Draft Concept Noteon Smart City Scheme

Context

1. Urbanization accompanies economic development. As countries move from being primarily agrarian economies to industrial and service sectors, they also urbanize. This is because urban areas provide the agglomerations that the industrial and service sectors need. This trend of urbanization continues to take place as seen in the Fig 1.

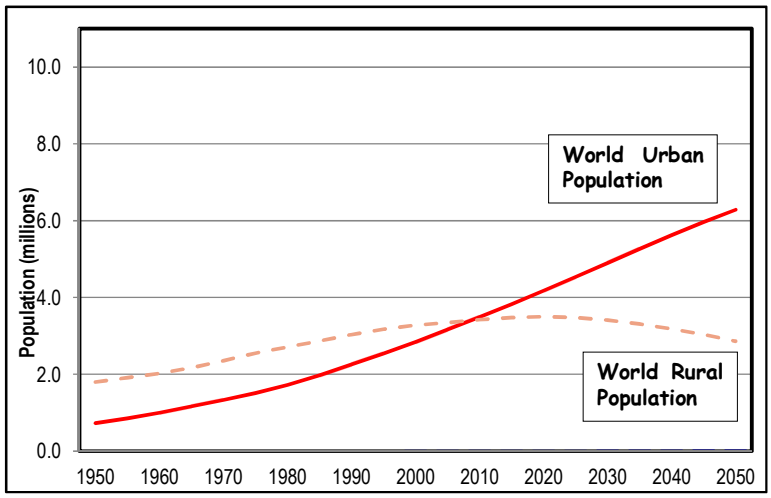


Figure 1: Urbanization Trends

2. In fact, 90% of the world's urban population growth will take place in developing countries, with India taking a significant share of that.

Urban areas also contribute a higher share of the GDP. The share of the GDP from urban areas in India has been growing, as seen from the Fig 2.

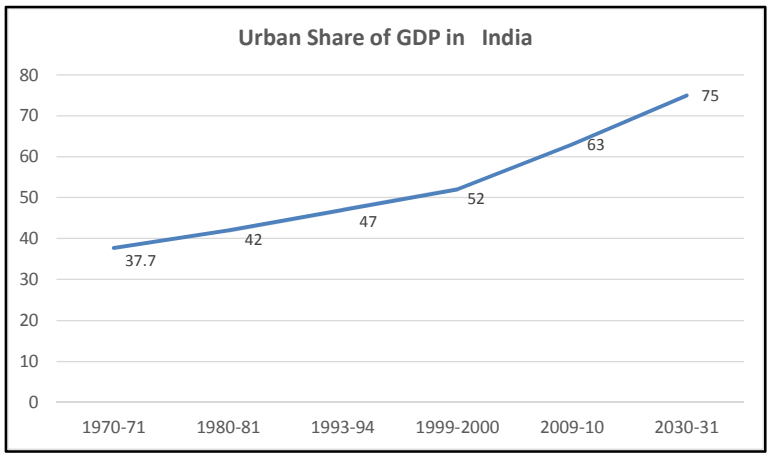


Figure 2: Urban Share of GDP in india

3. While the urban population is currently around 31% of the total population, it contributes over 60% of India's GDP. It is projected that urban India will contribute nearly 75% of the national GDP in the next 15 years. It is for this reason that cities are referred to as the

"**engines of economic growth**" and ensuring that they function as efficient engines is critical to our economic development. This trend of urbanization that is seen in India over the last few decades will continue for some more time. The global experience is that a country's urbanization upto a 30% level is relatively slow but the pace of urbanization speeds up thereafter, till it reaches about 60-65%. With an urban population of 31%, India is at a point of transition where the pace of urbanization will speed up. It is for this reason that we need to plan our urban areas well and cannot wait any longer to do so.The relatively low base allows us to plan our urbanization strategy in the right direction by taking advantage of the latest developments in technology. Moreover, it also offers us an opportunity to create a conducive environment for creation of employment opportunities and economic activities while improving the quality of life. It allows an opportunity to learn from good practices and mistakes made elsewhere.

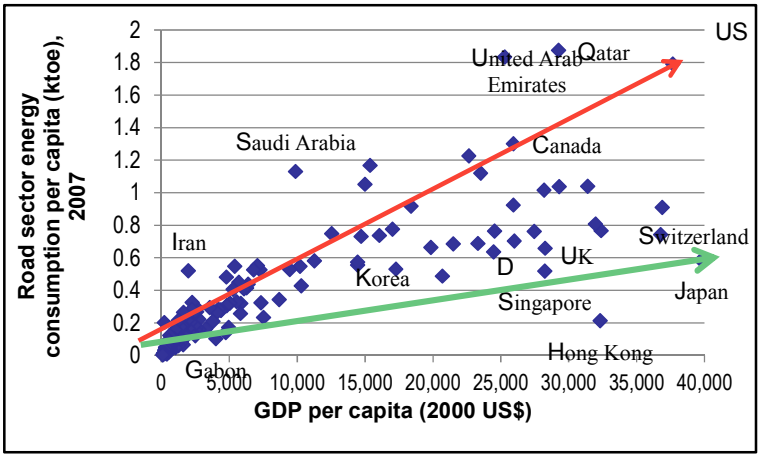


Figure 3: GDP Vs Energy Consumption

4. Countries have taken different paths to development as seen from the income Vs energy consumption graphgiven in Fig 3:

5. While some, such as the oil rich countries, have adopted an energy intensive approach, others have adopted a more energy efficient growth path. In India, since we are still a developing economy, we have the opportunity to choose the path we want to take. Clearly, we should take the low energy path, especially in view of environmental sustainability as well as in view of the fact that we have to import a major part of our energy requirement, at prices that have been very vulnerable to the international political situation.

6. It is in this context that the Government has decided on developing 100 "Smart Cities" in the country. Accordingly, in his budget speech of of July 2014, the Finance Minister has stated as follows:

"*As the fruits of development reach an increasingly large number of people, the pace of migration from the rural areas to the cities is increasing. A neo middle class is emerging which has the aspiration of better living standards. Unless, new cities are developed to accommodate the burgeoning number of people, the exisitng cities would soon become unlivable.* ***The Prime Minister has a vision of developing 'one hundred Smart Cities', as satellite towns of larger cities and by modernising the exisitng mid-sized cities.***"

What is a smart city?

7. People migrate to cities primarily for employment. To support their happy and comfortable living, they also need good quality housing cost efficient physical and social infrastructure such as water, sanitation, electricity, clean air, education, health care, security, entertainment,etc. Industries also locate in cities because there are agglomeration economies that provide easy acces to labour and other factors of production. In this context, Smart Cities are those that are able to attract investments. Good infrastructure, simple and transparent online processes that make it easy to establish an enterprise and run it efficiently are important features of an investor friendly city. Without this a city loses attraction as an investment destination. An investor is considered as someone who helps a city rather than someone who only profits from it.

