Introduction to Urban Planning
Prof. Harshit Sosan Lakra
Department of Agriculture and Planning
Indian Institute of Technology - Roorkee

Module No # 03
Lecture No # 14
Special Purpose Plan (Smart City)

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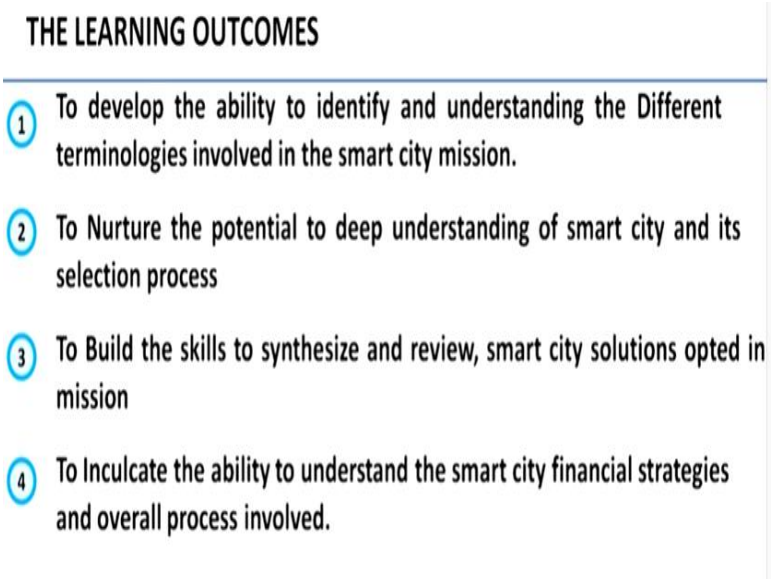

Welcome to the course introduction urban planning today we are going to discuss about smart city plan. To, understand special purpose plan within the larger ambit of types and levels of plan. And how; through such special purpose plans we meet our larger planning objectives. Accordingly the coverage would include we are going to explore the terms smart city and various steps involved in the smart city mission initiated by government of India.

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Following that we will explore importance of smart city understanding their purpose features and history.

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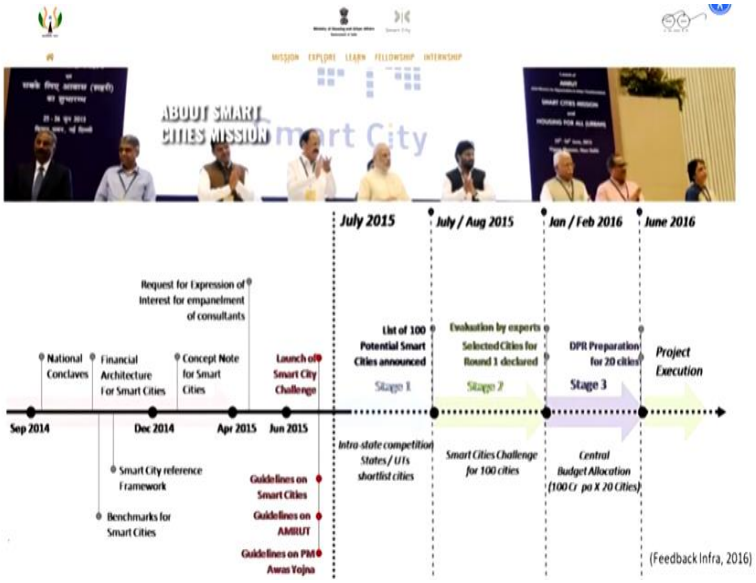

Thereafter we will look what is basic infrastructure components and procedure involved for the smart city. We will also cover the case of Bhopal smart city case study based on the area development and pan city initiatives. The learning outcomes targeted in today's lecture are that you after completion of this session you will be able to identify and understand the different terminologies involved in this smart city mission.

You will be able to develop understanding of smart city and its selection process you will be able to develop ability to synthesis and review smart city solutions opted in the mission. Further you will be able to with the support of the case study you will be able to connect all the interventions with the larger planning objectives of the mission as well as of the nation. First we are going to look at the smart city mission by the ministry of housing and urban affairs smart cities mission was launched by the honorable prime minister on twenty fifth June 2015.

100 cities were selected were selected to be developed as smart cities through a 2 stage completion process. The focus was on sustainable and inclusive development by creation of replicable models which may act as examples for the other aspiring cities. So, we can see that how the mission was aligned to meet the overall planning and sustainable goals?

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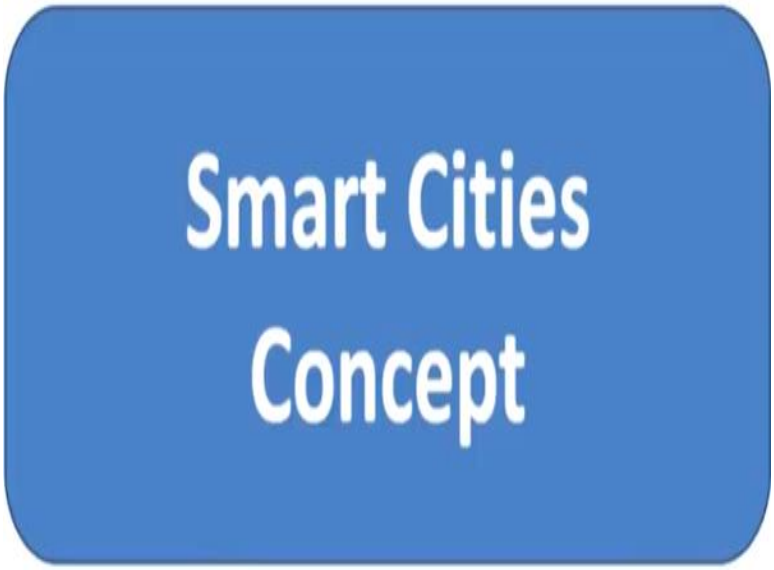

Let us try to understand the concept of smart cities there are number of definitions so what makes a city smart? For example IBM defines the smart city as 1 that makes optimal use of all the interconnected information available today. To better understand and control the operations of the city and optimize the use of the limited resources we have. However in short we can say a smart city uses of framework of information and communication technologies to create deploy and promote development practices.

To address; urban challenges and create a joined up technology enabled and sustainable infrastructures. The ministry of housing and urban affair did not adopt any standard definition or

template of smart city rather in the context of our country. The ministry proposed 6 fundamental principles on which the concept of smart cities was based.

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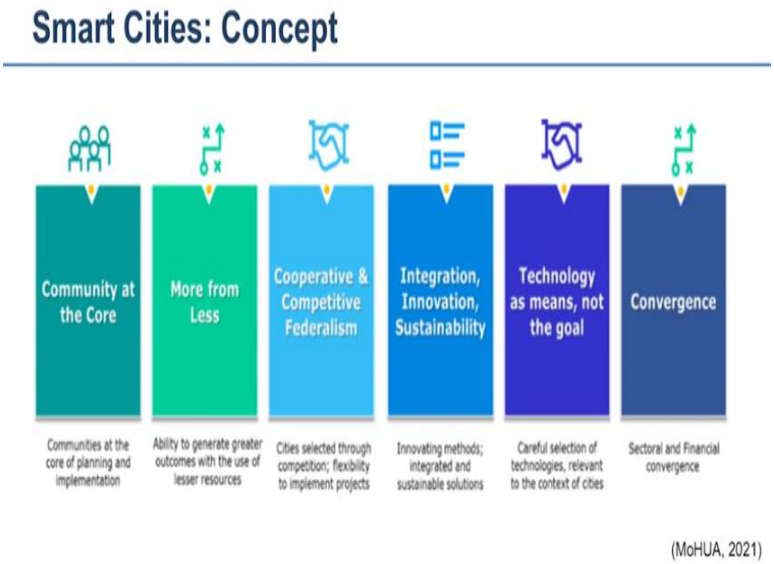

As you can see in the image the ministry kept the community at the center we follow the principle of efficient use of resources available. They targeted to engage in corporative and a competitive form of governance we focused on integrated innovative and sustainable solutions. They adopted the principle of using technology as a means to attain goals with careful selection. And finally encourage the principle of convergence of sectors and resources.

