**
- Bicycle sharing scheme
- Kiosks to rent and park bicycles
- **Decentralised SWM and upgradation of sewerage and drainage networks**
- Waste-wise processing units
- Decentralized model for SWM
- Centralized Incineration based SWM
- **Lake Bioremediation & Beautification**
- Design of pedestrian pathways
- Street-vending zones
- Inclusive access to differently-abled

Achieving improved service delivery of the water supply system by adopting smart solutions across the city and gradually moving towards 24X7 water supply

- Water Audit by SCADA system, Water quality monitoring station, and Bulk flow meters
- Installation of water kiosks / ATMs in slum areas
- Scaling up mobile application to include water supply related Complaints
- Development of online payment gateway for payment of water bills

Ensuring safety, security and digital connectivity in Thane through enhanced CCTV surveillance and free public WiFi

- Surveillance (CCTV cameras) for public safety and security along with enhanced coverage & vigilance
- Public Wi-Fi will avail easy access to online municipal services and faster redressal of grievances will be done

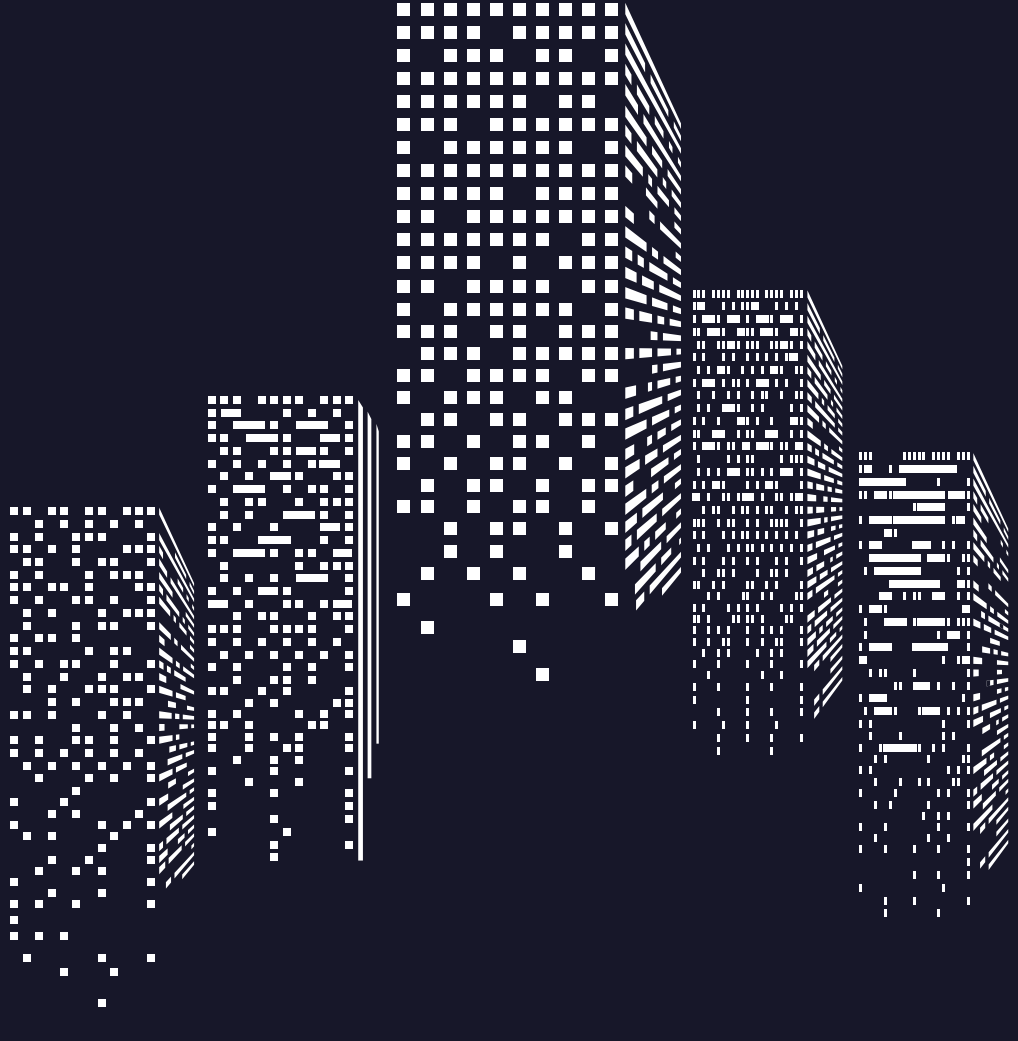
4.1.4. Kalyan-Dombivali[27]

