

Prospects of Smart Cities Development in India through Public Private Partnership

AMIRULLAH

Department of Political Science, Aligarh Muslim University, Aligarh, Uttar Pradesh, India

Email: amir.saveplanet@gmail.com

Abstract- There is an unprecedented growth of urbanization in India with a total urban population of 377 million (31%) in 2011.[1] It is expected to become the most populous country by 2030 with 590 million populations. There is already heavy stress on the limited city infrastructures and are suffering from shortage of space and residential houses, transport bottleneck, paucity of drinking water, pollution, disposal of city waste and sewage, power-cuts, maintenance of law and order, and control of crimes. The Government of India (GoI) is going to build 100 smart cities across the country. The aim is to harness Information and Communication Technologies (ICT) and knowledge infrastructures for economic regeneration, social cohesion, better city administration, intelligent transport management systems, energy efficiency in service delivery, public safety, online procurement, monitoring of physical assets, and making information available real in time.[2] The investment in each smart city is estimated to be in excess of \$10 billion. The government in the budget has provided a meagre sum of Rs. 7,060 crore for the development of 100 smart cities. In the smart cities 'mission statement and guidelines' the government is going to encourage Public Private Partnership (PPP) as an alternative option to build most of the infrastructures, as over 1252 projects with a total project cost of Rs. 7,06,669.02 crore are under various stage of development. PPP can be useful both for green-field as well as brown-field smart cities projects. It can help in smart building, smart healthcare, smart mobility, smart infrastructure, smart technology and smart energy. This paper aims to analyze how PPP can help in ensuring development of quality infrastructure and providing other services for the proposed smart cities in India.

Keywords- Urbanization, Pollution, Smart Cities, Public Private Partnership, Climate change

1. INTRODUCTION

Cities are the fundamental building blocks of modern society. The Indian cities are facing various problems like overcrowding, deteriorating quality of life parameters, poor standard of living, pollution, crime, rising costs and scarcity of resources. The present state of urban infrastructure in India cannot withstand the population pressures of tomorrow's urban India. To solve these challenges, the country needs cities that are responsive to citizens needs and consume resource optimally. The development of smart cities with an integrated and digitally enriched urban environment is perhaps the only solution forward.[3] The level of urbanization increased from 25% in 1991 to 31% in 2011 with a total urban population of 377 million in 2011.[4] The scale of urbanization is unprecedented with 590 million people expected to be living in city dwellings by 2030 from 340 million in 2008.[5]

The United Nations study conducted in 2011 estimated that 70% of population will live in cities by 2050. The cities have to address various issues such as ICT, urban planning, climate change, environmental pollution, non-renewable resources, social and economic development, increasing populations, city infrastructures, governance, etc. The GoI has planned to phase out Jawaharlal Nehru National Urban Renewal Mission (JNNURM) and to launch '100

smart cities' as satellite towns of larger cities by modernizing and developing the existing mid-sized cities.[6] In the budget 2014-15, GoI has allocated US\$ 1.5 billion (Rs.76 billion) for development of 100 smart cities (98 cities have been declared to be develop as smart cities by the GoI).[7] It is imperative to develop new cities to accommodate the burgeoning population as the existing cities with limited infrastructure and land would soon turn unlivable. Since it takes 20-30 years to build a new city, it is important to begin the work immediately. The main goal of smart city project is to promote a sustainable development taking advantage of ICT to supply energy more effectively, increase efficiencies, reduce costs, and enhance quality of life, bringing large benefits to the population. The GoI has sought help from foreign countries through PPP mode in this initiative.

2. SMART CITIES: THE CONCEPT

The concept of the smart city emerged during the last decade as a fusion of ideas about how ICT might improve the functioning of cities, enhancing their efficiency, improving their competitiveness, and providing new ways in which problems of poverty, social deprivation, and poor environment might be addressed.[8]

Smart cities are eco-friendly cities which use innovative ICT for efficient delivery of public services

and infrastructure. There is no universally accepted definition of smart cities. The scholarly definition of smart cities is cities where “investments in human and social capital, and traditional (transport) and modern (ICT) communication infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory governance”.