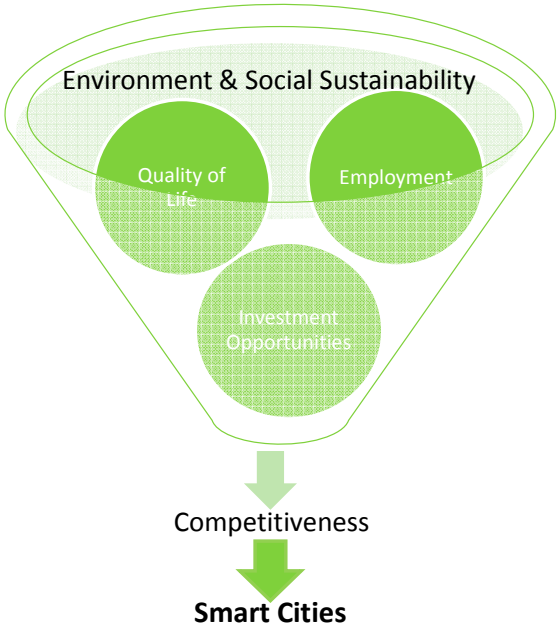


Figure 4: What is a Smart City

8. Different organizations have used different definitionsfor Smart Cities, as given at Annex - 1 . While there are many definitions, the key features of a Smart City, as it emerges from the variety of definitions,seem to be as shown in Fig.4. Smart Cities are those which have smart (intelligent) physical, social, institutional and economic infrastructure. It is expected that such a Smart City will generate options for a common man to pursue his/her livelihood and interests meaningfully. In this context:

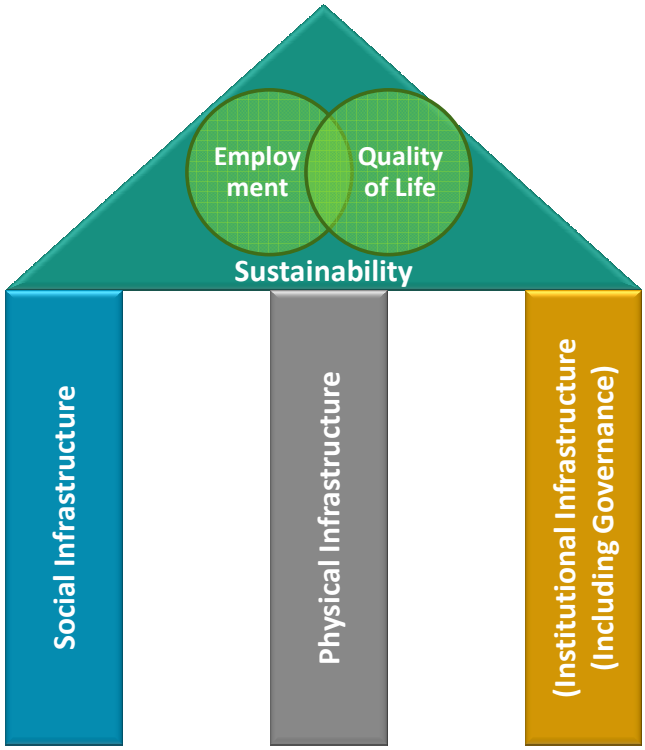
- C**ompetitiveness**refers to a city's ability to create employment opportunities, attract investmentsand people. The ease of being able to do business and the quality of life it offers determines its competitiveness.
- S**ustainability**includes social sustainability, environmental sustainability and financial sustainability.
- **Quality of Life**includes safety and security, inclusiveness, entertainment, ease of seeking and obtaining public services, cost efficient healthcare, quality education, and opportunities for participation in governance.

Pillars of a Smart City

9. Essentially, its **Institutional Infrastructure**(including Governance), **PhysicalInfrastructure**and **Social Infrastructure** constitute the three pillars on which a city rests. The center of attention for each of these pillars is the citizen. In other words a Smart City works towards ensuring the best for all its people, regardless of social status, age, income levels, gender, etc.

- **Institutional Infratsructure**refers to the activities that relate to the planning and management systems in a city. The new technology has provided a new dimension to this system making it efficient and transparent, It includes the systems of governance, the sense of safety and security, the opportunities for entertainment and sports, the open spaces and parks that are available.

- **Physical Infrastructure**refers to its stock of physical infrastructure such as the urban mobility system, the housing stock, the energy system, the water supply system, sewerage system, sanitation facilities, solid waste management system, drainage system, etc. which are all integrated through the use of technology.



- **Social Services**relate to those that work towards developing the human and social capital, such as the educational, healthcare, entertainment, etc systems.

These together determine the quality of life of citizens in a city.

10. A schematice of some of the major components of these pillars is shown at Annex – 2.

Creation of Economic Infratsructure

11. For a city to attract investments and to create the appropriate **economic infrastructure**for employment opportunities, it has to first identify its core comparative advantages and analyse its potential for generating economice activities. Once that is done, the gaps in required economic infrastructure can be determined. This would generally comprise the following:

- Industrial Parks and Export Processing Zones
- IT / BT Parks
- Trade centers
- Service Centres, such as tourism cetres, etc

- Skill Development Centres
- Financial Centers and Services
- Logistics hubs, warehousing and freight terminals
- Mentoring and Counselling services

The expectations for some of these in a smart city have been spelt out in the sections that follow.

Institutional Infrastructure (including Governance)

12. The current governance structures in most States require little involvement of citizens in decision making. Procedures are cumbersome and citizens often find it difficult to secure the services they seek. Further, responsibilities for different services are fragmented across multiple institutions, making the situation even more complex for any citizen. Besides, many of these institutions report to different departments of the State government and local bodies have little influence on them. For example, even within the transport system, metro rail, buses, roads, parking, traffic lights, street lights, etc. are dealt with by different institutions.

13. Reforms in how our cities are governed is necessary as high quality governance, with a strong local say in decision making,is critical for Smart Cities. Typically, the principle to be followed is "**Governance by Incentives rather than Governance by Enforcement**". This would imply that people do the right things because there are incentives to do so and not due to the fear of penal action. However, a greater sense of respect for civic discipline needs to be brought in through **deterrents to civic indiscipline**. Also, decisions will need to be taken at the local level and with well-established processes through which citizens can actively participate in such decision making.

14. In this context, it also needs to be recognized that cities comprise multiple systems, all of which are closely connected in meeting human needs. A Smart City is one where each of these systems works in harmony and reinforces the usefulness of the other. Therefore, a comprehensive approach to the development of a city, is

essential.This requires that the current practice of **working in silos needs to be broken down with greater institutional integration**, at least in planning and oversight. People are attracted to cities that provide all services well. While developing smart cities, it is important to adopt a wholistic approach rather than a sectoral approach.