Source:
[27]Information based on the smart cities proposal sent by the State Government to centre in June 2016 i.e. before the declaration of third list of 27 Smart Cities on 20th September 2016

The smart city proposal of Kalyan-Dombivali Municipal Corporation (KDMC) focuses on key areas such as

- Station precinct improvement – Pedestrianization, increased parking and improved east-west connectivity
- Intelligent coordinated traffic signaling and traffic management system

- Smart on-street parking and parking policy
- Network of green spaces and public areas
- Rain water harvesting and ground water re-charge
- Rehabilitation of existing solid waste dumping ground and conversion into a park / garden
- Water demand management
- Sewerage network augmentation, installation of bulk flow meters and SCADA at all pumping stations and STPs
- 5 MT Bio-Methanation plant, node level MSW segregation / recycling plant and treatment and landfill site
- Underground power cabling and installation of smart meters
- Creating a data warehouse for the city to tap the data generating at different sources, integrate them and disseminate the useful information to the specific target groups to facilitate further decision making



4.2. Cities proposed to be taken up by the Government of Maharashtra (Navi Mumbai, Mumbai, Amravati)

- **The Government of Maharashtra had initially opted for the "Independent Model" for development of the 8 cities mentioned earlier and now will be adopting this model for the balance three cities as under:**[28]

  - Mumbai
  - Navi-Mumbai
  - Amravati

- ₹ 400 Crore will be funded annually to help 8 cities i.e., each city will receive 50 crore per year for smart city development[29]

- As per the smart city scheme, the equal contribution of funds for smart city should be given by the central government and state government/Municipal Corporations and the Government of Maharashtra decided to provide funds (with the share of funds planned to be released from its side) to provide funds to ensure those cities which were not selected in Smart Cities Mission.

- **The Government of Maharashtra has designated the following authorities for the development of various Smart cities**[30]

Sr. No.:	Cities	Authority responsible to develop it as Smart City
1	Mumbai	Being financially sound, will implement Smart City project with their own funds
2	Navi-Mumbai	
3	Amravati	City and Industrial Development Corporation (CIDCO)

Source:

[28]http://smartcity.eletsonline.com/lt-bags-contract-to-develop-nagpur-into-integrated-smart-city/ (August 26, 2016)

[29]http://indianexpress.com/article/mumbai/budget-boost-rs-400-cr-a-year-to-cities-not-picked-for-smart-cities-project/ (March 20, 2016)

[30]http://indianexpress.com/article/india/india-news-india/maharashtra-to-go-ahead-with-smart-cities-plan-for-8-cities-that-didnt-make-it-to-centres-list-2872327/ (June 24, 2016)

- The state has asked all the 3 cities to form Special Purpose Vehicles (SPVs) and each SPV will have 15 directors on board, representing the following[31]

No. of directors	Departments concerned
6	Municipality/Municipal Corporation
4	State Government
1	Union Government
2	Independent Directors
1	Municipal Commissioner
1	Chief Executive Officer

4.3. Smart cluster development for Navi-Mumbai Gaothans

- It aims to upgrade the civic and social infrastructure through redevelopment of a larger area.
- Cluster development will legalize 20,000 unauthorized constructions in and around the gaothan areas of Navi Mumbai
- The cluster redevelopment scheme will be with a high Floor Space Index (FSI) of four[32]
- **The notified belt that falls under the City and Industrial Development Corporation (CIDCO) of Maharashtra**
  - Airoli to Belapur: 14,000 structures
  - Kharghar to Dronagiri area: 60,000 structures
- The State government will provide 25 per cent bigger homes to all existing residents under the cluster scheme
- Cluster development will also provide residents with all necessary amenities like water supply, sanitation, etc
- The project area for cluster scheme has to be minimum 4000 sq m (if required in extreme cases, permission could be given for the scheme to come up on plot area of 2000 sq m.)[33]
- The government will follow all due procedures including carrying out the "Impact Assessment Study"

