

# SMART CITIES IN INDIA



## INTRODUCTION



A smart city is one that uses digital technologies to enhance performance and wellbeing, to reduce costs and resource consumption, and to engage more effectively and actively with its citizens. Key 'smart' sectors interalia include transport, energy, health care, water and waste. Interest in smart cities is motivated by major challenges, including climate change, economic restructuring, the move to online retail and entertainment, ageing populations, and pressures on public finances. The terms "intelligent city" and 'digital city' are also used interchangeably.

The cities with ongoing or proposed smart cities include Kochi in Kerala, Ahmedabad in Gujarat, Aurangabad in Maharashtra, Manesar in Delhi NCR, Khushkera in Rajasthan, Krishnapatnam in Andhra Pradesh, Ponneri in Tamil Nadu and Tumkur in Karnataka. Many of these cities will include special investment regions or special economic zones with modified regulations and tax structures to make it attractive for foreign investment. This is essential because much of the funding for these projects will have to come from private developers and from abroad.

As India's population continues to grow, more citizens will move to cities.

Experts predict that about 25-30 people will migrate every minute to major Indian cities from rural areas in search of better livelihood and better lifestyles. It is estimated that by the year 2050, the number of people living in Indian cities will touch 843 million. To accommodate this massive urbanization, India needs to find smarter ways to manage complexities, reduce expenses, increase efficiency and

improve the quality of life. Government of India has allocated Rs 70.6 billion (USD 1.2 billion) for Smart Cities in Budget 2014-15. India plans 100 new smart cities and will develop modern satellite towns around existing cities under the smart city programme.

India has a population of 1.27 billion plus, and growing. To accommodate rapid urbanization, the Government of India has allocated US\$ 1.2 billion in fiscal year 2014-15 to build 100 new smart cities, and to develop satellite towns around existing cities. Most other funding will come from Indian and overseas private sector companies.

### **SMART GOVERNANCE**

The Government is using the Public Private Partnership (PPP) Model to upgrade infrastructure in 500 urban areas. Smart City projects are expected to create 10-15% rise in employment.

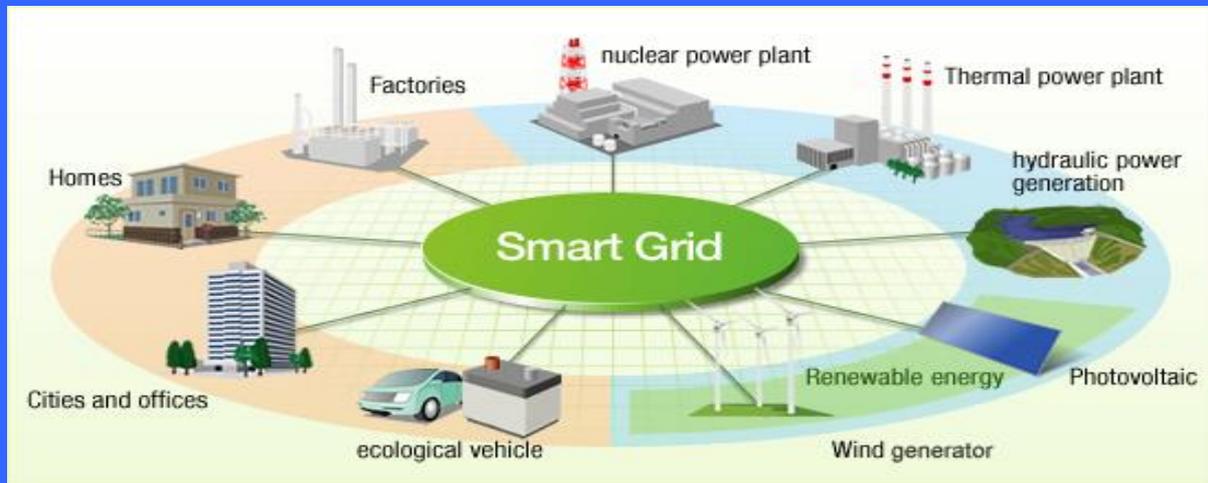
The Ministry of Urban Development has plans to develop 2 smart cities in each of India's 29 states. Delhi Mumbai Industrial Corridor Development Corporation Ltd (DMICDC) plans seven "smart cities" along the 1,500 km industrial corridor across six states with a total investment of USD 100 billion. Investments of about USD 1.2 trillion will be required over the next 20 years across areas like transportation, energy and public security to build smart cities in India.

### **SMART ENERGY**

- a) India operates the 3rd largest transmission and distribution electricity network in the world, yet faces a number of challenges including, inadequate access to electricity, supply shortfalls, huge losses, reliability and theft. The evolution towards smart grid will address these issues and transform the existing network into a more efficient, safe and reliable grid that would provide electricity access to all.
- b) Implementation of smart meters will allow utility companies to collect and analyse data from every meter, to ensure accurate billing. It is estimated that India will install 130 million smart meters by 2021.