15. More specifically, Smart Cities would have municipal offices fully automated so that citizens have the ability to seek and the municipal offices the ability to deliver services in real time, through IT based facilities. Public participation in governance should be made possible through the social media and by making all information available in the public domain.

Physical Infrastructure

Mobility

16. Our cities are faced with rapid motorization. This has led to severe congestion, deteriorating air quality, increasing incidence of road accidents and a rapidly increasing energy bill. Walking and cycling have been rendered unsafe due to poor infrastructure and public transport has been inadequate. So far, urban transport planning has emphasized providing for the personal motor vehicle. Public transport systems have been planned in isolation with the result that a well integrated multi-modal system has not come up. This has resulted in high cost facilities not giving the outcomes that were sought.

17. Ease of being able to move from one place to another is at the core of a "Smart City". Seoul, Singapore, Yokohama and Barcelona (all considered Smart Cities) have a sound transport system as the core of their "Smartness". The transport system emphasizes walking, cycling and public transport as the primary means for mobility with personal motor vehicles being actively discouraged. In fact, smart cities lay considerable emphasis on the walkability in the city. The pedestrian is given a place of prominence as every trip has a leg that involves walking.

18. If cities are to be efficient engines of economic growth, it is important that goods are able to move from production centers to consumption centers at low cost and high speed. Therefore, a good freight movement system acquires importance.

Hence, improved mobility will involve a three pronged approach whereby there are:

1. Improvements in public transport – metro rail, BRT, LRT, Monorail, etc
2. Improvments in infrastructrure of other motor vehicles – ring roads, bypasses, elevated roads, improvements in the existing road ways
3. Improvements in infrastructure for walking, cycling and waterways

Reliable Utility Services

19. Reliable, adequate and high quality Utility services is critical in a Smart City. Whether it is electricity or telephony or ICT services, they need to be very reliable and adequate. 24 X 7 services are necessary. For example, a minimum of 100 Mbps of internet bandwidth and wide availability of wifi will be very important features. It should be the right of every citizen to get these facilities on demand. Similarly, municipal services such water supply, drainage, solid waste management need to be of very high quality and available 24 X 7. Telephone services should be available for every household. A Smart City cannot have only a few hours of water supply a day or electricity that goes off for several hours or the streets littered with garbage. The general appearance of the city has to be pleasing and clean. The main utilities that need to ensured are the following:

Water Supply

20. Safe and 24 X 7 water supply is a public good as it has very large positive externalities. Access to water supply is important for all the urban residents and lack of safe water supply can keep the mortality rates high in general and among the poor in particular. It has been estimated that access to water increases the productive working hours of urban poor in general and the poor women in particular by 1.5 to 2 hours. Smart cities should thereforehave an availability of 24 X 7 piped water supply, that also meets benchmarks of water quality, pressure, etc. across the city. Dual water

supply systems that serve the needs of drinking water and other needs would help in recycling water and conserving it.

Sanitation

21. Sanitation is important for all the urban residents. Lack of sanitation cause outbreaks of epidemics, health disorders and keep the mortality rates high in general and among the poor in particular. It is well known that higher incidences of morbidity pushes low income households below the poverty line. It is therefore essential that cities should have a city wide sanitation plan and anetwork of sewerage which connects all parts of the city. Also, each and every household should have a toilet so that no citizen need to defecate in the open.Further, all commercial and other public buildings should have clean and hygienic toilets. There needs to be 100% recycling in the sanitation system.

Solid Waste Management

22. Waste management is the "generation, prevention, characterization, monitoring, treatment, handling, reuse and residual disposition of solid wastes". Indian cities are facing many issues with regard to waste management, which include:

- Absence of segregation of waste at source
- Lack of technicalexpertise and appropriate institutional arrangement
- Lack of proper collection, segregation, transportation and treatment and disposal system.

23. Cities which are not clean do not exhibit a smart character. Cities which are clean are perceived to be smart, providing a healthier environment and a better quality of life. Therefore, they attract people – both people who want to live and work in the city and those who want to invest in the city. The following strategies therefore need to be adopted:

- Segregation of recyclable and non-recyclable waste as well as wet and dry waste at the source so that there can be 100% recycling of solid waste
- Appropriate technology should be adopted for treatment of waste.
- Put in place an effective collection and disposal system

Storm Water Drainage

24. Lack of storm water drainage often exacerbates the sanitation problem in many Indian cities, especially during the monsoon months. Lack of storm water drains lead to water logging every monsoon and outbreak of vector diseases such as malaria, dengue and so on. Cities, therefore, need to adopt a storm water management approach. This would include preserving and maintaining the natural hydrological cycle, groundwater recharge, natural drainage system, etc. Provisions for storm water to feed lakes and water bodies would enable recycling of the storm water.

Electricity

25. As per the Government of India statistics, nearly 94% of the households in urban areas have access to electricity, however, the availability of the supply remains a concern. Smart cities should have universal access to electricity 24 X 7. This is not possible with the existing supply and distribution system. The cities should, therefore, shift towards renewable sources also to meet the demand such as solar and wind energy and the distribution system must be strengthened. Further, the focus should be on green buildings and green transport to reduce the need for electricity. There would thus be a need to review the existing state policy and bring in the necessary changes wherever needed.

Internet and Telephony

26. A 100 Mbps internet backbone coupled with 100% coverage of the area by cell phone towers and a high level of telephone penetration will be essential in a Smart City as most services will have to be offered online. Local service providers should also have multiple service kiosks that can be accessed by people for evaluating public services and accessing public information. Fibre Optic connectivity to each home, wifi in all public places and educational institutions would be important features of a Smart City.

Social Infrastructure

27. Social Infrastructure would include the following:

- Education - The city should have good quality educational facilities both for schooling and higher education.
- Healthcare - High quality healthcare facilities are important factors in making a city liveable and attractive for people and businesses.
- Entertainment - Goodf entertainment facilities make the people in a city happy. Good sports facilities, cultural centers, open spaces and plazas allow opportunities for recreation, so important for healthy and happy living

Cross cutting features

28. In addition, there are several cross cutting features that characterize a smart city. They cut across the three pillars of governance, infrastructure and social services. These are:

Minimizing waste

29. There need to be incentives for curbing waste. Pricing structures should be such that while services are affordable, waste is discouraged. These can generally be achieved through rate slabs that are low for low levels of consumption, but rise sharply for increased use. This would offer an inherent incentive for conservation. 100% metering will be essential so that people pay for what they use and not a flat rate for some infrastructure, such as number of water taps. Time of day metering for electricity or time of day fare structures for public transport would also allow a flattening of the load curve and enable use of capacity when it is available and reduced demand during peak periods. Infact, attaining a 24 X 7 level of service needs to happen to a great extent through reducing leakages and waste.