Source:

[31]http://indianexpress.com/article/india/india-news-india/maharashtra-to-go-ahead-with-smart-cities-plan-for-8-cities-that-didnt-make-it-to-centres-list-2872327/ (June 24, 2016)

[32]http://indianexpress.com/article/cities/mumbai/cluster-redevelopment-scheme-with-fsi-4-to-be-extended-to-navi-mumbais-gaothans/

[33]Ibid

4.4. Smart Townships

- The state government has recently issued the "Urban Township Policy" for integrated development of more than 100 acres of land.[34]
- **The Policy aims**
  - To utilize the maximum development potential
  - to attract foreign direct investment in the field of special township project
  - to develop smart townships through privatization
  - to bring clarity in the process of approval
- **The policy plans self-sufficient modern townships with developers being tasked with providing and maintaining**
  - timely transportation system
  - pedestrian friendly pathways
  - cycle tracks
  - better power management
  - commercial activities
  - smart facilities
  - including broadband connectivity and CCTVs
- **Developers will reserve 15 acres out of the proposed 100 acres for public amenities such as**
  - markets
  - town hall
  - school
  - public health care
  - shopping
  - theatre
- A total of five per cent of the master layout area has to be reserved for gardens and another 7.5 per cent for play grounds, besides reserving space for public utilities such as a fire brigade station, police station, sewage treatment plant etc.[35]
- 20 per cent of the residential built-up area in these townships will be reserved for social housing made up of smaller tenements for the low-income group and economically weaker sections
- The developers will get an enhanced floor space index (FSI) in the range of 1.7 to 2
- **Projects in Pipeline**

  - Palghar[36]

  (i) Plan to develop a new township complete with administrative offices and logistics in the district of Palghar

  (ii) CIDCO and MMRDA will make Comprehensive plan for Palghar new township

  (iii) The core sector where investments will have to be brought and developed includes education, health and industries.

  - Nagpur[37]

  (i) Government of Maharashtra appointed L&T as partner to contract for Nagpur development as "Integrated Smart City"

  (ii) The State government has decided to develop this city as it is situated in the central location of India (the geographical location of Nagpur connects all the major cities of India like Delhi, Mumbai, Chennai and Kolkata

  (iii) Phase I will include
  - Laying of 1200 km of optical fibre network
  - Creating 136 city Wi-Fi hotspot at key locations
  - Setting up 100 digital interactive kiosks
  - Developing city surveillance system with 3800 IP based cameras

  (iv) 6 km (From Japanese Garden Square to Orange City Hospital Square)to be developed as "SMART STRIP" with state of art systems for ICT based interventions.

Source:

[34]http://www.hindustantimes.com/mumbai/state-issues-policy-to-make-way-for-smart-townships/story-XHp70Zgll8Pjrg8ChkVdkO.html (June 9, 2016)

[35]Ibid

[36]http://indianexpress.com/article/mumbai/maharashtra-govt-plans-new-township-in-palghar-2806070/ (May 18, 2016)