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Now let us look at the purpose objectives of the smart city intended by the ministry.

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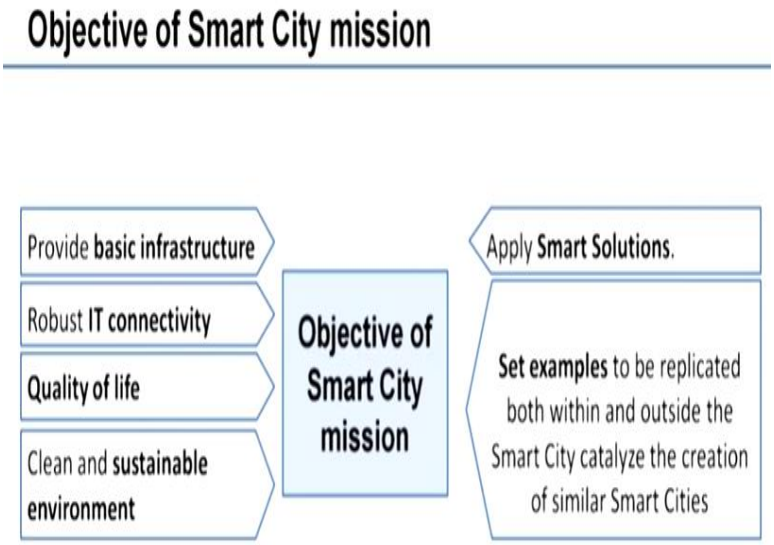

We see that the main objective of the mission was to promote the cities that provide core infrastructure clean and sustainable environment and give a decent quality of life to their citizens through the application of smart solutions. The mission aim was to drive economic growth and improved quality of life through comprehensive work on social economical physical and institutional pillars of the city.

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Now let us look at the smart city features through smart cities interventions efforts were made to combine automation machine learning and IoT.

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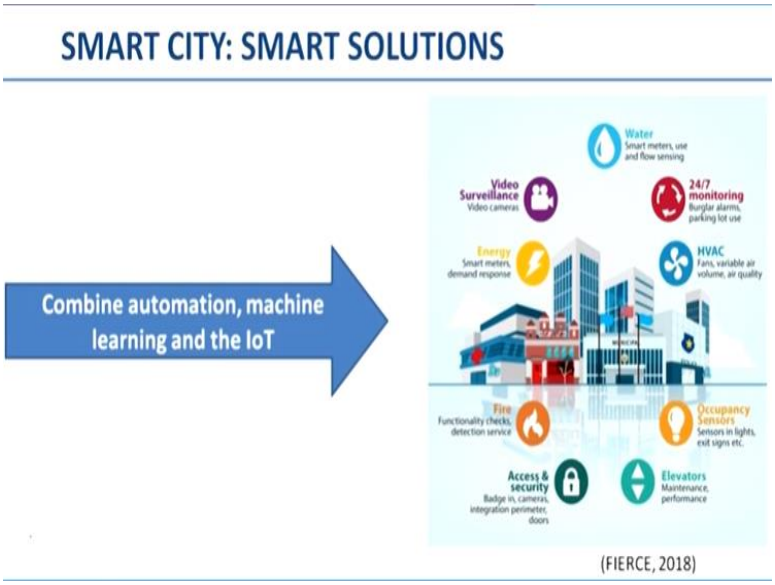

In variety of applications in managing and operating cities.

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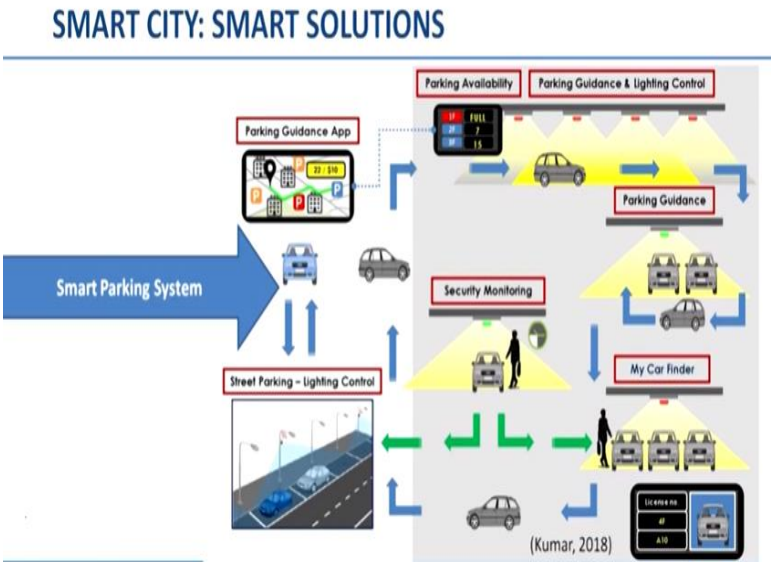

For example smart parking can help drivers to find up a parking space and also allow for digital payment.

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Another example we can talk about could be smart traffic management to monitor traffic flows and optimize traffic lights to reduce congestion.

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Likewise another example we could look at is ride sharing services through use of IoT. Smart city features can also include energy conservation and environmental efficiencies like here we can see smart water management from source of water to the consumer.

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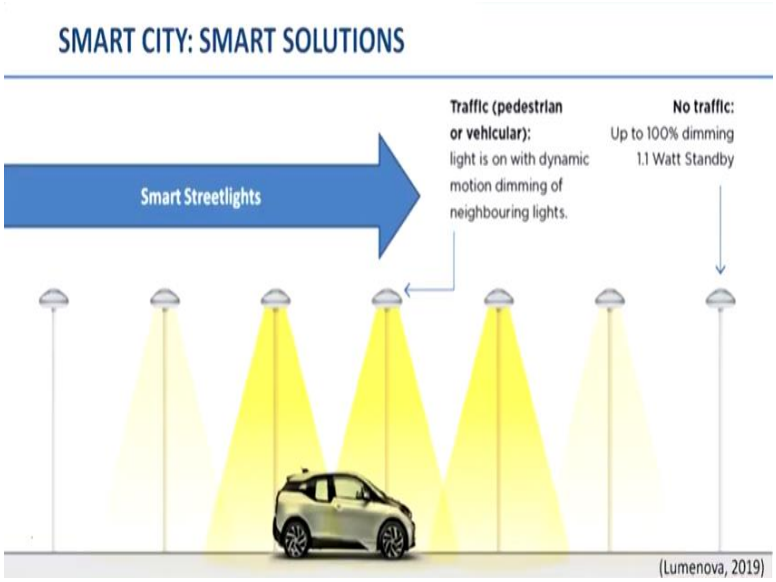

Likewise another example could be use of street lights that dim when the roads are empty.