30. Installation of water leakage prevention devices and water rates that rise steeply with consumption will be essential. Incentives for rain water harvesting, such as discounts in the water bill for rain water harvested will go a long way in minimizing waste and conserving natural resources. Recycling sewerage water and local STP based

water supply systems could also help reduce waste and conserve water. Educating citizens on the importance of conserving natural resources will go a long way in furthering a culture of conservation.

31. Solid waste management is another important area where there is considerable potential for recycling. Wet garbage needs to be segregated from dry garbage. The wet garbage can be converted to compost and the dry garbage into bricks and fuel. This helps minimize the amount of waste that goes into landfill. A smart city would try to ensure that it recycles its solid waste to a large extent.

Financial sustainability

32. The services need to be financially sustainable so that there are no financial constraints to delivering quality services. However in doing so, tariff structures adopted should be such that they are affordable for the poor and yet recovers costs at higher levels as use. The revenue gaps can be bridged by innovative means to raise and allocate resources to the service providers. Use of the private sector would be a good way of tapping efficiencies in delivery to reduce costs.

Energy efficiency

33. Energy concerns are also a key feature of "Smart Cities". Energy efficient practices are adopted in transportation systems, lighting and all other services that require energy. Tariff structures are such that conservation has incentives. Awareness programs lead to a culture of conservation. Good areas to focus energy efficiency measures would be the building material used, the transport system, sewerage and water supply systems, street lighting, airconditioning systems and energy consumtion in buildings.

Demand Management

34. While enhancing supply to meet the demand is important, Smart Cities would also lay special emphasis on demand management, by creating incentives for savings and disincentives for excessive consumption. This could be by way of rate structures that are affordable and low levels of consumption, but increase steeply as more is consumed.

For transport systems the demand management efforts will be such that they promote the use of non-motorized modes of travel or public transport and discourage personal motor vehicles. They also promote shorter trip lengths by improved integration of land use and transport plans and mixed use planning, where residential and commercial areas are well interspersed.

Improved access to information

35. A very important feature of all smart cities is good citizen access to information. Whether it be regarding city specific data or the measures being taken by municipal bodies or information relating to various service providers such as transport and similar information relevant for potential investors has to be conveniently available. This could be through multiple channels – internet, mobile apps, radio, TV, print media, etc.

Instruments that make smart cities possible

36. There are several instruments that facilitate the development of a Smart City. These are:

Use of Clean Technologies

37. As per the WHO report, Indian cities are amongst the most polluted in the world, creating severe health hazards. The trend needs to be reversed by promoting the use of clean technologies that harness renewable materials and energy sources and have a lower smaller environmental footprint. In smart cities buildings, transport and infrastructure should be energy efficient and environmentally benign.

Use of ICT

38. The extensive use of ICT is a must and only this can ensure information exchange and quick communication. Most services will need to be ICT enabled, and this often helps reduce the need for travel. The ability to shop on-line or book tickets on-line or converse online are very powerful ways of reducing the need for travel, thereby reducing congestion, pollutants and energy use. An extensive use of ICT enabled services will need a sound communications backbone. In this context, it is important to

note that ICT is not the "end" but only the "means" to an "end" – the end being improved service quality and information availability.

Participation of the Private Sector

39. PPP allows Government to tap on to the private sector's capacity to innovate. Greater involvement of the private sector in the delivery of services is another instrument as it enables higher levels of efficiency (this should be the prime motive for using the private sector rather than just tapping financial resources).

40. Over the last few months, several professional agencies made presentations in the Ministry highlighting different aspects of what constitutes a smart city. Globally renowned consulting companies like KPMG, PWC and Accenture have presented a wide range of features that are the hallmark of a smart city. Leading experts like Dr Keshav Verma have also presented some of the important features of a smart city. Leading IT companies like IBM have made presentations on the role that IT can play in developing smart cities.

41. Given the knowledge base that exists in such agencies, as well as others in the country, it would be important to involve them actively in the process of designing smart cities hand holding the city/ state government in coming up with visionary plans. It is therefore proposed to take advantage of this capability in a structured manner. Detailed guidelines for doing so will be developed.

Citizen paricipation

42. Citizen consultation and a transparent system by which citizens can rate different services is yet another instrument for improving performance. Making these ratings openly available for public scrutiny creates a powerful incentive for improved performance and a disincentive for poor performance.

43. A Smart city also communicates well with its people and enlists their support in everything it is doing. The culture of working in a closed environment needs to end as people are often the biggest support base for any initiative a city takes up, if they have

been informed of the efforts and the reasons for the same. Social pressure on other citizens can often remove resistance and facilitate a greater degree of civic discipline.

Smart Governance

44. The existing government setup in the ULBs is rather fragmented with each department working in silos. The result of this is lack of coordination which is reflected in form of poor services to the citizens. Therefore, for cities to become smart, it is essential that the governance structure is also smart. Therefore, ULBs would need to make effective use of ICTs in public administration to connect and coordinate between various departments. This combined with organizational changeand new skills would improve public services and strengthen support to public. This will mean the ability to seek and obtain services in real time through online systems and with rigorous service level agreements with the service providers.

Identifying the Smart Cities

45. In order to modernize our cities and make them internationally competitive, the Government has decided to support the development of 100 Smart Cities in the country. In this context, one has to recognize the federal structure of the country as well. Moreover, it has been the experience world over that developing greenfield cities have seldom been successful as a city can grow on a sustainable basis only if there are opportunities for economic activity, entertainment, education, healthcare and a wide range of such services. However, some new cities need to be developed in the Hills and Coastal areas. In view of this cities with a 1 – 4 million population would seem to be the most appropriate. Besides, satellites to larger cities would also make very good candidates. Given their tourist importance some cities of this type need to be taken up. Besides some cities in a slightly smaller population range will also be taken up to test the possibility of their becoming smart cities.

46. Accordingly, the current thinking is that 100 cities to be developed as Smart Cities may be chosen from amongst the following:

- One satellite city of each of the cities with a population of 4 million people or more(9 cities)
- All the cities in the population range of 1 – 4 million people(44 cities)
- All State/UT Capitals, even if they have a population of less than one million (17 cities)
- Cities of tourist and religious importance (10 cities)
- Cities in the 0.5 to 1.0 million population range (20 cities)
- In Delhi, it is beng proposed that DDA will develop a new smart city through the land pooling scheme as a demonstrativecity and the NDMC area may also be considered for demonstrating all the components of Smart Cities.

47. In deciding the final list of cities to be developed as Smart Cities, it would be ensured that some are Hill cities and some are Coastal cities.