According to the Ministry of Urban Development, GoI, smart cities are those that are able to attract investments, provide good infrastructure, and simple and transparent online processes that make it easy to establish an enterprise. The Ministry identifies environment and social sustainability and competitiveness as the basic elements of smart cities that promote quality of life, employment, and investment opportunities. The institutional, physical, and social infrastructures are identified as the three pillars that can ensure achievement of smart cities goal of the government.[9]

The smart cities are environment friendly and use sustainable materials for building facilities and reduce energy consumption. It is influenced by the idea of developing urban hubs that run on technology to provide better electricity and water supply, improve sanitation, manage traffic and transportation systems. They are expected to improve economic efficiency, provide better quality of life and promote sustainable urban development.[10]

A smart city has a mix of commercial (service and manufacturing), residential, social infrastructure, physical infrastructure and public utilities. Smart is not just about technology-enabled, but also about power, water, transportation, internet connectivity, telemedicine, solid waste management and sewerage.[11] There are eight key elements that define a smart city: Smart Governance, Smart Building, Smart Healthcare, Smart Mobility, Smart Infrastructure, Smart Technology, Smart Energy and Smart Citizens.[12]

The government has given equal weightage (50:50) to urban population of the State/UT and the number of statutory towns in the State/UT for allocating number of smart cities. So far, the government has shortlisted 98 cities to be developed as smart cities. Uttar Pradesh and Tamil Nadu (12) have been allocated the maximum number of cities. Maharashtra (10), Madhya Pradesh (7), Gujarat and Karnataka (6 each) are the other states that has been shortlisted the highest number of cities as shown in the table-1.

Table.1: List of 98 Cities selected under Smart Cities Mission

S. No.	Name of State/UT	Names of selected Cities
1.	Andaman & Nicobar Islands	1. Port Blair
2.	Andhra Pradesh	1. Vishakhapatnam 2. Tirupati 3. Kakinada
3.	Arunachal Pradesh	1. Pasighat
4.	Assam	1. Guwahati
5.	Bihar	1. Muzaffarpur 2. Bhagalpur 3. Biharsharif
6.	Chandigarh	1. Chandigarh
7.	Chhatisgarh	1. Raipur 2. Bilaspur
8.	Daman & Diu	1. Diu
9.	Dadra & Nagar Haveli	1. Silvassa
10.	Delhi	1. New Delhi Municipal Council
11.	Goa	1. Panaji
12.	Gujarat	1. Gandhinagar 2. Ahmedabad 3. Surat 4. Vadodara 5. Rajkot 6. Dahod
13.	Haryana	1. Karnal 2. Faridabad
14.	Himachal Pradesh	1. Dharamshala
15.	Jharkhand	1. Ranchi
16.	Karnataka	1. Mangaluru 2. Belagavi 3. Shivamogga 4. Hubballi-Dharwad 5. Tumakuru 6. Davanegere
17.	Kerala	1. Kochi
18.	Lakshadweep	1. Kavaratti
19.	Madhya Pradesh	1. Bhopal 2. Indore 3. Jabalpur 4. Gwalior 5. Sagar 6. Satna 7. Ujjain
20.	Maharashtra	1. Navi Mumbai 2. Nashik 3. Thane 4. Greater Mumbai 5. Amravati 6. Solapur 7. Nagpur 8. Kalyan-Dombivali 9. Aurangabad

		10. Pune
21.	Manipur	1. Imphal
22.	Meghalaya	1. Shillong
23.	Mizoram	1. Aizawl
24.	Nagaland	1. Kohima
25.	Odisha	1. Bhubaneswar 2. Rourkela
26.	Puducherry	1. Oulgaret
27.	Punjab	1. Ludhiana 2. Jalandhar 3. Amritsar
28.	Rajasthan	1. Jaipur 2. Udaipur 3. Kota 4. Ajmer
29.	Sikkim	1. Namchi
30.	Tamil Nadu	1. Tiruchirapalli 2. Tirunelveli 3. Dindigul 4. Thanjavur 5. Tiruppur 6. Salem 7. Vellore 8. Coimbatore 9. Madurai 10. Erode 11. Thoothukudi 12. Chennai
31.	Telangana	1. Greater Hyderabad 2. Greater Warangal
32.	Tripura	1. Agartala
33.	Uttar Pradesh**	1. Moradabad 2. Aligarh 3. Saharanpur 4. Bareilly 5. Jhansi 6. Kanpur 7. Allahabad 8. Lucknow 9. Varanasi 10. Ghaziabad 11. Agra 12. Rampur
34.	Uttarakhand	1. Dehradun
35.	West Bengal	1. New Town Kolkata 2. Bidhannagar 3. Durgapur 4. Haldia