- c) Central and state governments could implement new energy laws, compliance structures, training programmes and offer incentives for efficiency projects.

## SMART GRID



- Electrification of all households with power available for at least 8 hours per day by 2017
- Indigenous low cost smart meter
- Establish smart grid test bed and smart grid knowledge centre by 2015
- Implementation of 8 smart grid pilot projects in India with an investment of USD 10 million.

## ENERGY STORAGE

- Addition of 88,000 MW of power generation capacity in the 12th Five Year Plan (2012-17)
- India needs to add at least 250-400 GW of new power generation capacity by 2030
- The Power Grid Corporation of India Ltd has planned to invest USD 26 billion in the next five Years.

## SMART ENVIRONMENT

### A. Renewable Energy

- (i) India's installed electricity generation capacity at, 250 GW, is the world's fifth-largest, with power generation from coal, natural gas, hydro, oil, nuclear, solar, wind, bio-gas, etc.
- (ii) India is mainly dependent on coal to produce electricity, which is also the main source of greenhouse gases, causing global warming. Therefore, the need to focus on more efficient use of coal or alternate fuels and renewable energy.
- (iii) The potential for renewable energy in India is estimated at 249.18 GW and the installed capacity is 31.69 GW as on 31 July 2014. The Ministry of New and Renewable Energy (MNRE) has a target to achieve an installed capacity of 41.40 GW by 2017, which is a US\$10.51 billion opportunity.

## **B. Water and Waste Water Management**

- i) The demand for clean water continues to grow for domestic and industrial purposes. The health burden of poor water quality is enormous. It is estimated that around 38 million Indians are affected by waterborne diseases annually.
- ii) More than 38 billion litres of sewage is generated in India on a daily basis, but only 30 per cent is treated, with the balance untreated sewage discharged into rivers, ponds or lakes, which is the main source of municipal water.
- iii) Sanitation problems in urban areas are more serious and need immediate attention; sewerage systems commonly suffer from poor maintenance and negligence, leading to overflows with environmental and health concerns. Municipal authorities are building community toilets, and are working on incentives to build additional sanitation facilities. Concerted efforts are on to create awareness on health issues, etc.
- iv) To overcome water supply, waste water and sanitation issues, cities seek to incorporate the latest technologies, products, solutions, systems, etc., and efforts are on to collate data to diagnose problems, and to prioritize and manage maintenance issues.

- v) The Indian Ministry of Water Resources plans to invest USD 50 billion in the water sector in the coming years
- vi) The Yamuna Action Plan Phase III project for Delhi is approved at an estimated cost of USD 276 million

### C. Sanitation

- About 67 per cent of the rural population continues to defecate in the open, and India accounts for about 50 per cent of the world's open defecation.
- The Government of India and the World Bank have signed a USD 500 million credit for the Rural Water Supply and Sanitation (RWSS) project in the Indian states of Assam, Bihar, Jharkhand and Uttar Pradesh.



### D. Solid Waste

Around 60 million tonnes of Municipal Solid Waste (MSW) is generated in India per annum. With rapid urbanization and changing lifestyle and food habits, the amount of municipal solid waste has been increasing. Dumpsites in almost all cities are handling more waste than capacity, and finding new landfills near cities is almost impossible. Most dumpsites lack systems for leachate collection, landfill gas collection or monitoring, etc. This results in ground and surface water contamination from runoff, air pollution caused by fires, toxic gases, and odour, and public health problems due to mosquitoes and other epidemics.

There is a focus on solutions to reduce waste and environmental pollution, including to generate energy, and to free up land that would otherwise be used for landfill.

## E. Smart Transportation

No one enjoys clogged cities with overcrowded vehicular population (with its attendant pollution), or with metro or local train systems bursting at the seams. For example:

- Mumbai suburban railways carry 7.5 million commuters per day, which is the highest passenger density, and most intensively utilised system in the world
- Delhi Metro has an average daily ridership of 2.5 million commuters
- Chennai city buses carry 5 million passengers per day
- Mumbai buses carry 4.8 million passengers per day
- New Delhi has the largest vehicular population in the country, with more than 7.5 million registered cars, and 1,400 new cars added to city roads every day.

Urban transportation is an important element for smart cities. Hence, the need to review city transportation systems in India (including metros, BRT's, monorail, trams, waterways, walkways, bicycle tracks, etc.), to provide new and enhanced infrastructure for public transportation.

- i. EVs / HEVs, with infrastructure for recharging electric vehicles, and battery storage is expected to play a role in improving the quality of life in Indian cities. Fiscal incentives could encourage faster development in cities. To encourage the use of EV's, the government has launched a National Mission on Electric Mobility, with a target of 6 million electric vehicles by 2020: Electric vehicle charging stations in urban areas, and along state and national highways are to be introduced by 2027.
- ii. The use of bio-fuels is being encouraged with an ethanol-blending program (ethanol with petrol) to curb India's oil imports. The interstate railway networks on existing routes are to be improved; and high speed rail facilities will be introduced on important routes.