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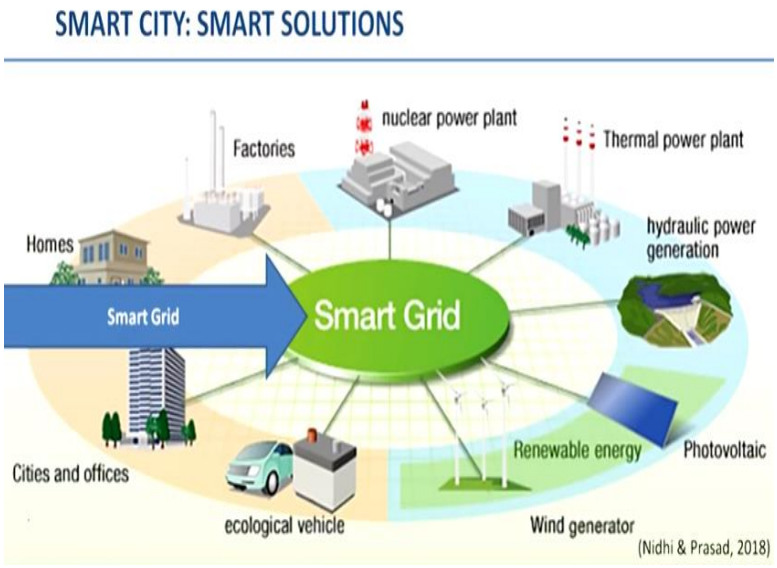

Use of smart grid technologies which can improve many aspects such as operations, maintenance or planning of power supplies such also technologies are promoted.

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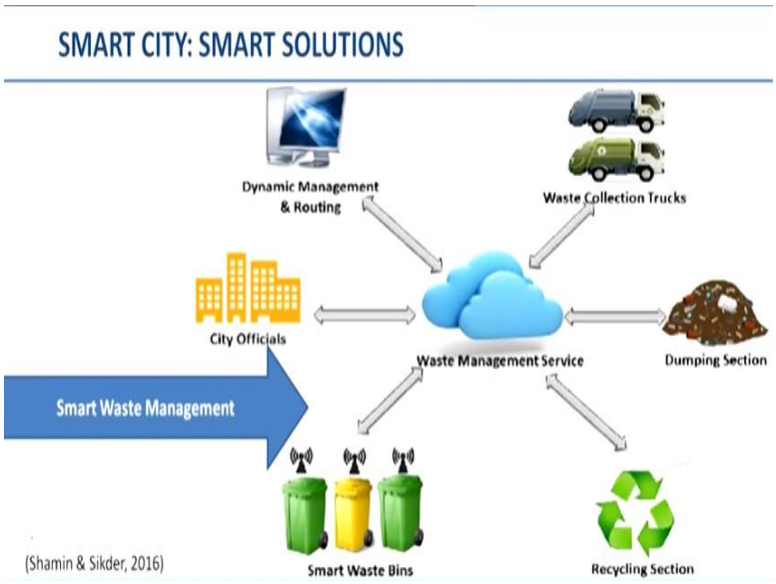

Smart city initiatives can also be used to combat climate change and air pollution as well as waste management and sanitation via internet enabled rubbish collection bins.

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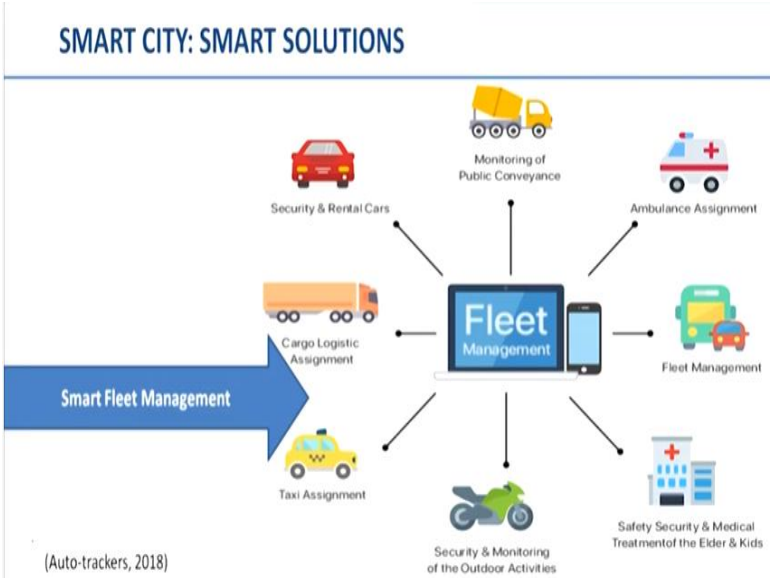

And it can also help in fleet management like we can see here in the image aside from services smart cities allow for provision of safety measures such as monitoring areas of high crime or using sensors.

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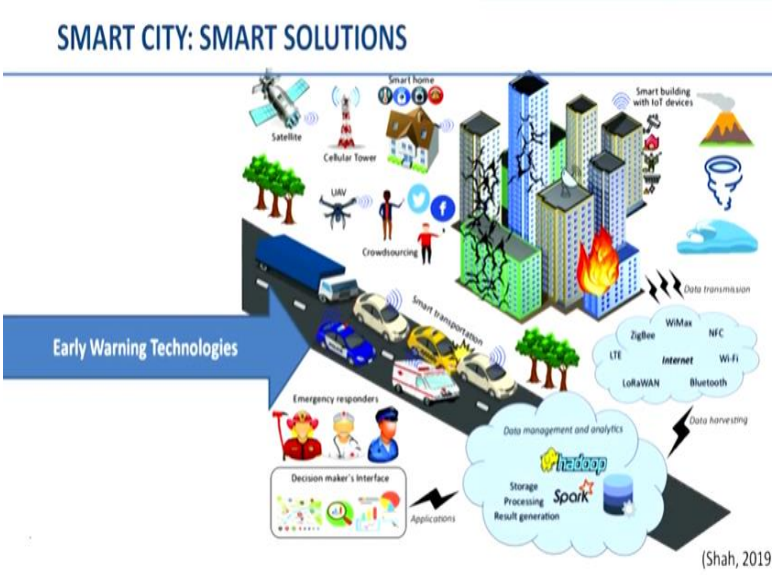

To enable as an early warning for incidents like floods, landslides, hurricanes or droughts.

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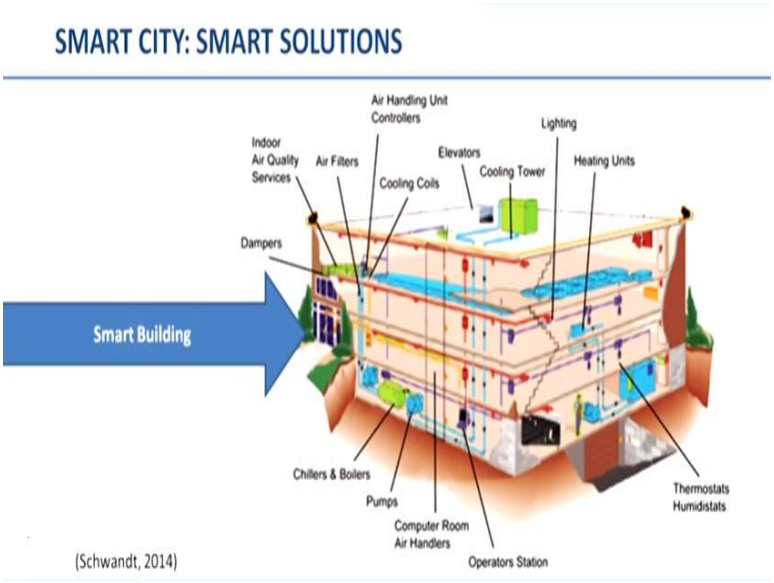

Smart buildings can also offer real time space management or structural health monitoring and feedback to determine when repairs are necessary. Citizens can also access the system to notify officials of any problems such as potholes.