Source: <http://pib.nic.in/>

*Jammu & Kashmir has asked for time to decide on the potential Smart City.

**12 Cities have been shortlisted from Uttar Pradesh against 13 cities allocated to that state.

3. RATIONALE FOR SMART CITIES IN INDIA

The smart cities are imperative in emerging economies like India because of growing populations. The rampant urbanization, new lifestyles, rising mobility and the resulting challenges, such as congestion and ecological problems like air pollution, noise, etc. have shaken the model of urban growth to its core. The smart cities concept has consequently become an essential element of urban development.[13]

Most of the Indians still live in villages and face many challenges. It is predicted that about 25-30 people migrate every minute to major Indian cities from rural areas in search of better livelihood and better lifestyles.[14] Spreading them evenly around the country is good to control urban sprawl and will ensure good quality of life in urban pockets.[15] To accommodate this growing and increasingly mobile populace, it is imperative that a sustainable model of housing be developed.[16]

Over-population and the ensuing overuse of scarce resources put heavy pressure on the environment. If environment challenges and climate changes have to be mitigated, it should first start from the cities with the use of smart technologies.

The infrastructure in mega-cities like Mumbai, Delhi and Kolkata haven't kept pace with the burgeoning population. Most of the infrastructure that is near or has past its design life requires massive up-gradation. Though, infrastructure has been expanding, there is inequity in access to these services.

The revolution in ICT ensures better access to information and services via mobile devices and computers. This aspect is high in public consciousness, especially with disconcerting news on the safety of women, road rage, robbery attacks on the elderly and juvenile delinquency. Clearly, networks of video-cameras, brightly lit public areas, intensive patrolling and surveillance, identity-verified access, and rapid response to emergency calls are all on the expectations list.[17]

The world has seen a rapid rise in competition between cities to secure investments, jobs, businesses and talent for economic success. Increasingly, both businesses and individuals evaluate a city's 'technology quotient' in deciding where to locate. India has vast manpower who are unemployed, can be benefitted by the development of smart cities.

4. INDICATORS OF SMART CITIES

There are different indicators of smart cities. The main six indicators and their sub-divisions are as follows:[18]

4.1 Smart Economy

- a. Innovative spirit
- b. Entrepreneurship
- c. Economic image and trademarks
- d. Productivity
- e. Flexibility of labour market
- f. International embeddedness
- g. Ability to transform

4.2 Smart Mobility

- a. Local accessibility
- b. (Inter-) national accessibility
- c. Availability of ICT-infrastructure
- d. Sustainable, innovative and safe transport system

4.3 Smart Environment

- a. Attractivity of natural conditions
- b. Pollution
- c. Environmental protection
- d. Sustainable resource management

4.4 Smart People

- a. Level of qualifications
- b. Affinity to life-long learning
- c. Social and ethnic plurality
- d. Flexibility
- e. Creativity
- f. Cosmopolitanism/Open-mindedness
- g. Participation in public life

4.5 Smart Living

- a. Cultural facilities
- b. Health conditions
- c. Individual safety
- d. Housing quality
- e. Education facilities
- f. Touristic attractivity
- g. Social cohesion

4.6 Smart Governance

- a. Participation in decision making
- b. Public and social services
- c. Transparent governance
- d. Political strategies and perspectives