Conditions Precedent

48. The selected cities will have to strive towards attaining specified benchmarks in a range of services as given in Annex - 3. In addition, they will need to undertake the following through a tripartite MoU between the Central Govt., State Govt., and the Urban Local Body:

- Have an existingmaster plan that is valid for atleat the next 10 years or one that is likely to be approved shortly and have such a validity
- Have digitized spatial maps
- Issue all clearances for projects in a collegiate manner using online processes and in a time bound manner
- Electronic/Online delivery of all public services, so that visits to the local offices are rendered gradually redundant.
- Free right of way for laying optic fibre networks, water supply lines, sewerage systems, draining systems and other utilities.
- Create a platform for effectively communicate with the citizens and keep them abreast of various activities and plans of the city.

- Adopt tariff structures that are affordable for the poor and yet minimize waste. In doing so the state/ cities could use their own resources to bridge the gap between the revenue and expenses.
- Create open data platforms that are regularly updated.
- Make all information and decisions taken available in the public domain
- Setup a regulatory body for all utility services such as water supply etc. so that a level playing field is made available to the private sector and tariffs are set in a manner that balances financial sustainability with quality.

Financing Smart Cities

49. The High Power Expert Committee (HPEC) on Investment Estimates in urban infrastructure has assessed a Per Capita Investment Cost (PCIC) of Rs 43,386 for a 20 year period. Their estimates cover water supply, sewerage, sanitation and transportation related infrastructure. Using an average figure of 1.0 million people in each of the 100 smart cities, the total estimate of investment requirements for the services covered by HPEC comes to Rs 7.0 lakh crores over 20 years (with an annual escalation of 10% from 2009-20 to 2014-15). This translates into an annual requirement of Rs 35,000 crores. However these estimates need to be analyzed for the purpose of funding by the Central Government. Moreover, tt is expected that most of the infrastructure will be taken up either as complete private investment or through PPPs. The contributions from the Govt. of India and States/ULBs will be largely by way of Viability Gap Support (VGF). The possible sources that they may like to explore for raising the required funds are given as Annex – 4.

50. Therefore, a large part of the financing for smart cities will have to come from the Private sector with the States/Cities and Central Government only supplementing that effort.

51. To fully realize the potential of a Smart City, investments will also be required in housing, electricity, ICT, education, health, recreation, cultural facilities, sports facilities, environmental facilities, etc. Therefore, it is expected that contributions

from the Ministry of Urban Development will also be supplemented by other Ministries, such as Housing and Urban Poverty Alleviation, Health, Education, Power, ICT, Culture, Sports, etc. in relation to their respective sectors. Besides, the funds for high cost mass transit systems, such metro rail, LRT, monorail, BRT, etc. would come from the Ministry of Urban Development, outside the allocations under the Smart City scheme.

52. Investments ofRs 5,000 crore may be required as an initial investment to be provided as unlinked/ untied funds for the selected cities to prepare the City Development Plan and project reports to ensure successful implementation of the scheme. This would also include setting up of a PMU at the State and ULB level. Fragmented approach will not work as has been the experience in JnNURM. Proper planning and a holistic approach will be necessary.

53. In addition to the budgetary resources available with various levels of government, additional resources would need to be leveraged for the sector from both domestic and overseas investors. As an option to leveragage such resources for the municipal sector, the Central government will explore the possibilities of establishing a Fund, which would blend grant funds from CSS, borrowings from multi-lateral and bi-lateral agencies and bonds subscribed by national and state level land development agencies. Similarly, States and Cities May like to establish a Fund at their level.

54. Other financing sources could include the Pooled Municipal Debt Obligation (PMDO) announced in the budget, Real Estate Infrastructure Trusts (REITS), Infrastructure debt funds (IDFs), tax-free municipal bonds, PPPs etc. Details of such possibilities are given at Annex – 4.

Operational Proceedures

55. Detailed guidelines would be issued with regard to the preparation of proposals as well as the criteria to be used in the selection of the cities. It is osed that a **Smart City Reference Framework**be evolved. Current thinking on the parameters for such a

reference framework is at Annex 5. Cities would be expected to develop their City Development Plan based on such a reference framework.

56. The proposals received will be scrutinized by a Committee specially constituted for this purpose and supported by a multi-disciplinary PMU at the Central/Regional level. While regional level Hubs would undertake handholding of cities and appraisal of the projects, the final sanctioning of the projects will be by an Empowered Committee of Experts including senior level officers at the Central Government/ State/ ULB, duly supported by a PMU at the national level.

Nature and Extent of Central Government Support

57. Central Government's support will be in three forms:

Financial support

58. Huge investments will be needed. Current financial resources of the States and Cities do not permit this level of investment. Therefore, innovative methods of raising revenues will have to be developed by the States and Cities, taking into account some of the possibilities outlined earlier. These efforts will be supplemented by the Central Government through the Ministry of Urban Development and other Ministries responsible for different sectors, such as Health, Education, Power, Transport, IT, Communications, etc., by way of allocations specifically for the development of smart cities. the involvement of other ministries such as health, education, power, transport, IT , communications, housing, etc. is critical because all these services need to be available in a comprehensive and integrated manner. Fragmented enhancement of only some services will not prove adequately beneficial.

Policy support and legal backing

59. It is recognized that urban development is a state subject under the constitution of India. Yet the Centaral government can play an imprortant supporting role in facilitating appropriate policies that provide a framework for urbanization. While we have a national urban transport policy, we don't have a national urban policy.

It would be appropriate for the urban transport policy to also fall within the framework on a national "urbanization policy". Such a policy, which channels the growth of cities along a "Smart"trajectory, would be crucial for guiding the national government financial support to cities.

60. Existing legal frameworks and policies that regulate the urban sector need to be reviewed by the State and urban local bodies to see what changes, if any, are required. As possible examples:

- The "Development Acts" need to insist on a public transport master plan to be part of a land use master plan and must have the same legal backing as the Master Plan itself.
- FAR norms need to be increased and made more granular rather than city wide, to allow very high densities to be interspersed with adequate green areas
- The existing Urban & Regional Development Plans Formulation and Implementation Guidelines (URDPFI) guidelines need to be updated to reflect the higher standdars expected in a smart city
- The current standrads for water supply, sewerage and drainage etc. need to be reviewed to aim at higher standards
- Policies related to investment by the private sector need to be reviewed so that a higher level of private investment in urban infrastructure becomes possible.
- Policies for making changes in land use need to be reviewed and procedures simplified
- Byelaws need to be made more citizen friendly
- Laws for making land available for public purposes need to become more liberal

61. In this context the Government of India would be able to play a supporting role by developing model policy guidelines as well as model concession agreements.