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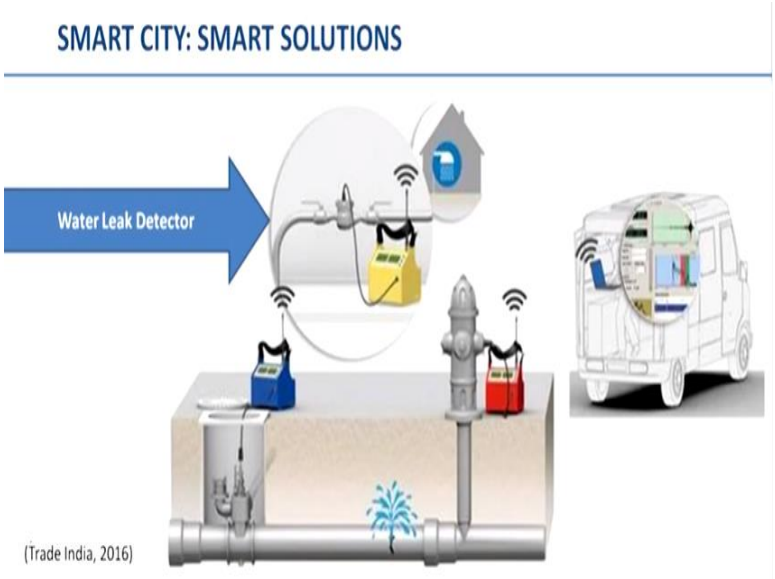

While senses can also monitor infrastructure problems such as leaks in water pipes in addition smart cities technology can improve the efficiency of manufacturing urban farming energy use and more. Smart cities can collect all manner of service to join up solutions for citizens. We can apply all these and many more such interventions into our cities like smart water meters and billing systems remotely controlled automatic distribution values.

Real time online system; of monitoring water quality city wide intelligent video surveillance network using mobile phones for cyber tour or work sites for the purpose of municipal services and infrastructure to make our cities better. So we see smart city features identified in the mission include the following it combines automation. It combines machine leaning internet of things energy conservation it focuses on environmental efficiency.

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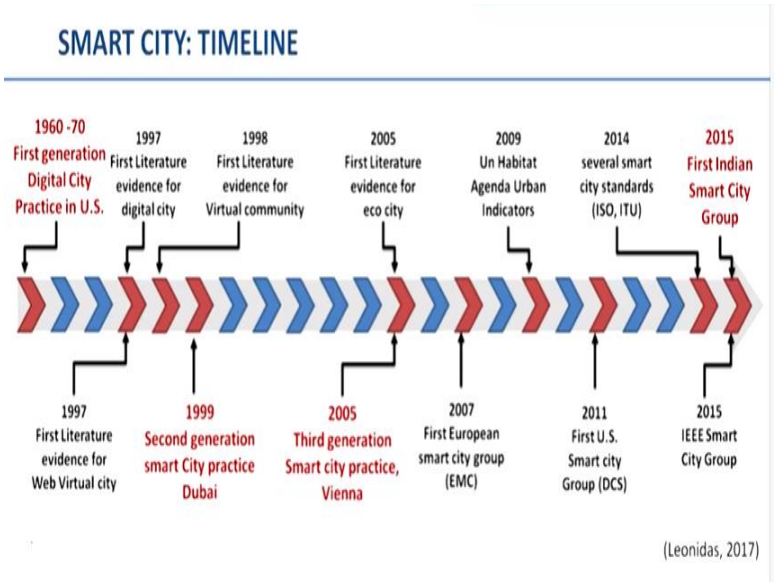

Smart traffic management safety measures smart buildings, climate change and air pollution. Now let us briefly look into the history of smart city and its concept how it evolved. The concept of smart cities began as far as the 1960 and 1970 when the US community analysis bureau began using databases aerial photography and cluster analysis to collect data.

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Direct resources and issues reports in; order to direct services mitigation against disasters and reduce poverty. This led to creation of first generation of smart cities the first generation of smart city was delivered by technology providers to understand the implication of technology on daily life. This led to the second generation of smart city which looked at how smart technologies and other innovations could create joined by municipal solutions.

The third generation of smart city took the control away from technology providers and city leaders instead creating a model that involved the public and enable solution in social inclusion and community engagement. This third generation model was adopted by Vienna which created a partnership with the local ven energy company allowing citizens to invest in the local solar plant as well as working with the public to resolve gender equality and affordable housing issues.

Such adopted as continued around the world including in (()) (10:20) where 30,000 cities citizens co-created the (()) (10:23) greenest city 2020 action plan. Now let us see why smart cities are important as we had discussed in the beginning of the course that 54% of the world's population live in cities and this is expected to rise to 66% by 2050. Adding a; further 2.5 billion people to the urban population over the next 3 decades.

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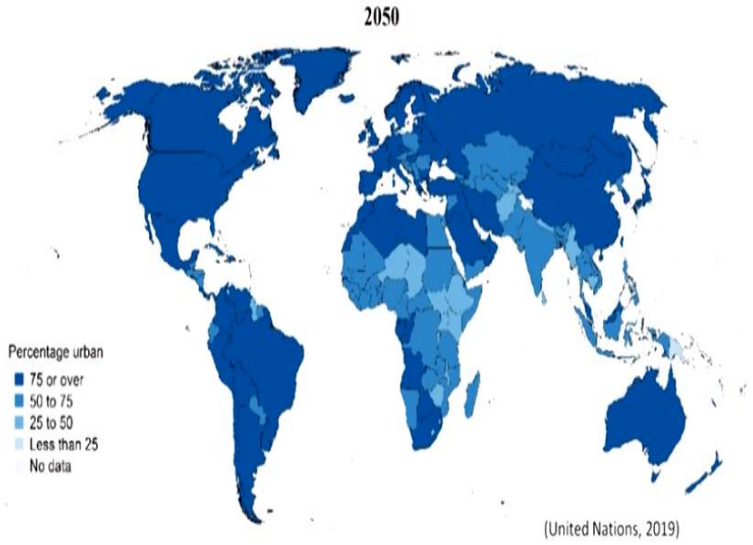

With this expected population growth there comes a need to manage environmental social and economic sustainability of resources smart cities allows citizens and local government authorities to work together to launch and use smart technologies to manage assets and resources in the growing urban environment.

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Now let us see the basic infrastructure in our cities what is basic infrastructure?

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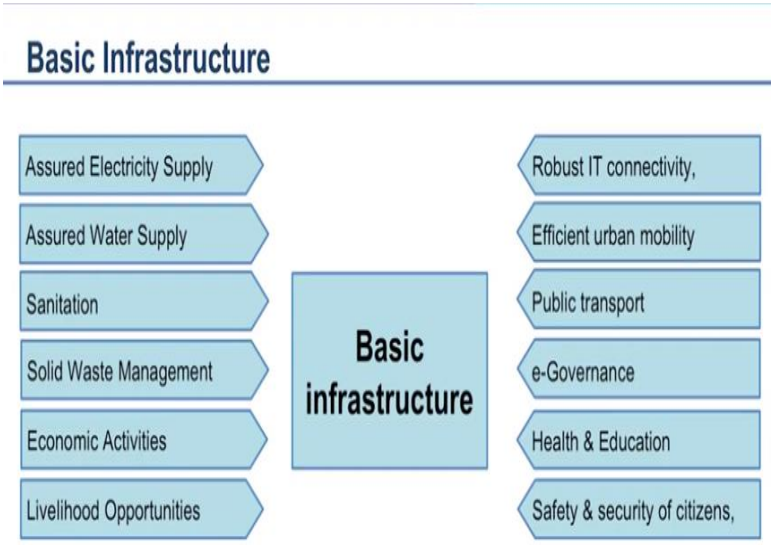

Basic infrastructure include assured water and electricity supply sanitation and solid waste management. Efficient urban mobility and public transport; affordable housing robust IT connectivity, e-governance and citizen participation safety and security of citizen health and education and economic activities and livelihood opportunities. So all these need to be addressed to improve the quality of life for everyone to improve our environment to make our cities more inclusive and make our cities sustainable.