5. WORLD SMART CITIES

According to the United Nations, by 2030, six out of every 10 people will live in a city, and by 2050, this will increase to seven out of 10 people.[19] The most urbanized countries of America and Europe have undertaken many smart city projects and the number of projects is growing worldwide. In Europe, the smart cities are Copenhagen, Amsterdam, Vienna, Barcelona, Paris, Stockholm, London, Hamburg, Berlin, Helsinki, and Lyon while Seattle, Boston, San Francisco, Washington, New York, Toronto,

Vancouver, Portland, Chicago, Montreal, Mexico City, Bogota, Buenos Aires, Rio de Janeiro, etc. are in America. The Asia/Pacific nations have also made Seoul, Singapore, Tokyo, Hong Kong, Auckland, Sydney, Melbourne, Osaka, Kobe, and Perth as smart cities.

Europe is the model for the rest of the world to learn from smart cities. The European cities tend to be denser, have better public transit, larger commitment to cycling and walking, a stronger focus on sustainability and low-carbon solutions, and a culture and citizenry more engaged in the journey towards more sustainable and smarter cities. Amsterdam smart city through PPP model focused on using the city as an urban laboratory for the use of open data, new mobility solutions and ultimately improved quality of life for all residents and visitors.[20]

The city of San José and Intel Corporation are collaborating on a PPP mode to further the city's 'Green Vision' goals. This is expected to help drive San José's economic growth, foster 25,000 clean-tech jobs, create environmental sustainability and enhance the quality of life for residents.[21]

Singapore city is a clean, organized, technological city with excellent public transit systems (especially their metro) and a commitment to sustainable development. In fact, it has one of the lowest carbon footprints of any major city in the world (around 2.7 tons of CO₂ per capita). It has more than 100 companies generating \$ 370 million in annual revenue from selling their rainwater collection and water recycling technologies around the globe.[22]

6. PPP IN INDIA

The scheme and guidelines for the India Infrastructure Project Development Fund, issued by Ministry of Finance, GoI defines PPP as 'Partnership between a public sector entity (sponsoring authority) and a private sector entity (a legal entity in which 51% or more of equity is with the private partner/s) for the creation and/or management of infrastructure for public purpose for a specified period of time (concession period) on commercial terms and in which the private partner has been procured through a transparent and open procurement system'.[23]

The story of PPP in India dates as far back as the later half of the eighteenth century when British companies made investments in rail and roads sectors. During the 1990s, the economic liberalization opened the door for private investment. The GoI is promoting PPP as an effective tool for bringing private-sector efficiencies in creation of economic and social infrastructure assets and for delivery of quality public

services. The central as well as state governments have made PPP policies and issued guidelines for undertaking PPP projects. As of March 2013, the central as well as state governments have undertaken 2,563 projects worth 12,22,529 crore in different sectors (table-4). The central government alone initiated about 1252 projects in different sectors with a total project cost of Rs. 7,06,669.02 crore throughout India till November 2015, (table-3).[24]

In order to accelerate the implementation of PPP projects and providing them long-term finance, the government has initiated the ‘Viability Gap Funding (VGF) scheme’. It is a special facility created to support those infrastructure projects which are economically justifiable but not commercially viable in the immediate future. The status of central as well as state PPP projects are given in table-4. Sector-wise PPP projects initiated by the central government have been shown in the table-3. Some of the completed PPP projects are given in the table-2.

7. PROSPECTS OF PPP IN SMART CITIES DEVELOPMENT

The Prime Minister of India has envisaged developing 100 smart cities by 2022 to accommodate rapid urbanization and has allocated US\$ 1.2 billion in fiscal year 2014-15.[25] The investment strategy primarily relies through a combination of public investment, private participation through PPP and stand-alone private investment. The investment figure would vary widely depending on whether the development is green-field or brown-field.