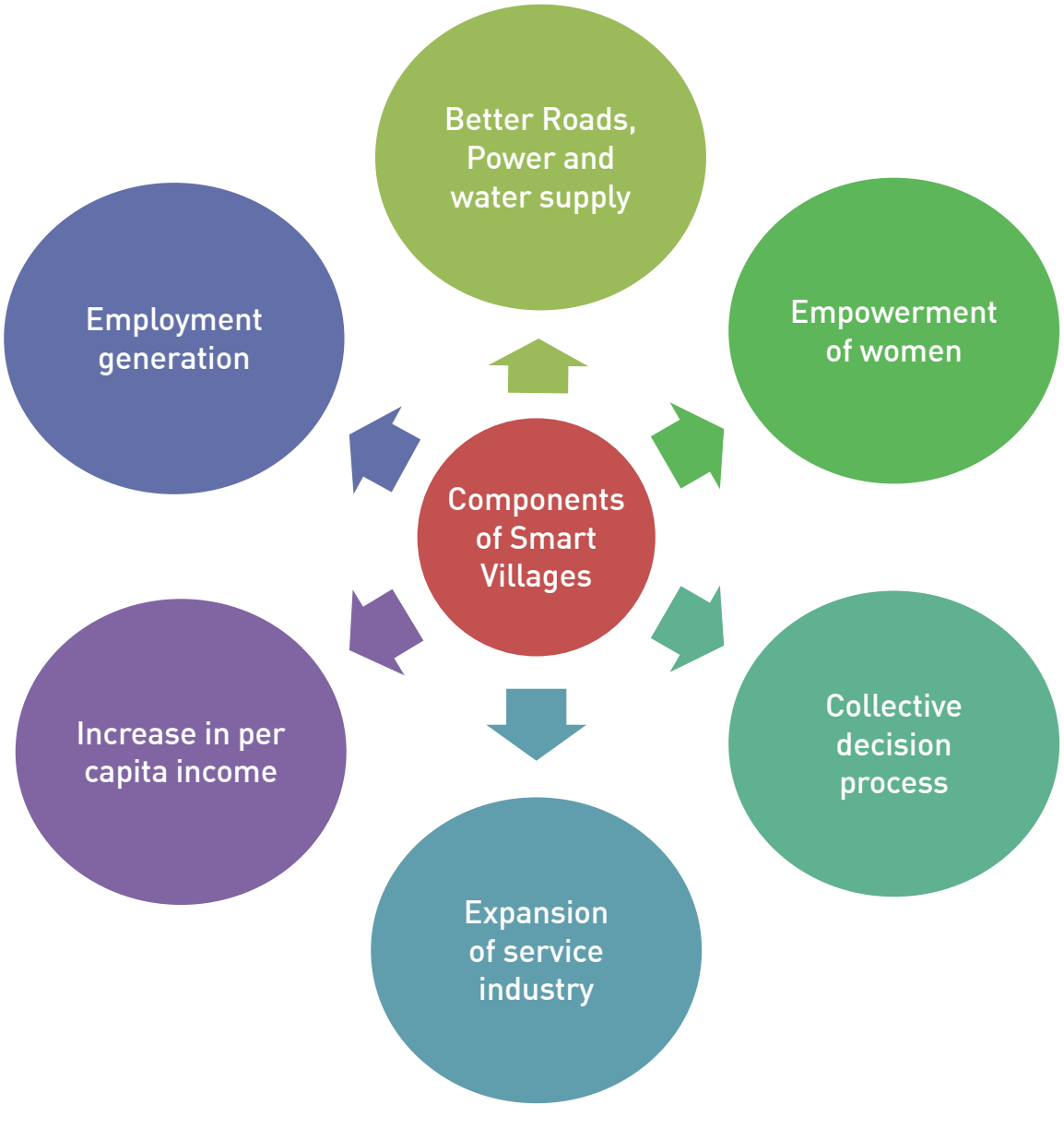
[37]http://smartcity.eletsonline.com/lt-bags-contract-to-develop-nagpur-into-integrated-smart-city/

Extending the Concept of Smart Cities to Smart Villages

5.1. Main Components of Smart Villages

Smart villages should aim at enabling villagers to become self–reliant through the smart interventions such as provision of good education and healthcare, access to clean water, sanitation and nutrition, sustainable energy services, the growth of productive enterprises to boost incomes, and enhanced security, gender equality and democratic engagement to achieve sustainable development and in the process ensure the socio-economic transformation of Villages.[38]

Source:
[38]http://e4sv.org/about-us/what-are-smart-villages/ (Smart Thinking, New thinking for off-grid communities worldwide)



5.2. Guideline for Aadarsh Village under Sansad Aadarsh Gram Yojana (SAANJHI):

- **SAANJHI has responsibility of developing physical and institutional infrastructure in villages and turn them into model villages. The Scheme focusses on**