<u>Capacity Building</u>

62. It is well recognized that the current capacity to take up such a large program is weak. It is also recognized that with the previous emphasis on rural development, a

strong cadre of urban planners has not developed in the civil services. Developing 100 Smart Cities across the country will need a large number of professionally trained manpower and several decision support systems to be in place. Thus, there is a need for a large capacity building program that encompasses training, education, contextual research, knowledge exchange and a rich database. Investments in such a program will have a considerable multiplier effect and several times this amount can be easily saved if the capacity building program is meaningful and well implemented. A program of this nature benefits from economies of scale, as there will be a need to invest in designing programs, developing faculty, building databases as well as designing toolkits and decision support systems. Therefore, it would be advantageous if this is managed and coordinated by the Central Government instead of all States duplicating the effort. However, the role of the State Governments will remain important. Accordingly, the Ministry of Urban Development will take up a national program towards Capacity Building. This will cover both "leadership" level manpower and "technical" level manpower. It will also cover opportunities for knowledge exchange and research that would support decision making in the Indian context. Relevant databases and toolkits will also be developed under this program. Efforts will also be towards developing a professional cadre of urban managers in the civil services.

63. About 5% of the total central allocation may be allocated for capacity building.States will be expected to identify their manpower that needs to be trained and also set up a capacity building cell that would coordinate with the national program in ensuring that their personnel benefit from the national program. Support of leading institutions abroad and in India, such as the IITs, IIMs, the Indian School of Business, SPAs etc. will be sought. It is recognized that professions and technical organizations in the country will have to play an extremely important role in supporting the capacity building effore. They will have to be brought together in implementing a large capacity building programs in a coordinated manner.

Approval process

64. States would be required to submit proposals for approval of the respective satellite cities, cities of tourist and religious importance as well as cities in the 0.2 – 1.0 million population range, These proposals would be reviewed by a Committee that will be serviced by a regional multidisciplinary PMU and then approved by the Central Government, supported by the national PMU. A two stage approval process will be followed, as given below:

1. Stage 1 would invite cities and Sates to submit an IntegratedSmart City Development Plan, based on the Smart City Reference Framework. Thereafter, cities would be sanctioned an initial amount for preparation of professional and comprehensive project reports.
2. Stage 2 will require the development of Project Reports which will be appraised by designated Project Managemnt Units and finally approved by an Empoewred Committee.

65. To facilitate faster procurement of consultants,a process to empanel capable consultants would be taken up. The list of empanelled consultants will be communicated to the State Governments who could take advantage of this list, if they want, in procuring their consultants.

66. For effective and coordinated implementation, there would be an advisory committee at the Central and State levels with mission directors at both levels. Advisory committees and Project Management Units would provide the necessary support. An implementation framework is presented at Annex-6.

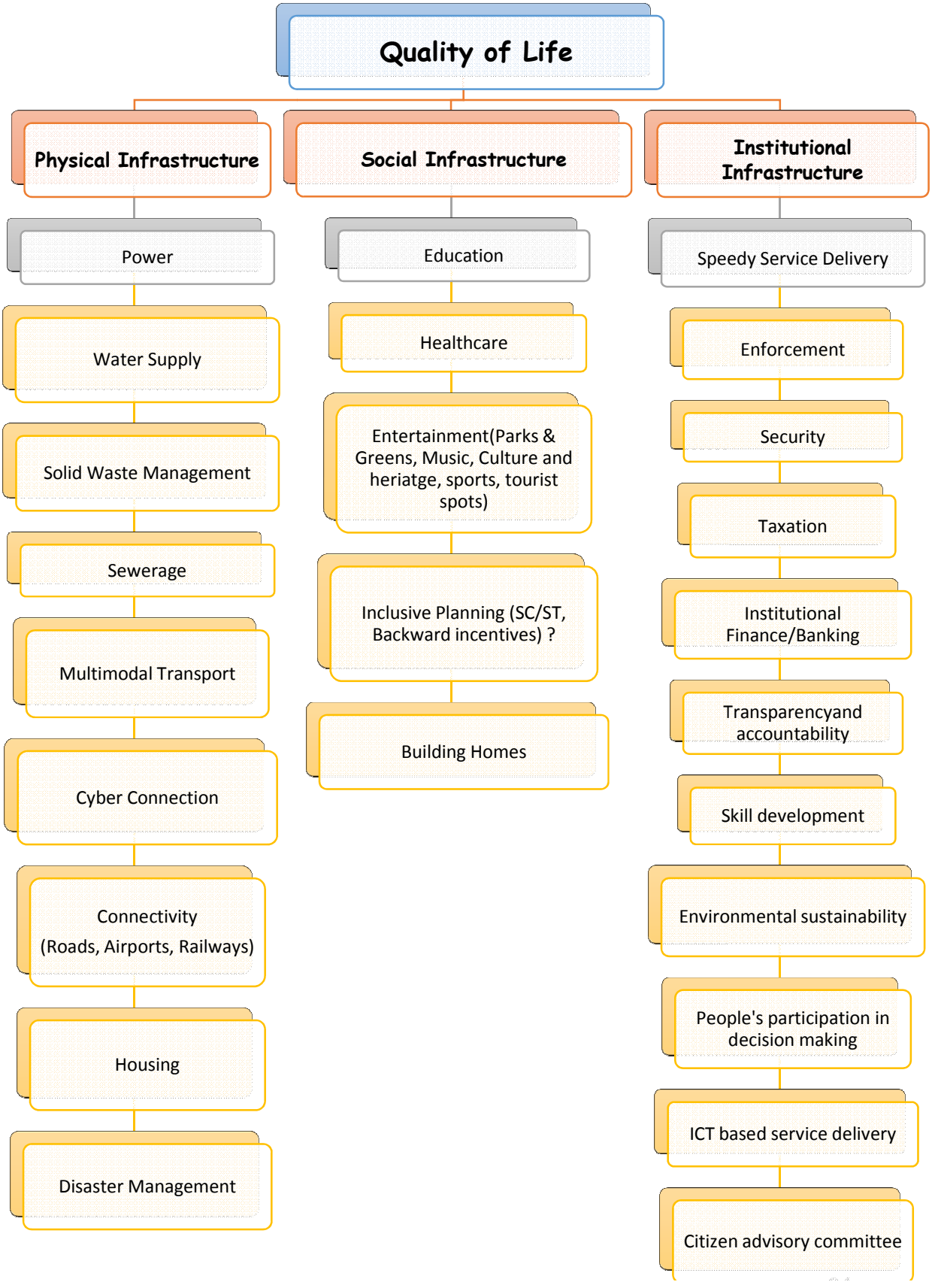
Annex - 1

Definitions for Smart Cities

- The UK Department of Business, Innovation and Skills considers smart cities a process rather than as a static outcome, in which increased citizen engagement, hard infrastructure, social capital and digital technologies make cities more livable, resilient and better able to respond to challenges.
- The British Standards Institute defines it as "the effective integration of physical, digital and human systems in the built environment to deliver sustainable, prosperous and inclusive future of its citizens".
- IBM defines a smart city as "one that makes optimal use of all the interconnected information available today to better understand and control its operations and optimize the use of limited resources".
- CISCO defines smart cities as those who adopt scalable solutions that take advantage of information and communications technology (ICT) ti increase efficiencies, reduce costs and enhance the quality of life".
- Wikipedia defines a city as Smart when investments in human and social capital and traditional (Transport) and modern (ICT) communications infrastructure fuel sustainable economic development and a high quality of life, with a wise management of natural resources, through participatory action and engagement (Caragliu et al, 2009)
- Accenture defines it as "A Smart City delivers public and civic services to citizena nd businesses in an integrated and resource efficient may while enabling innovative collaborations to improve quality of life and grow the local and national economy"