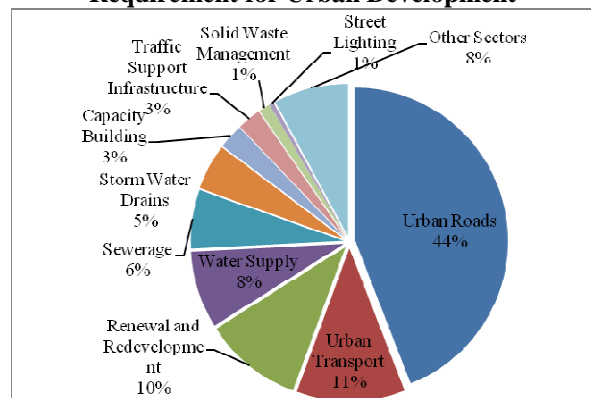
The investment in green-field smart cities can be significantly higher as new cities require development of smart urban infrastructure from scratch. The need to address all aspects like use of non-conventional sources for power, green building constructions, recycling of waste water for non-potable uses, environment-friendly mass rapid transport, zoning including mandatory open areas, etc, could drive up new development costs significantly.[26] On the other hand, in a brown-field development, the focus in most cases is limited to leveraging technology solutions to deliver various citizen services in a seamless and efficient manner. Large scale modifications of existing infrastructure is usually not undertaken to avoid major disruptions.[27]

In general, the investment for urban infrastructure over the 20-year period from 2012-13 to 2031-32 is estimated at Rs 39.2 lakh crore at 2009-10 prices as shown in the figure-1.[28] India has emerged as the largest PPP market in the world with over 2563 projects at various stages of development. PPP have

delivered some of the iconic urban infrastructure which is seen as models for development globally.

There are several smart city projects going to be being undertaken across the country in place such as Dholera in Gujarat, Kochi in Kerala, Aurangabad in Maharashtra, Manesar in Delhi NCR, Khushkera in Rajasthan, Krishnapatnam in Andhra Pradesh, Ponneri in Tamil Nadu, Tumkur in Karnataka.[29] It is estimated that many industrial and commercial centres will be created as smart cities along the Delhi-Mumbai Industrial Corridor, the Chennai-Bangaluru Industrial Corridor and the Bangaluru-Mumbai Economic Corridor.

Figure.1: Relative Shares of Sectors in Investment Requirement for Urban Development



The government has declared 98 lists of cities to be developed as smart cities. These can be executed in PPP model and the government should contribute as VGF for the project. PPP can supplement the smart city facilities like continuous water supply, modern sewerage system, solid waste management, ICT, health, education, power and development of other urban infrastructures. The total estimate of investment requirements for providing these services is estimated to be around Rs 7.5 lakh crore over 20 years which means it requires Rs 35,000 crore in a year.[30] Many projects have been successfully completed in India in different sectors through PPP model and other projects are under various stages of development (table-2,3&4).

Table.2: Completed PPP Projects in India

(As on March 31, 2013)

S. No.	Name	Project Cost (cr.)	Date of Completion
	National Highways		
1.	Udaipur bypass	24	Mar-98
2.	Zadeshwar Bridge	113	Nov-00
3.	Amritsar-Wagha Border	206	Oct-10
4.	Banglore	445	Dec-10

	Neelamangala (6 lane)		
5.	Pondicherry-Tindivanam	285	Dec-11
6.	Sitapur-Lucknow	322	Jan-12
7.	Kosi Bridge	418	Jan-12
8.	Gurgaon-Faridabad and Ballabgarh-Sohna Road	180	Jun-12
9.	Hyderabad-Vijayawada	1740	Mar-13
	Airports		
10.	Cochin International Airport	563	May-99
11.	Rajiv Gandhi International Airport, Hyderabad	2,920	Mar-08
12.	Bangalore International Airport	2,400	May-08
	Ports		
13.	Pipavav Greenfield Port	312	1996
14.	Captive Fertilizer Berth, Paradip Port	26	Aug-99
15.	Container Terminal, Visakhapatnam Port	108	Jun-03
16.	Marine Liquid Terminal, Ennore Port	249	Jan-09
17.	Gangavaram Port	1,850	Jul-09
18.	Iron ore Terminal, Ennore Port	480	Feb-11
19.	ICTT, Cochin Vallarpadam	2,118	Feb-11
20.	LNG Re-gasification Terminal, Cochin Port	4150	Jan-13
	Railways		
21.	Surendra Nagar-Pipava Rail connectivity project	373	Mar-03
22.	Hassan-Manglore port connectivity project	293	May-06
23.	Gandhidham-Palanpur port connectivity project	500	Nov-06
24.	Bharauch-Dahej	395	Mar-12
	Power		
25.	Combined Cycle Power Project, Jegurupadu	816	2009
26.	Champawati 4 MW Power Project, Kokrajpur	16	Jun-10
27.	Jhajjar Power Transmission Project	382	Mar-12
28.	Rosa Extension TPP (600 MW)	3,099	Mar-12
29.	Lignite based Power Plant, Bhadresh	5,000	Mar-13