  - Nurturing values of national pride
  - Community spirit
  - Self-confidence and
  - Developing rural infrastructure like water supply, electricity, sanitation, transport, etc

- **Process of selecting village for SAANJHI programme**

  - Each member of parliament has to choose one village from the constituency they represent (except their own village/their in-laws village)
  - Set the parameters like provision of health, education, transport, water, technology, etc. and make it a model village by 2016
  - Later, two more villages should be selected for developing by the end of 2019

- **Strategies of making identifies villages into an Adarsh Gram[39]**

  - Entry point activities: to energize and mobilize the community towards positive common action
  - Participatory planning exercise: for identifying peoples' needs and priorities in an integrated manner
  - Converging resources: from Central Sector and Centrally Sponsored Schemes and also other State schemes to the extent possible.
  - Repairing and renovating: existing infrastructure to the extent possible.
  - Strengthening: the Gram Panchayats and peoples' institutions within them
  - Promoting: transparency and accountability

Source:
[39]"Guidelines of Saansad Adarsh Gram Yojana (SAGY) page no. 12"

5.3. Smart Villages in Maharashtra by National Rurban Mission

The Maharashtra government will soon implement the Centre's National Rurban (rural and urban) mission in 99 tehsils of the state's 28 districts[40]

- **The mission aims to**
  - Remove the disparity between rural and urban development
  - Provide financial and technical facilities
  - Create job opportunities

As per the Centre's guidelines, the State has been divided into **"tribal"** and **"non-tribal"** categories while selecting areas to be included in this mission.[41]

Sr. No.:	Districts	Tehsils
1	11 Tribal Districts	49
2	18 Non-tribal Districts	50
Total	**29 Districts**	**99 Tehsils**

Source:
[40]http://www.thehindu.com/news/cities/mumbai/after-smart-cities-maharashtra-readies-for-smart-villages/article8071218.ece (January 6, 2016)

[41]http://www.thehindu.com/news/cities/mumbai/after-smart-cities-maharashtra-readies-for-smart-villages/article8071218.ece (January 6, 2016)

- **Parameters used while selecting tehsils include**

  - Population growth in the last decade
  - Increased number of employment opportunities in non-agriculture sector
  - Financial institutions in the district
  - Important tourist and pilgrim spots
  - Proximity to transport facilities

- **Villages selected for Smart Cluster Scheme should have neighboring villages with approximately**

  - 25,000 to 50,000 population in the coastal or plain areas
  - 5,000 to 15,000 population in tribal or hilly areas

- **The mission focuses to develop "Smart villages cluster" based on**

  - Agriculture and related units
  - setting up skill development programmes
  - mobile health unit
  - tap water scheme
  - solid and liquid waste management
  - building gutters
  - LPG connections
  - digital literacy
  - public transport
  - civic service centres

Institutional framework for Smart Village implementation[42]

Sr. No.:	Districts	Tehsils
1	State's Rural Development department	coordinate the mission
2	State-level committee chaired by the chief secretary	look after the implementation work
3	District-level committee	look after the implementation work at District level
4	Cluster-level committee	look after the implementation work at cluster level

- **Government of Maharashtra seeking 9,000 crore for ICT for villages to get smarter**

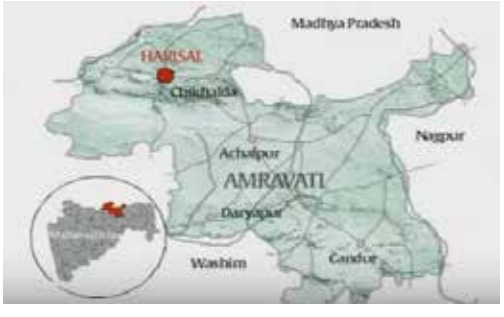
  - The scheme plans to connect gram-panchayats across 40,000 villages and aims at 'using communication to bring in reforms in the agriculture sector'
  - Government of Maharashtra has sought sanctions of Rs 9000 crores from the Union Minister for Communications and Information Technology
  - Extending the digital network through gram-panchayats will make villages socially and economically vibrant
  - ICT in villages will create virtual markets which helps "Agro-Industrial Practices"

Source:
[42]http://www.thehindu.com/news/cities/mumbai/after-smart-cities-maharashtra-readies-for-smart-villages/article8071218.ece (January 6, 2016)

5.4. Harisal – Smart Village (will be the first smart village out of 50 smart villages in Maharashtra)

Harisal, a village in Melghat situated in Amravati district will be the first village to transform into 'Smart Village' of Maharashtra. Maharashtra Government and Microsoft decided on September 2015 to convert this village into a digital village.