So like we have been reviewing since the beginning of this course now let us looks at the components of smart cities.

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There are few components that mission document has highlighted these 4 components are which gives us direction to the approaches cities can adopt to address the current urban challenges.

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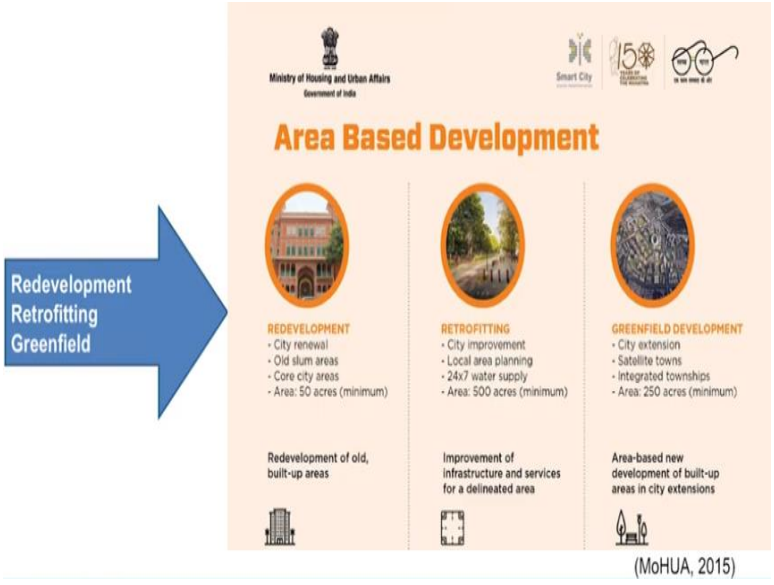

First we look at redevelopment which means redevelopment of old built up area could covers city renewal where we revive our older part of the city. City development of old slum areas or we can also revive the core city area through the redevelopment. The minimum area which was

prescribed in the mission was 50 acres within this component. Another component was retrofitting which means to add improvement of infrastructure and services for identified areas.

It could include city improvement plan it could include local area plan 24 by 7 water supply the minimum area which could be taken over was 500 acres within this component. The next element we see is green field development which meant development of new area termed as area based development of built area in this city extension. It could include city extension satellite town planning for integrated townships.

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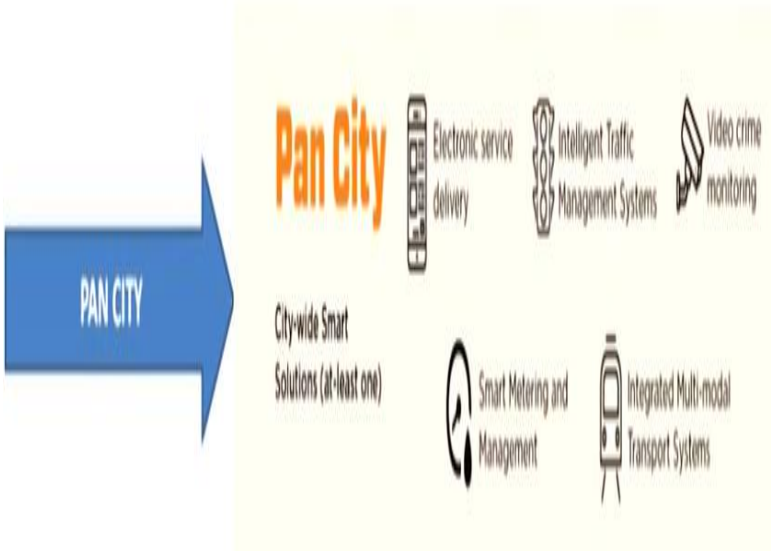

Minimum area specified within this component was 250 acres the fourth component was pan city development city wide implementation of the smart solutions covering aspects such as smart metering management and so on.

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(MoHUA, 2021)

In the image we can see the redevelopment project of Bhendi Bazaar in Mumbai of 50 acres. You can see in the image retrofitting image in Ahmedabad in 500 acres. You can see green field development in Amravati in the area of 250 acres. Pan city development to make interventions across the city 100 cities was selected 5 over 5000 projects were identified and above 2 lakhs crores was invested.

For example to understand further retrofitting strategy we look into the retrofitting strategy for this we will look at the development of an existing built area greater than 500 acres so as to achieve the object of a smart cities mission to make it more efficient and livable such as local area development.

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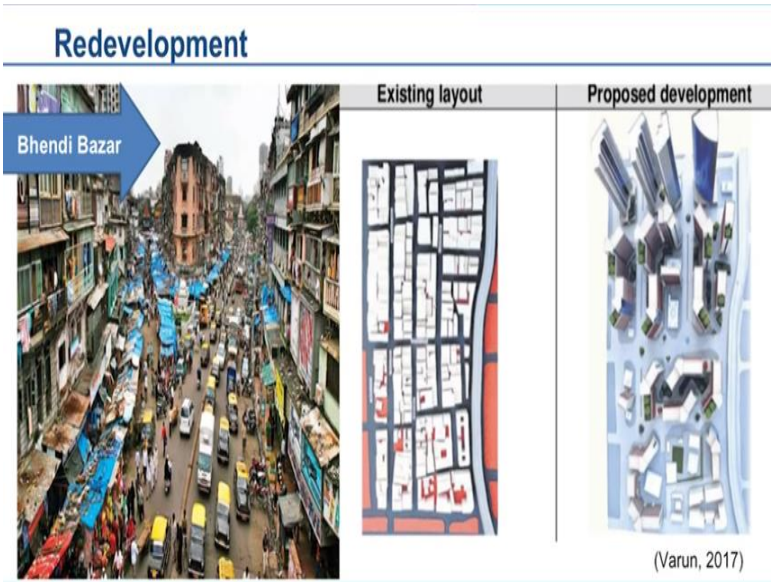

Retrofitting strategy will look into development of an existing built area greater than 500 acres. So as to; achieve the objective of smart cities to make it more efficient and livable such as local area development. To understand better we see in the image Bhendi bazaar of Mumbai. On the left hand side the prevailing conditions which was proposed to be transformed as you can see on the right hand side image.

This was planned through redevelopment by replacing the existing building environment in an area and enabling co-creation of new lay out specially enhanced infrastructure mixed land use and increase density as you can see.

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Further we see the example of green field development in this image you can see how a previously vacant area of more than 250 acres in Dholera city, Gujarat by using innovative planning, plan financing and plan implementation tools with provision for affordable housing. Especially for the poor transformation of urban environment is planned in the mission all these 4 components were identified.

And all those 4 have to happen in the existing cities no new cities that we are building in the mission all these 3 components were identified and all these 4 components were supposed to be covered within the proposal. Further all the proposals where to be taken in the existing cities and no new cities would be covered under this. This is the key structure of smart cities that the government of India did in year 2015 so we have seen that.

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Now let us look at the procedural aspect of the mission first step was the ministry asked the state to shortlist the cities for the mission. Every state was allowed number of cities which would be included in 100 smart cities based on the urban population in this state.

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Annexure 2: Number of cities allocated to States based on urban population and number of statutory towns

State/ UT	No. of cities
Andaman & Nicobar Islands	1
Andhra Pradesh	3
Arunachal Pradesh	1
Assam	1
Bihar	3
Chandigarh	1
Chhattisgarh	2
Daman & Diu	1
Dadra & Nagar Haveli	1
Delhi	1
Goa	1
Gujarat	6
Haryana	2
Himachal Pradesh	1
Jammu & Kashmir	1
Jharkhand	1
Karnataka	6
Kerala	1
Lakshadweep	1
Madhya Pradesh	7
Maharashtra	10
Manipur	1
Meghalaya	1
Mizoram	1
Nagaland	1
Odisha	2
Puducherry	1
Punjab	3
Rajasthan	4
Sikkim	1
Tamil Nadu	12
Telangana	2
Tripura	1
Uttar Pradesh	13
Uttarakhand	1
West Bengal	4
Grand Total	**100**

For example Madhya Pradesh was given 7 cities the state was required to select 7 cities in their state for the smart city proposal. Like we can see in the diagram the total number of 100 smart cities was distributed among the states and union territories on the basis of equitable criteria. The formula gives equal weight 50-50 of urban population of the state or union territory and the number of statutory towns in this area based on the formula.