	(Barmer)		
	Urban Infrastructures		
30.	HITEC City, Cyberabad, Hyderabad	450	Nov-98
31.	Sewage Processing Plant, Ahmedabad	10	1997-98
32.	City Centre at Salt Lake	120	Jun-04
33.	Tirupur Water Supply and Sewerage Project	1.023	May-05
34.	Modern Bus Terminal, Amritsar	13	Oct-05
35.	HILAND Park at Baghajatin	140	Dec-07
36.	Jawaharlal Nehru Pharma City, Visakhapatnam	313	Aug-08
37.	Inertisation and land fill facility, Shimoga	4	Oct-08
38.	Bus Stops for City Bus Service	2	Sep-09
39.	Desalination Plant, Matasukh	300	Sep-10
40.	Dispensary and Multi Complex, Visakhapatnam	27	Apr-10
41.	Waste Water Treatment Plant, Bhilwara	20	Sep-12
	Others		
42.	Arogya Raksha Scheme	2	Mar-99
43.	E-Seva	2	Dec-99
44.	e-Procurement	3	Apr-05
45.	108 Emergency Response Services	99	Aug-05
46.	Hospital Building at Pimpri Chinchwad	25	Jul-07
47.	ICT @ 5000 Schools, Computer Education Project	460	2008-09
48.	1000 Schools Computer Education Project	274	Dec-09
49.	G.N.C Institute of Management & Tech., Tezpur	10	Apr-11
50.	Super specialty hospital, Mohali	200	Jul-11
51.	O & M of Skilled Development Training Centres	10	Sep-12

Source: Compendium of PPP Projects in infrastructure-2014, Planning Commission, GoI

India is a vast country and adequate transport infrastructure like roads, railways and airports within the smart cities and also connecting all the proposed smart cities ranks importance. Without smooth transportation, no city can survive. The poor transport systems stifle economic growth and development. The efficient transport systems provide many economic and social benefits in cities, both direct as well as indirect. It has direct impact on employment, added value, larger markets as well as time and costs improvements. The development of transport infrastructure through PPP occupies about 55% of the total number of PPP projects initiated in India. Out of these, around 53% is in roads sector and the rest is shared between railways and airports, one percent each. So, PPP provides immense opportunity for building adequate transport infrastructure for the shortlisted smart cities. As on March 31, 2013, 75 projects of national highways (Rs. 31,404 crore), 29 projects in port sector (Rs. 12,964 crore), 4 railways projects (1,561) and 3 airports (Rs. 5,883 crore) have been completed through PPP mode (table-4).

Table.3: Sector-wise Status of PPP Projects

(As on December 2015)

S. No.	Sector-wise	No. of Projects	Total Project Cost (Rs Crore)
A	Energy	162	41,923.20
1.	Electricity generation (grid)	34	18,838.89
2.	Electricity transmission	21	8,059.30
3.	Oil/ Gas/ LNG Storage	1	1,500.00
4.	Renewable energy (grid)	106	13,525.01
B	Social and Commercial Infrastructure	113	44,434.80
1.	Cold Chain	10	1,628.54
2.	Common infrastructure for industrial parks, SEZ	50	36,321.59
3.	Education	15	1,213.49
4.	Health Care	9	938.02
5.	Tourism	29	4,333.16
C	Transport	873	601,456.46
1.	Airports	12	5,30.52
2.	Ports (excluding captive)	114	95,526.06
3.	Railway track, tunnel, viaducts,	8	4,848.89

	bridges		
4.	Roads and bridges	684	462,968.35
5.	Urban public transport (except rolling stock)	55	32,805.64
D	Water Sanitation	104	18,854.55
1.	Sewage collection, treatment and disposal system	22	1,609.05
2.	Solid waste management	52	10,959.00
3.	Water supply pipeline	20	4,465.95
4.	Water treatment plants	10	1,820.55
	Total	1252	706,669.02

Source: <https://infrastructureindia.gov.in/>

Note: Includes only operational and under construction PPP projects.