The village was selected by the Government of Maharashtra as it is the most inaccessible part of the state where there is an urgent need for facilities such as water, electricity, livelihood, access to basic transport services, etc.





Profile of Harisal Village[43]

1	Population	2241
2	Households	406
3	Literacy Rate	71%
4	Schools	4
5	Anganwadi	3
6	Primary Health Centre (PHC)	1
7	Bank	1
8	Self Help Groups	3

Issues in Harisal Village

1	Electricity shed of 18 hours daily (6 hours in the night and 8 hours in a day)
2	Shortage of water supply due to no power to run water pumps as the electricity shedding is for 18 hours
3	Lack of transport service to the outer skirts of the city for traveling as buses are not frequent in Harisal Constituency
4	Lack of education facility: as the nearest undergraduate college is in Dharni, 26 kms away from Harisal
5	Lack of healthcare: Only one PHC in entire village, and frequently faces problems such as no doctor for treatment, lack of medicines, etc.

Source:
[43]http://articles.economictimes.indiatimes.com/2016-01-22/news/69989291_1_chief-minister-devendra-fadnavis-maharashtra-government-fadanvis (January 22, 2016)

- Smart solutions proposed for Harisal Village are:
  - Sustainable Village Economy
  - Banking System with 100% conformity to Pradhan Mantri Jan Dhan Yojana
  - Socio-Economic Growth will be measured along with GDP
  - Empowering village solving malnutrition problems
  - Skill development centre with the help of self-help groups
  - Using solar energy to tide over the perennial absence of electricity in Melghat village
  - Telemedicine facility and e-learning projects
  - Transport connectivity to the main streamline
  - All the 406 families would be given solar pumps

- This smart village will be equipped with:
  - Health cards
  - Wi-Fi zone
  - Mobile Connectivity
  - Cashless Markets
  - Telemedicine, etc.

- Microsoft said that basic facilities would be provided to every villager like
  - Health
  - Education
  - Employment
  - Agriculture
  - Electricity

5.5. Climate Smart Villages: An initiative in Bihar and Haryana for farmers to adopt climate smart agriculture

"Climate Smart Village" model is an initiative by Climate Change Agriculture, Food and Security (CCAFS) in India, undertaken currently in Haryana and Bihar, to promote agriculture practices.[44]

Climate changes like summer temperatures and delayed rainfall severely affected the crop planning. So, the main concern is how a farmer should know the best time to farm. South Asia Regional Program is working on a new concept of 'Climate-Smart Village' model project and this same project is in its pilot stage in the states of Bihar and Haryana.

- **The strategies carried out in Climate Smart Villages[45]**

- The location of a Climate-Smart Village is selected based on its
  - climate risk profile
  - willingness of farmers and local governments to participate in the project

- Conducting a baseline survey
  - to capture the current socio-economic conditions and
  - analyse resource availability
  - analyse average production and income

- Stakeholders assemble to prioritize which interventions they will take up that are best suited to their local conditions and this is done by choice experiment that analyses
  - Farmers' preference and
  - Farmers' willingness to pay for technologies

- Farmers have to record their testimonials and feedback at regular intervals and share it with researchers and the community as distributing the information of climate smart interventions is an important practice of "Capacity Building"

Source:
[44]http://timesofindia.indiatimes.com/city/patna/Climate-Smart-Village-model-to-be-implemented-in-Bihar/articleshow/21314706.cms

[45]https://ccafs.cgiar.org/what-are-climate-smart-villages#.V9fZl9J95dg (January, 2016)