Each state union territory would receive certain number of potential smart cities and every state would get one minimum city for the mission. Projects started with the within state competition we are talking about the first stage.

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	BPL	JBP	IND	GWL	SGR	SAT	BUR	UJJ	DWS	KAT	REW	MOR	SIN	KHA	RAT	CHI
1. Toilets	10	10	10	7.5	7.5	10	7.5	10	7.5	5	10	0	0	7.5	0	10
2. Online Grievances	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
3. Newsletter	5	5	5	5	5	5	5	5	0	0	0	0	0	0	0	0
4. Online Budget	5	5	5	5	5	5	5	5	0	0	0	0	5	5	0	5
5. City Resolution	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
6. Consultation	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
7. Penalty	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
8. Revenue trend	10	10	10	10	10	10	10	10	10	10	5	10	10	0	0	0
9. Salaries	5	5	5	5	5	5	5	5	5	5	0	5	5	5	5	5
10. Audit	5	5	5	5	5	5	5	5	5	5	0	5	0	0	5	0
11. Own revenue %	10	10	10	10	7.5	7.5	7.5	10	7.5	0	0	5	7.5	7.5	7.5	0
12. OM Cost	10	10	10	5	10	0	7.5	5	5	5	10	5	0	0	5	0
13. Capital works	10	7.5	10	5	0	7.5	0	7.5	5	7.5	10	0	0	0	0	0
14. Jnnurm Reforms	7.5	7.5	7.5	0	0	0	0	5	0	0	0	0	0	0	0	0
15. JN Project completion	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	93	85	88	84	81	81	78	78	69	59	55	50	47	44	41	38

Thereafter they were required to finalize the entities that will assess them to prepare the proposal from the empaneled list of consulting firm. A point a consulting firm outside the panel as per the state financing rules or use a hand holding agency like bi-lateral multi-lateral like world bank, DFID UN habitat or Asian development bank. Thereafter the finalized smart cities would receive rupees 2 crores for proposal preparation.

The states had stipulated number of days after finalization of first list of the potential smart cities to prepare the proposals. Let us see the example of Madhya Pradesh to understand how if they select 7 cities in the state? They did competition in the state this competition was done by the government of Madhya Pradesh and based on the different format. The allocated marks for different areas based on the competition the cities which got the maximum number got selected.

For, example in Madhya Pradesh had 7 cities under the mission so they did competition in this state. In the image on the left hand side you can see there are criteria's based on which marks were given such as availability of toilet online grievance system, online budget the consultation process that happened in the cities revenue trends whether their property tax is sufficient or not. So such kind of aspects were reviewed and how much percentage of own revenue they generated?

They also looked into what capital works have been done by the ULB's under JNNRUM and so on. So you see that this was the multi facet criteria based on 15 parameters developed for the selection of the cities in this state. On the right hand side Bhopal, Jabalpur, Indore, Sagar and so on. You can see city which participated in the competition these all cities were given marks on 15 parameters.

You may notice the highest marks 93 in the bottom road to Bhopal city which is the capital city of the state. And the top 7 cities which scored maximum marks were asked to compete at all India level and to be included in the smart cities intervention. This was the first level stratification that had happened at the state level.

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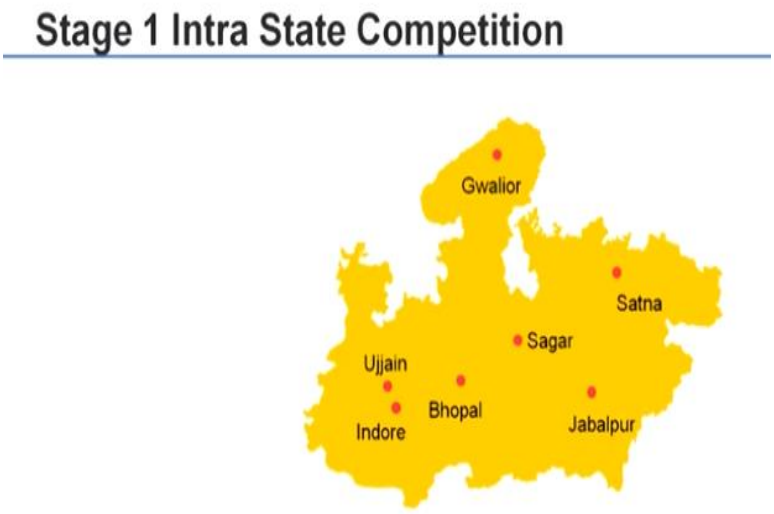

In 2015 the interstate competition was held in Madhya Pradesh among all 16 municipal corporation of this state based on criteria provided by the government of India under the smart city mission guidelines top 7 cities were shortlisted. After this the center identified the 7 cities based on the maximum marks and nominated under the smart city challenges.

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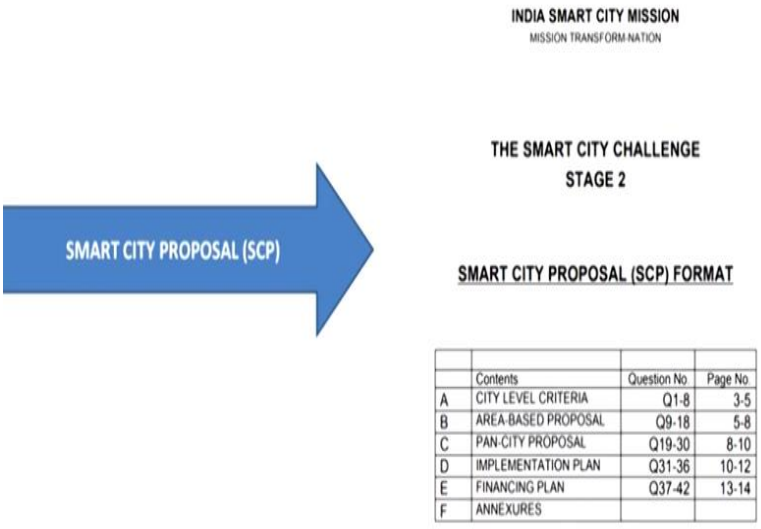

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Now coming to the second stage here we will discuss how the smart city proposals were developed. Each city was required to submit a proposal in the ministry smart city proposal template which had 43 questions. These forms the special purpose plan this smart city proposal SCP forms our special purpose plan prepared within this mission. We are looking at the format or which was given by the ministry.

Based on the SWOT analysis strategy vision area and fan city proposal implementation and financing plan.