Annex- 2

Pillars of Smart Cities



Annex – 3

Benchmarks for Smart Cities

Sl.No.	Parameter	Benchmark
A	**Transport**	• Maximum travel time of 30 minutes in small & medium size cities and 45 minutes in metropolitan areas • Continuous unobstructed footpath of minimum 2m wide on either side of all street with RoW 12m or more • Dedicated and physically segregated bicycle tracks with a width of 2mor more, one in each direction, should be provided on all streets withcarriageway larger than 10m (not ROW) • High quality and high frequency mass transport within 800m(10-15 minute walking distance) of all residences in areas over 175persons / ha of built area • Access to para-transit within 300m walking distance.
B.	**Spatial Planning**	• 175 persons per Ha along transit corridors. • 95% of residences should have daily needs retail, parks, primaryschools and recreational areas accessible within 400m walkingdistance. • 95% residences should have access to employment and public andinstitutional services by public transport or bicycle or walk • At least 20% of all residential units to be occupied by economically weaker sections in each Transit Oriented Development Zone 800m from Transit Stations • At least 30% residential and 30% commercial/institutional in everyTOD Zone within 800m of Transit Stations
C.	**Water Supply**	• 24 x 7 supply of water • 100% household with direct water supply connections • 135 litres of per capita supply of water • 100% metering of water connections • 100% efficiency in collection of water related charges
D.	**Sewerage &Sanitation**	• 100% households should have access to toilets • 100% schools should have separate toilets for girls

		• 100% households should be connected to the waste water network • 100% efficiency in the collection and treatment of waste water • 100% efficiency in the collection of sewerage network
E.	**Solid Waste Management**	• 100% households are covered by daily door-step collection system. • 100% collection of municipal solid waste • 100% segregation of waste at source, i.e. bio-degradable and non-degradablewaste • 100% recycling of solid waste
F.	**Storm Water Drainage**	• 100% coverage of road network with storm water drainage network • Aggregate number of incidents of water logging reported in a Year = 0 • 100% rainwater harvesting
G.	**Electricity**	• 100% households have electricity connection • 24 x 7 supply of electricity • 100% metering of electricity supply • 100% recovery of cost • Tariff slabs that work towards minimizing waste
H.	**Telephone connections**	• 100% households have a telephone connection including mobile
I.	**Wi-Fi Connectivity**	• 100% of the city has wi-fi connectivity • 100 Mbps internet speed
J.	**Health Care Facilities**	• Availability of telemedicine facilities to 100% residents • 30 minutes emergency response time • 1 dispensary for every 15,000 residents • Nursing home, child, welfare and maternity, centre - 25 to 30 beds per lakh population • Intermediate Hospital (Category B) - 80 beds per lakh population • Intermediate Hospital (Category A) - 200 beds per lakh population • Multi-SpecialityHospital - 200 beds per lakh population • SpecialityHospital - 200 beds per lakh population • General Hospital - 500 beds per lakh population • 10020Family Welfare Centre for every 50,000 residents • 1 Diagnostic centre for every 50,000 residents • 1 Veterinary Hospital for every 5 lakh residents • 1 Dispensary for petfor every 1 lakh residents

K.	**Education**	
1.	Pre Primary to Secondary Education	• Area equivalent to 15% of residential area for building hospitals • 1 Pre Primary/ Nursery School for every 2,500 residents • 1 Primary School (class I to V) for every 5,000 residents • 1 Senior Secondary School (Cass VI to XII) for every 7,500 residents • 1 integrated school (Class I to XII) per lakh of population • 1 school for physically challenged for every 45,000 residents • 1 school for mentally challenged for 10 lakh population
2.	Higher Education	• 1 college per 1.25 lakh population • 1 university • 1 technical education centre per 10 lakh population • 1 engineering college per 10 lakh population • 1 medical college per 10 lakh population • 1 other professional college per 10 lakh population • 1 paramedical institute per 10 lakh population • 1 veterinary institute
L.	**Fire Fighting**	• 1 fire station per 2 lakh population / 5-7km radium • 1 sub – fire station with 3-4 km radius
M.	**Others**	• Use of renewable energy in all sectors • Rooftop solar panels on all public, institutional and commercial buildings as well as multistoried residential housings • Adherence to green building norms • Common ducting for all services • Double entry accounting on real time basis • 3D maps on GIS of property and all services – power, water supply, sewerage etc • Cities to formulate building and parking standards

Annex - 4

Financial Architecture for Smart Cities

(These are only suggestions for discussions and no final decision has been taken)

It is suggested that cities which desire to participate in the smart city programme develop a financing plan along with their smart city development plan and detailed project reports. The financing plan developed for a city/urban agglomeration could factor resources from multiple government agencies and departments not restricted to the ambit of urban development schemes alone such as the textile ministry's subventions for textile clusters, textile units in SEZs etc. Credit ratings could also be used by city managements as a dynamic managerial tool for assessing current level of borrowing capacity, along with other performance parameters including economic base, service levels and recovery of user charges and sustainability of proposed investments.

As part of the City Development Plan, the city may develop an investment and financing strategy and identify projects which are amenable to innovative financing such as accessing the bond market or structuring projects as PPP interventions for leveraging additional resources from the private sector. Other strategies for enhancing the resource pool available to cities include the following:

- User charges for utilities to reflect O&M and capital investment costs
- Land value based taxation:
    1. Sale or leveraging the land available with the ULBs
    2. Betterment levy/ Higher FSI or FAR to take advantage of the increase in property prices on land serviced by new infrastructure such as roads, water etc. by imposing a surcharge on stamp duty on sales transaction, FSI, FAR, property taxes etc.
- More accounting transparency (double entry, accrual based accounting, balance sheets) to capture unencumbered cash resources.

In addition to the budgetary resources available with various levels of government, resources would need to be leveraged for the sector from both domestic and overseas investors.

As a first step for leveraging such resources for the municipal sector, the Central government may establish a Fund consultation with other ministries, multilateral, bilateral developing agencies and banks. This fund may blend grant funds from:

- CSS (Central Government allocation),
- borrowings from multi-lateral and bi-lateral agencies and
- bonds subscribed by national and state level land development agencies (e.g. HUDA, PUDA, DDA etc.).