Opportunities related to infrastructure development and Smart Cities in Maharashtra

6.1. Investment envisaged for the smart cities of Pune and Solapur for the year 2016-2020

Pune Smart City - Fiscal Plan (2016-2020)		
Projects	Sectors	Project Cost in Rs. Crore
ABD :	**Marquee riverfront development along with river clearing**	100
Aundh- Baner-Balewadi (ABB) area is selected to transform it across sectors like mobility, water supply, employment, citizen services, etc	**24x7 electricity supply, smart grid and solar panels**	364
	Water and sewage	
	- Reservoirs	87
	- Storm water drains	43
	- STP augmentation	100
	Waste and sanitation	
	- SWM	16
	- Public toilets	2
	Open spaces and amenities	
	- Gardens	1.25
	- Community Hall and Open Vegetable market	11.6
	NMT Infrastructure	
	- Street redesign	189
	- Roads and road widening	190
	Public transport	
	- BRT	210
	- E-buses	125
	Citizen Services, e-governance, security	
	- IT connectivity	146
	- Smart Parking	50
	Slum redevelopment and Affordable Housing	40
	Miscellaneous	185.5
	Total of ABD	**1860.35**
Pan city	Water	278
	Transport	393
	Total of Pan City	671
Administrative & Office Expenses	**A&OE**	**65**
Grand Total of ABD and Pan City		**2596.35**
Rs. 2032 crore of Capex and Rs. 564 Cr of Opex (for 5 years)		

Solapur Smart City - Fiscal Plan (2016-2020)		
Projects	Sectors	Project Cost in Rs. Crore
ABD : **The area comprises of old Gaothan and the Gaothan extension to transform it a place of planned development, transit mobility, heritage site, centre of tourist attraction.**	Waste Management	34
	NMT Infrastructure Cycle Tracks	272
	Clean and efficient energy usage	154
	Efficient water supply	976
	Efficient waste water recycling	97
	Efficient transportation	284
	Efficient use of Public Spaces	94
	Total of ABD	**1911**
Pan city	Metering of water supply connection	190
	Mapping utilities and implementation of SCADA	54
	Vehicle tracking and monitoring	10
	Provision of bulk meters	30
	Service level data and analytical centre	5
	Total of Pan City	289
Administrative & Office Expenses	**A&OE**	**65**
Grand Total of ABD and Pan City		**2265**
Rs.1910 crore of Capex and Rs. 355 Cr of Opex (for 5 years)		

6.2. Summary of opportunities related to investment of Maharashtra

Pune and Solapur have been selected as smart cites under the Smart City Mission of Government of India. The institutional framework for these smart cites will be based on creation of Special Purpose Vehicles with representation from various stakeholders. While the guidelines of the national Smart Cities Mission will set out the institutional, regulatory and policy framework governing these cities specific infrastructure, PPP will also be governed by the relevant policies and regulations of the respective government.

As explained earlier in this report, the Government of Maharashtra also seeks to develop Smart Cities at 8 other location in the state. These cities will be developed by nodal agencies such as MMRDA, CIDCO, Brihanmumbai Municipal Corporation, Navi-Mumbai. The adhesion regarding the institutional framework has to be taken.

Investment aggregating Rs. 4861 crores is estimated for the development of Pune Smart City. Investment envisaged in Pune and Solapur is Rs. 2596.35 crores and Rs. 2265 crores respectively for Smart City Mission. Since only about 1000 crores will be available to city to the combination of Central and State/Urban Local Bodies, the balance will need to be brought in through tapping existing infrastructure development schemes, monetizing land banks, leveraging Corporate social responsibility, initiatives of various corporates and most relevantly Public Private Partnership (PPP).

The 8 Smart Cities will receive about 400 crores of funding in five years i.e., Rs. 50 crores per years and also present substantial opportunities in Private investment. Maharashtra government will implement Centre's National Rurban Mission in 99 tehsils of Maharashtra This will include developing the villages with respect to physical and social infrastructure facilities such as provision of transport, water supply, electricity, technology, education, health, etc. Harisal will be the first village to be developed as Smart village with facilities such as Wi-Fi zone, Mobile connectivity, Health cards, Telemedicine, etc.