## F. Green Transport

- The Government of India has approved a USD 4.13 billion plan to spur electric and hybrid vehicle production by setting an ambitious target of 6 million vehicles by 2020.
- Electric vehicle charging stations in all urban areas and along all state and national highways by 2027.



## G. Railways

- Metro: Ministry of Urban Development plans to invest more than USD 20 billion on the metro rail projects in coming years.
- High Speed Rail: The proposed 534 km Mumbai- Ahmedabad high speed rail project will have an investment of around USD 10.5 billion.
- Monorail: India's first monorail project at Mumbai will cost around USD 500 million, of which USD 183 million has been spent on phase

## H. Smart IT & Communications

- (a) India ranks 122 in the world for fixed broadband penetration, with only 1.1 per 100 inhabitants having access to fixed broadband.. India ranks 106 in the world for mobile broadband penetration, with only 4.9 per 100 inhabitants having access to mobile broadband. India has around 243 million internet users, with 70 percent accessing the Internet through mobile phones and tablets, and the rest through desktops and laptop computers. India has around 933 telecom subscribers: 59 percent urban and 41 rural.

- (b) Despite being Facebook's second largest market worldwide, social media penetration in India remains at just 8 per cent or 106 million active users.
- (c) India's average Internet speed is 1.5 Mbps, the lowest among Asia Pacific region. Only 4.9 per cent of Indians have access to speed higher than 4 Mbps. IT and communications technology will be a key component of the investments allocated by the Governments to build smart cities.
- (d) City administrations are aware of issues like public safety, security, prevention of accidents, terrorism, etc. and to provide swift responses
- (e) To implement Smart IT and communications, policymakers must develop a strong wired and wireless broadband network, and ensure its availability throughout the city to all its residents. Smart cities will use IT to improve the quality of life of its citizens by providing citizen services over communication networks.

## **I. Information and Communications Technology**

Cloud computing will evolve into a USD 4.5 billion market in India by 2016. Broadband connections to 175 million users by 2017 Security and Surveillance. Under the flagship "Safe City" project, the Union Ministry proposes USD 333 million to make seven big cities (Delhi, Mumbai, Kolkata, Chennai, Ahmedabad, Bangalore and Hyderabad) to focus on technological advancement rather than manpower.

## **J . Disaster Management**

Government of India and World Bank signed USD 236 million agreement for reducing disaster risks in coastal villages of Tamil Nadu and Pondicherry.

## **SMART HEALTH**

### **I. Hospitals**

- Health budget up by 27 percent in FY 2014-15 to USD 5.86 billion, with special focus on improving affordable healthcare for all.

- To establish four new AIIMS like institutes and 12 government medical colleges in the country.
- Accessible, affordable and effective healthcare system for 1.2+ billion citizens Insurance.
- FDI limit in the insurance sector increased to 49 percent from 26 percent.
- Insurance industry has potential to reach USD 1 trillion by 2020.

## II. Devices

- Indian medical devices market to reach USD 11 billion by 2023.
- The industry is import driven with about 70 percent of the devices being imported.

## SMART EDUCATION

- a. The Government of India has allocated USD 13.95 billion in the Union Budget 2014-15 for the education sector, up by 12.3 percent from the previous year.
- b. The Ministry of Human Resource Development plans to have 1,000 private universities for producing trained manpower to meet services and industry requirements.
- c. 100 percent FDI allowed in the education sector.
- d. India's online education market size expected to be USD 40 billion by 2017.

## SMART BUILDINGS



- i. The Government of India needs to develop 110 million housing units to achieve the vision of "housing for all by 2022". Encouraging private sector

participation in urban affordable housing could help achieve this vision. Current annual investments in the housing sector are about US\$ 120 billion, and are expected to be around US\$ 2 trillion by 2022, translating to about US\$ 250 billion annually.

- ii. More than 2,771 green buildings projects are registered with the Indian Green Building Council (as on August 2014) with a footprint of over 2.23 billion sq ft (IGBC). Buildings in India consume around 40 percent of total energy generated, and 20 per cent of water (Centre for Science and Environment). Buildings in India generate 40 percent of the carbon emissions, 30 per cent of solid waste, and 20 per cent of water effluents (Centre for Science and Environment)
- iii. It is estimated that India can save around US\$ 42 billion every year with efficient management of lighting, heating, air-conditioning, etc. (McKinsey & Company). Smart building technologies reduce maintenance costs by 10-30 percent, and enhance occupant's comfort, health and safety.<sup>1</sup>

According to the Ministry of Urban Development, 731 smart city projects worth Rs 46,366 crore approved so far and 24 projects have been completed as of January 2017. India plans to have 100 such cities by 2022. For this purpose the Government has been encouraging private sector participation and foreign investments in India.

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