The pooling of monies from commercial and non-commercial sources would allow for reduction in borrowing cost and lengthening of tenor. The fund may provide VGF as well as provide credit guarantees to municipal bonds and term-loans in order to leverage debt resources from the financial markets.

Other financing sources could include:

- Pooled Municipal Debt Obligation (PMDO) facility: As er budget speech of the Finance Minister "*This facility was set up in 2006 with the participation of several Banks to promote and finance infrastructure projects in Urban Area on shared risk basis. Present corpus of the facility is Rs 5,000 Crore. The Government has a major focus of providing good infrastructure, including public transport, solid waste disposal, sewerage treatment and drinking water in the urban areas, in keeping with the Hon'ble Prime Minister's vision for urban areas it is proposed to enlarge it to Rs 50,000 crore with extension of the facility by five years to March 31, 2019*".
- Real Estate Investment Trusts (REITS): As er budget speech of the Finance Minister"*REITS has been successfully used as instruments for pooling of investment in several countries. I intend to provide incentives for REITS which will have pass through for the purpose of taxation……. These structures would reduce the pressure on the banking system while also making available fresh equity. Iam confident these two instruments would attract long term finance from foreign and domestic sources including the NRIs*"

- Infrastructure debt funds (IDFs) which could be directed to invest in highly rated municipal bonds/green bonds by defining these as eligible investments. As IDFs are required to invest in post construction assets they could be used as a means to re-finance debt taken during the construction phase as well as additional monies for financing operations
- Encourage issuance of tax-free municipal bonds by creditworthy local governments to bring down the cost of borrowing
- Use PPPs where feasible in smart city projects to leverage private sector financing. To encourage PPPs in the urban sector provision for incentives could be explred However, these need to be discussed with the relevant ministries of the Government of India and concerned departments in the Central/ State Governments.

Annex - 5

Smart City Reference Framework

(This is only indicative based on suggestions from KPMG and others. Detailed framework will be developed after discussions)

S.No.	Principles	Key Feature
1.	Attract Young Wealth Creators and others	Cities should setup incubators and certain new-investment areas to lure next generation. Facilities like affordable housing, cityscapes, social networks, rapid transport linkages, entertainment zones, etc. should be provided to attract the younger generation For eg. Gurgaon gave space to IT enabled services, BPO sector to flourish which led to the creation of new opportunities for younger generation with high salaries and incentives. This, coupled with urban development, including luxury and budget housing, commercial facilities, recreational facilities (sports complexes, gyms, swimming pools, etc.), world-class medical facilities, etc. created a magnetic force which attracted the younger generation from across the country. Similar initiatives were taken by cities like Pune, Bangalore.
2.	Constant Physical Renewal	People prefer to live in core areas or neighbourhoods, which are linked to the city centre by quick and easy public transport. These core areas give an identity to a city. It is therefore important that these areas should be made vibrant, with public spaces that encourages people to use it throughout the day. For eg., they can be pedestrianized with authentic and environment friendly streetscapes which will also help in increasing the livability index of the area. In India, the core city areas are the central business districts of the city. They are generally characterised by heritage buildings. But these areas often constitute of old, dilapidated housing, compact development with mixed land use, very poor linkages (both local & city-wide), and inadequate social & physical infrastructural facilities. Further, small and medium towns in India are generally

S.No.	Principles	Key Feature
		mono-centric with the core city centre as the only nodal point of the city which results into a heavy inflow of people towards the city centre. The inadequate infrastructural facilities are not able to bear the pressure imposed by the heavy movement of people and hence the condition of these areas deteriorates making the city centres unsuitable for living. It is therefore essential that to make a city attractive to the young generation and tourist, these core areas need to be redeveloped. For example, after the redevelopment of Connaught Place in Delhi, the area has regained its lost charm. People now like to visit the place, sit, walk, shop there. Similar initiative has been taken by Lucknow to redevelop its CBD, the Hazratganj.
3.	Unique and Strong City Identity	Each city should have strong and clear city identity that reflects the values, interests, skills of its residents such that they resonate with those they aim to attract. For eg. Business cities, industrial townships, heritage cities, religious centers, IT city, etc. Providing a city with a certain identity, just for the sake of it, doesn't work. Taking the example of a business city – it should be such that the local laws help entrepreneurs in setting up of new businesses, and at the same time support existing businesses to flourish. In India, cities generally have a very strong identity attached to it. But due to a number of factors, these cities lose their vibrant nature or significance, or potential to attract people with similar interests. Haridwar, Rishikesh are two very important religious towns of India, but their condition is deteriorating rapidly. Local linkages within the city is very poor, the city lacks basic infrastructural facilities like proper sewerage, solid waste management systems, etc. Tourist cities like Agra lacks linkages to and amongst various tourist sites. On the other hand, we have Udaipur, the City of Lakes. All the five lakes of the city are being preserved and cleaned regularly. The city has also redeveloped the lake palaces and developed them as centre

S.No.	Principles	Key Feature
		of tourist attraction.
4.	Connected to other Cities	Cities should have good regional connectivity. This not only saves time, but helps businesses grow. This encourages exports and imports of both goods and labour. This can be done via building high speed trains, airport for enhancing the regional connectivity of cities. For Eg. The Rapid rail transit system has been proposed to connect various NCR towns with Delhi. Similarly, big cities like Mumbai, Kolkata already have sub-urban rail transit system in place.
5.	Inculcate innovative/ out of box thinking	City culture should be such that it encourages formation and fermentation of new ideas. This can be done by building institutions which supports world class infrastructure to help in promoting research in a certain field. In India, infrastructure to promote the local skill should be emphasized upon. For eg. Local arts, craft, etc. should be promoted and similar institutions and industries should be setup in order to generate employment for the locals like developing the art of silk weavers in Varanasi, Chikan workers in Lucknow, Katha work of the Gujaratis, Madhubani painting in Bihar via building up of some institution for its training or industry for its promotion and export to the world.
6.	Investors	City must be able to attract investments and funds from private players. Municipal or urban local bodies should be able to generate funds for various infrastructural projects. This can be done in a number of ways like land value capture mechanism, generating funds through advertisement on public property, and through various taxation policies, etc. In India, cities are trying to implement various types of projects on PPP like city bus service in Bhopal & Indore, construction of roads in Delhi, Bangalore, etc. Cities are also innovating new financing mechanisms like advertisement on buses, at bus stops; Transfer of Development Rights, etc.
7.	Have Strong Political and	Strong political will is the key to creating substantial changes in any city. The leader should be such who works in

S.No.	Principles	Key Feature
	Administrative Leaders	collaboration with the residents of the city, investors, developers, etc. He should be inflexible about changes to the future vision of the city but extremely flexible about the steps to be adopted to reach there. Often such leaders may not have the required professional experience. Therefore, eminient professional personalities could be thought of as advisors and mentors who would guide the leadership in developing their cities.

Annex – 6

Implementation Framework