Urban Township Policy in Maharashtra will have integrated development in area with more than 100 acres of land and cities like Palghar and Nagpur are will be developed as self-sufficient modern townships. Palghar will develop the

township with administrative offices and logistics, industries, education and health facilities while Nagpur will look into creating Wi-Fi hotspot at key locations, developing city surveillance system, and laying optical fibre network.

Smart cities need to be financially self-sustainable over the medium to long term. Government support is aimed at catalyzing private sector investment into infrastructure development in Smart Cities. The Smart Cities proposal for each city estimates the cost of each project in a phased manner.

Detailed project reports (DPRs) establishing the technical and financial feasibility of each smart project /intervention. As indicative funding of projects based on categorization could be as under

- Core physical infrastructure projects such as roads, water supply, sewerage and drainage through government funding support, and PPP where feasible. In view of the limitations with regards to user charges, PPP could also require grant/ funding support to some extent. This will be typically in projects such as Solid Waste Management (SWM).

- Commercially viable projects such urban regeneration/land development through PPP supported by project revenue streams.
- Smart Technology based interventions such as smart metering, smart parking, and integrated traffic management systems through Government funding available under the Smart City Mission.
- Digital Kiosks, e-learning centres, environmental improvement projects such as cleaning of water bodies under Corporate Social Responsibilities (CSR)

Smart cities projects will therefore need to be categorized on the basis of including but not limited to

- Gestation period,
- Extent of investment required,
- Amenability of the sector/project to user charges,
- Extent of technological innovation/intensity,
- Criticality of the project in the context of the city,
- Economic profile of the city and need for socially inclusiveness in the context of a project,
- Commercial attractiveness of the project and consequently private sector interest
- The extant regulatory and policy framework governing the sector and possible impact on Private Sector Participation.

Smart cities aim to improve the delivery of Urban Infrastructural services with innovative applications with technology wherever feasible. The Area Based Development focuses on improving service delivery across multiple urban infrastructural sectors within a given area as a showcase for application citywide. Pan city interventions are typically implemented citywide and could include innovation as under

- Smart water supply systems (monitoring and lead detection through SCADA, minimizing distribution losses and revenues through smart metering)
- Urban transport (integrated traffic management systems, smart parking, green transport)
- Energy efficiency (reducing energy consumption in municipal buildings, street lighting, and water supply)
- Urban planning (transit oriented development, automated building permission systems)
- Environment (ambient air quality monitoring systems, water quality monitoring systems in rivers and other water bodies, soil quality monitoring systems in industrial estates)
- Solid Waste Management (GPS enabled monitoring of waste bin levels and clearances and movement of waste collection vehicles)

Smart cities therefore seek to further built upon urban infrastructure development initiatives that were hitherto solely focused on physical infrastructure; through leveraging technology and focusing on efficient service delivery.

Maharashtra therefore present exiting opportunities for private sector participation in Smart Cities across various infrastructures sectors, smart cities also present an ideal platform to showcase and build upon cutting edge innovations in the context of infrastructure creation and service delivery with a view to enhancing the overall quality of life of the citizens and creating socially and economically vibrant engines of growth in Maharashtra.

JSW Steel

What would you choose to build the future?

Superior Pure TMT bars or local TMT bars



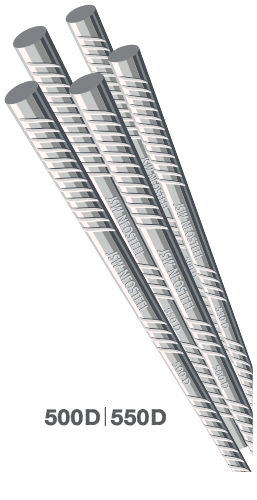
HIGHEST LEVEL OF PURITY

CONSISTENT QUALITY ACROSS THE BAR

BEST BONDING WITH CEMENT

JSW NEOSTEEL
PURE TMT BARS

Kyunki ghar bhi toh family hai



500D|550D



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