After the roads sector, urban development is the second most important sector for PPP projects. As on March 2013, around 179 urban infrastructure projects have been executed through the PPP mode involving an investment of Rs. 7,568 crore.[31] Out of this, about 144 urban infrastructure projects with an investment of Rs. 47,496 crore are currently under implementation (table-4).[32] Almost all the states have initiated projects in building urban infrastructure. For example, Andhra Pradesh has completed HITEC City in Cyberabad, Passenger Ropeway on Kailasagiri in Visakhapatnam, Bus Toilets in Hyderabad, Jawaharlal Nehru Pharma City, Dispensary and Multi Complex in Visakhapatnam (table-2).[33] The Solar Light System, Traffic Islands, Pay and Use Toilets at Surat, City compost from Solid Waste Project at Kadi, CTFD of Bio Medical Waste and Sewage Processing Plant at Ahmedabad are some of the completed projects through PPP mode.

A city cannot be smart if there is no power. Therefore, there is a need to create proper transmission and distribution system to ensure uninterrupted supply of electricity.[34] PPP can provide 24x7 power supplies to the smart cities by building new power projects and transmission lines. There are many successful examples of PPP in energy sector and it shares 7% of the total PPP projects. Some of the successful examples are Champawati 4 MW Power Project at Kokrajpur (Assam), Paguthan Expansion Project (Gujarat), Jhajjar Power Transmission Project (Haryana), Lignite based Power Plant at Bhadresh (Rajasthan), Vishnu Prayag HEP, Rosa and Bajaj Extension Transmission Project (Uttar Pradesh (table-2).

Besides transport, urban development and energy sectors, many projects in education, health, ICT, water

supply, ropeways, ITIs, sports city have been taken through PPP route. As on March 2013, around 597 projects are under different stage of development

including solid waste management and sewerage, urban transport, social sectors like health care and education, affordable housing, people's participation,

Table.4: Status of PPP Projects in Central and States/ UTs Sectors (As on March 31, 2013)

S N	Ministry/ Sector	Completed Projects		Projects Under Implementation		Projects in Pipeline		Overall Status	
		Completed Projects	No. of Projects	Projects Cost (Rs. crore)	No. of Projects	Projects Cost (Rs. crore)	No. of Projects	Projects Cost (Rs. crore)	No. of Projects
(A) Central Sector									
1.	National Highways	75	31,404	161	1,55,438	18	25,377	254	2,12,219
2.	Major Ports	29	2,964	29	8,561	20	17,420	78	38,954
3.	Airports	3	5,883	2	25,237	15	23,692	20	54,812
4.	Railways	4	1,561	3	3,441	12	58,100	19	63,102
	Total	111	51,812	195	1,92,677	65	1,24,589	371	3,69,078
(B) State Sector									
1.	Roads	166	22,445	187	65,038	200	71,614	553	1,59,096
2.	Ports	28	33,162	18	28,411	39	40,620	85	1,02,193
3.	Urban Infra	179	7,568	144	47,496	420	2,57,196	743	3,12,259
4.	Power	26	36,580	121	1,13,491	42	34,878	189	1,84,949
5.	Railways	-	-	2	1,357	-	-	2	1,357
6.	Airports	-	-	1	141	22	14,434	23	14,575
7.	Other Sectors	183	9,861	126	20,371	288	48,789	597	79,021
	Total	582	1,09,615	599	2,76,305	1,011	4,67,531	2,192	8,53,450
(C) Overall (Centre + States/UT)									
	Grand Total	693	1,61,427	794	4,68,982	1,076	5,92,120	2,563	12,22,529