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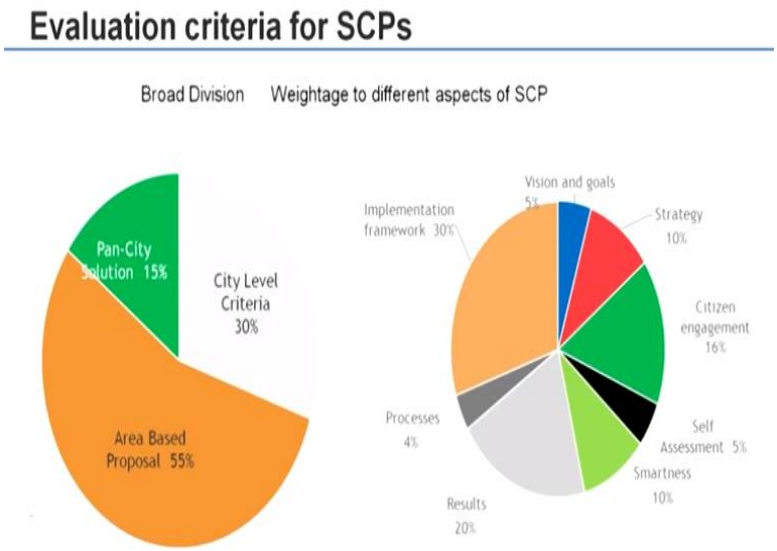

Key themes included like careful renovation replicability, financial sustainability and convergence. Each city would select one strategic area and preferably one pan city solution. In the second stage of competition every smart city proposal marks were given for 3 sections. You may see in the left hand side graph that 55% was assigned for area based proposal 15% for the pan based solution and 30% for the city level.

Now within this there were further breakdowns of every city were questions were asked to related to the city vision. What is the strategy there were marks for how citizens were engaged and strength of the smart proposal. It was reviewed based on what process was involved how will the plan be implemented? What will be the results that are anticipated and the breakup of the marks for each of these questions? You can see in the graph in the right hand side it was a very rigorous exercise that each city was doing.

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Like here in the image taken from the smart city of Bhopal on the left hand side you can see that they have addressed area based development. And on the right hand side pan city interventions you may notice accordingly that they have taken 342 acres in TT Nagar of for based development. It had 2 smart city project under pan city interventions. They focused on unified governance and intelligence street lighting.

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Similarly in this image from the smart city proposal of Bhopal you can see their vision and how area based development and pan area intervention facilitate the realization of the vision.

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In the smart city plan the pan city initiatives included integrated command and control center intelligent traffic management systems. Smart poles and intelligent street lights Bhopal plus which was one city one app mayor express smart handy man services. Market which they created smart map which had 99 layers of GIS smart parking they worked in the heritage conservation. They worked on the water management digital door numbering, smart schools, Smart Park public bike sharing, B-nest incubation center for the people.

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We can see here that they are identified 342 acres area in TT Nagar and to ok interventions of redevelopment as per the components of smart cities.

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They reviewed it with the master plan and they aligned it with the ToD strategy which was proposed in the master plan and accordingly proposed high density mixed use development.

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Accordingly they prepared the land use plan which you can see on the map further they develop strategies for the provision of infrastructure as you can see on the right hand side of the image. You may also see the change in the land use plan according to the proposed development in this image.

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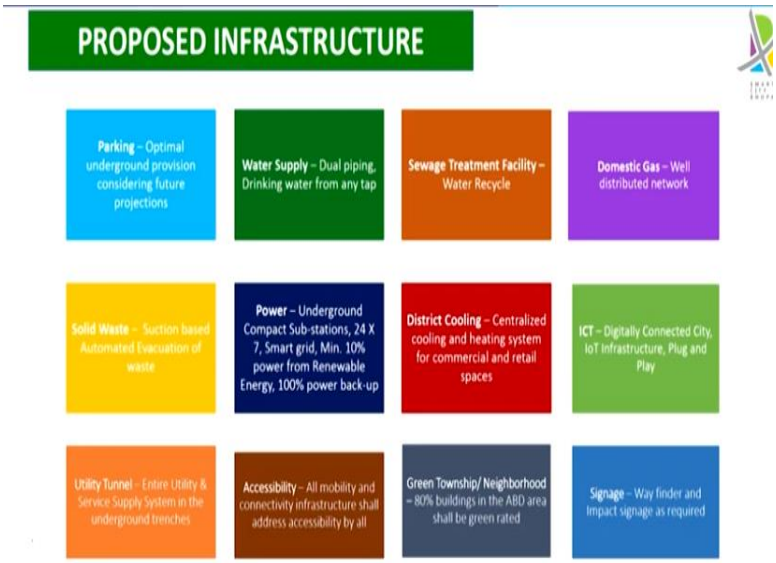

You can see on the left hand side the existing land use on the right hand side you can see the proposed land use. In the proposals they have prepared a list of infrastructure such as parking, water supplies, sewerage treatment, power, solid waste district cooling, domestic gas, ICT, signages, green township accessibility and utility tunnel.

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Within the area based development we can see provision of the government housing more than 2000 units as seen in the image from the proposal was provided. Within this you can see provision of other development and process like EIA for the development.

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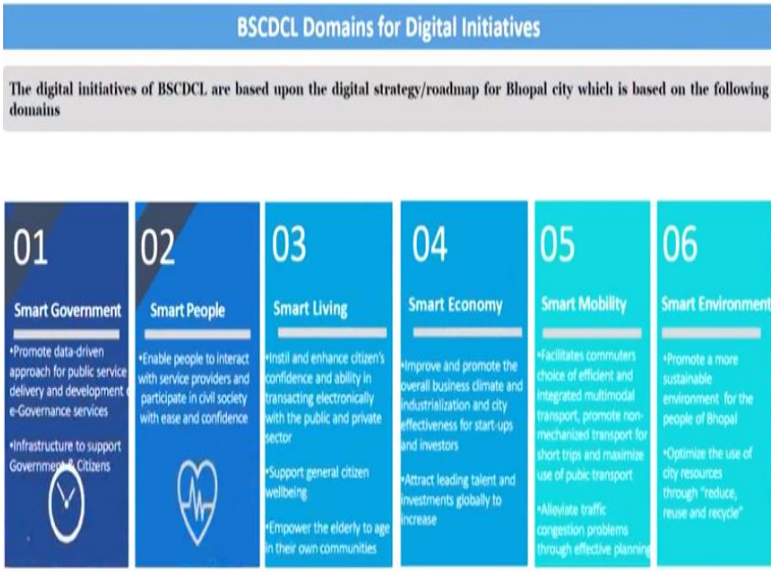

Further within pan city initiative you may find interventions like digital initiatives based on smart governance smart people smart living, smart economies, smart mobility and smart environment as per the mission.

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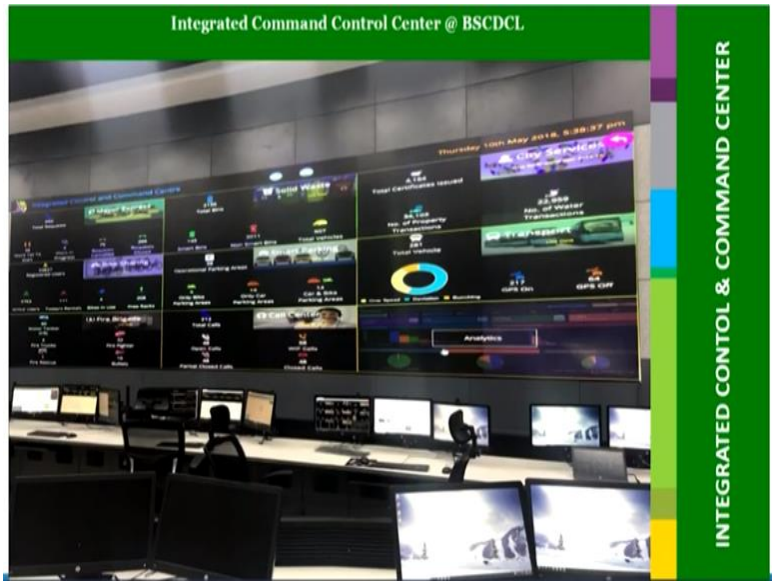

We can see integrated command control center developed in this city.