Source: Compendium of PPP Projects in infrastructure-2014, Planning Commission, Government of India

through the PPP mode involving an investment of Rs. 79,021 crore in these sectors. Out of this, about 183 projects have been completed with an investment of Rs. 9,861 crore (table-4).[35] Some of these projects completed in Andhra Pradesh are Indira Gandhi Zoological Park, Health Resort Project and Beach Resort Project at Visakhapatnam, Snow World Project, FAB City, Mind Space Project and Urban Entertainment Centre Project at Hyderabad, IT/ITES SEZ at Vijayawada, AP Online Portal, APNET/SAPNET, Rajiv Aarogyasri Health Scheme, 104 Mobile Health Service, 108 Emergency Response Services, up-gradation of 1396 Government ITI's, Rajiv Common Service Centres and so on.[36]

Gujarat International Finance Tech-City (GIFT), near Ahmedabad would become the world's first integrated smart city built from scratch. The PPP project has set up special purpose vehicles to implement critical utility components through major private sector participation. It will deliver services such as a district cooling system, water infrastructure, waste management, power and information and communications technology services. Some of the key areas where PPP will play a significant role in smart cities are water supply, urban waste management

vocational and skill training, matching the worker with the job/task, amongst others.

So, PPP provides vast opportunities in the development of smart cities of India both green-field and brown-field. The investment in each smart city is estimated to be in excess of \$10 billion.[37] The government is short of finance and technological knowledge where PPP provides an alternative solution in solving the budgetary constraints of the state. In almost all the sectors, projects have been successfully completed through PPP model. There is fast implementation of infrastructure projects through PPP. They are long term projects i.e. 25-30 years with strong incentives to minimise costs over the whole life of a project. They provide improved quality of services to the citizens. They help in technology for construction and operating system, projects and operational management, financial engineering, institutional engineering and many more.

8. CHALLENGES

Firstly, there is neither an internationally accepted definition of a smart city, nor does India have any national policy on urbanization in the first place.

The government is yet to finalize PPP policy for smart cities. Recently, the government has announced the smart cities mission statement and guidelines. There are difficulties in attracting finance for smart cities projects for different sectors. Most of the finance is coming for building transport infrastructure as it is profitable for private sectors.

Apart from difficulties in attracting private capital, the biggest concern is over land acquisition. Most of these smart cities are being built ground up, on land currently owned by villagers who may not be open to a change of ownership or who may want a premium price. For example, the proposed smart city in Dholera, Gujarat, has faced resistance from the locals. Some farmers and residents have challenged the notification of the Special Investment Region Act under which this project is being executed, calling it unconstitutional.[38]

Lack of coordination between various government agencies and project execution are other areas of concern. Police and Municipal Corporation have their separate agendas and structured processes for smart cities.[39]

The lengthy procurement process and project clearance is one of the main challenges. There are many levels of project clearance due to which the cost of projects increases manifold. Moreover, the private sector wants confidence from the government that policies will not change mid-way and they are seeking room for flexibility in the terms of agreement, while a project is in progress.[40]

The situation in India is more complex because, in most cities, user charges are inadequate to recover even the basic cost of service delivery, due to lack of political will to undertake periodic increases. For example, cost recovery (through user charges) for solid waste management ranged between 25-50% even for larger Municipal Corporations like Delhi and Chennai, as per the 2014 JNNURM reforms appraisal report.[41]

9. CONCLUSION

The smart cities initiative by the government is a step in right direction, with a clear goal for achieving sustainable development of cities. It is the need of the hour before the situation become unmanageable. To attract private investments, government should provide incentives in housing, electricity, ICT, education, health, recreation, sports facilities, environmental facilities and others. An equitable allocation of risks and rewards between the parties will benefit both the commercial interests and public

welfare. For timely completion of project, all clearances should use online processes and should be cleared in a time bound manner. A regulatory body should be set up for all utility services so that level playing field is made available to the private sector and tariffs are set in a manner that balances financial sustainability with quality. The government should set up a smart-city governance cell that can monitor and coordinate the projects execution. From a social perspective, smart cities must be inclusive, not only for the urban rich but also for the poor. If the state overlooks the existing city's situation and privileges new enclaves, the urban fabric will be torn into two unequal parts.[42]

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