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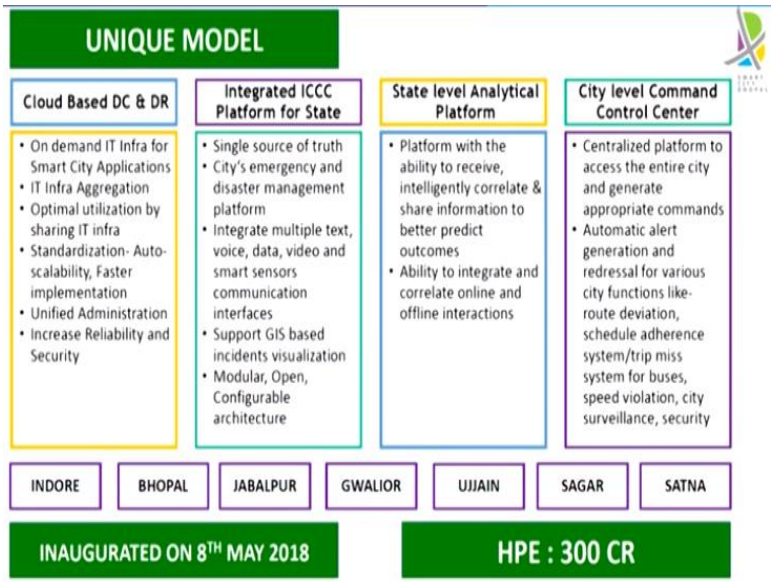

Based on the unique model cloud based; model integrated platform for city state level analytical platform city level command control center.

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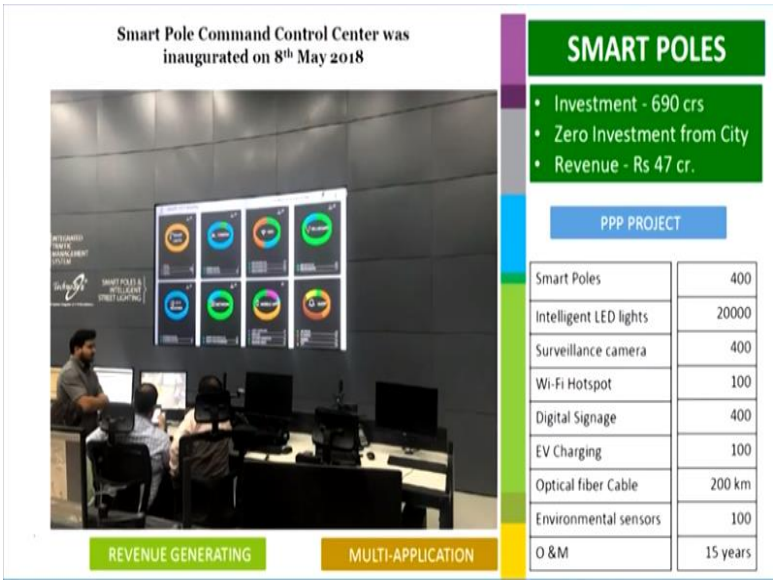

Likewise we see smart poles, command control center developed in the city.

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In the image you can see the transformation from left side to the right hand side such interventions helped in gaining efficiency as well as aesthetics for the city.

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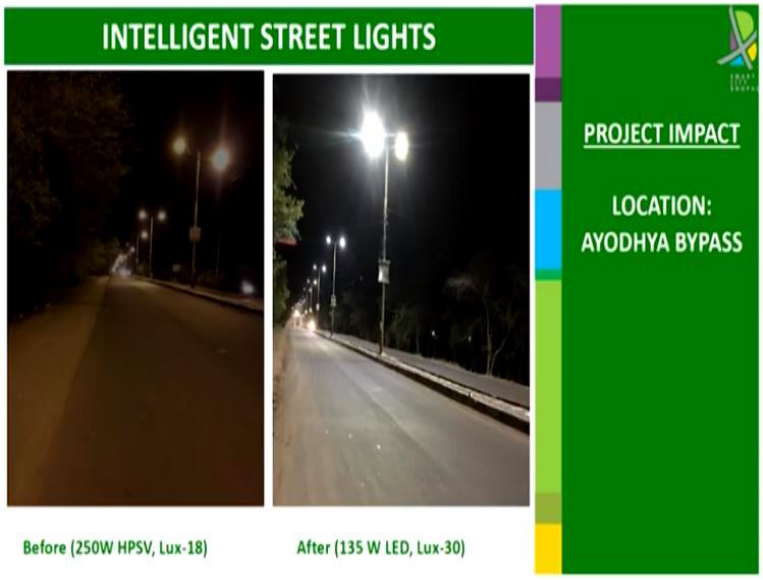

You can see how the interventions are transforming the land scape in the city. You can see before and after picture here. You can also see the app developed for the people in the city.

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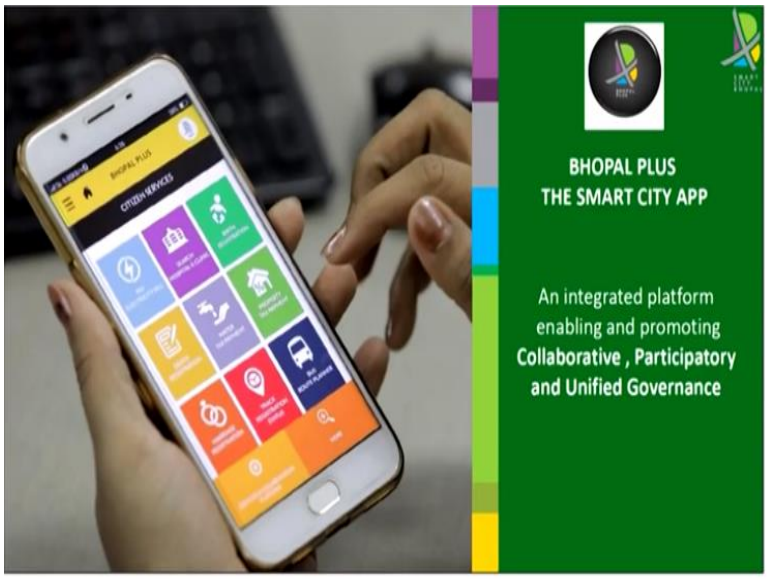

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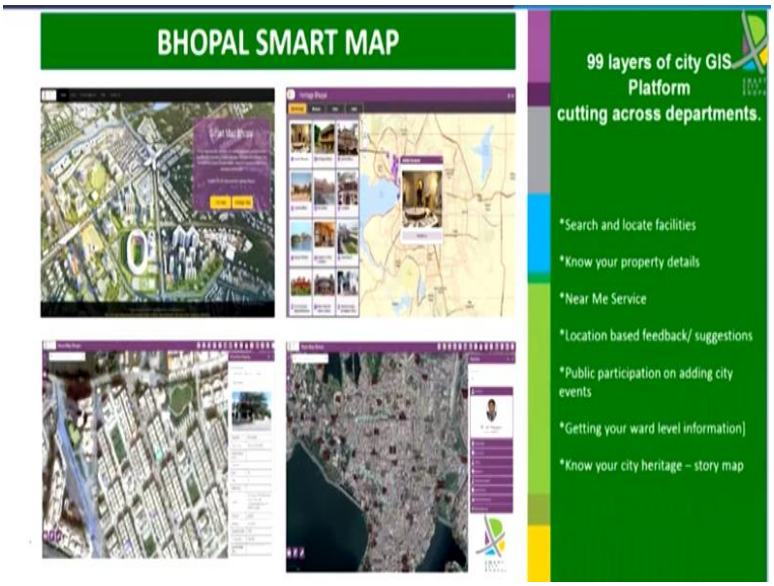

Bhopal plus the smart city app likewise you can see that Bhopal smart map being prepared with 99 layers on GIS platform. You may also see the smart mobility solutions prepare proposed.

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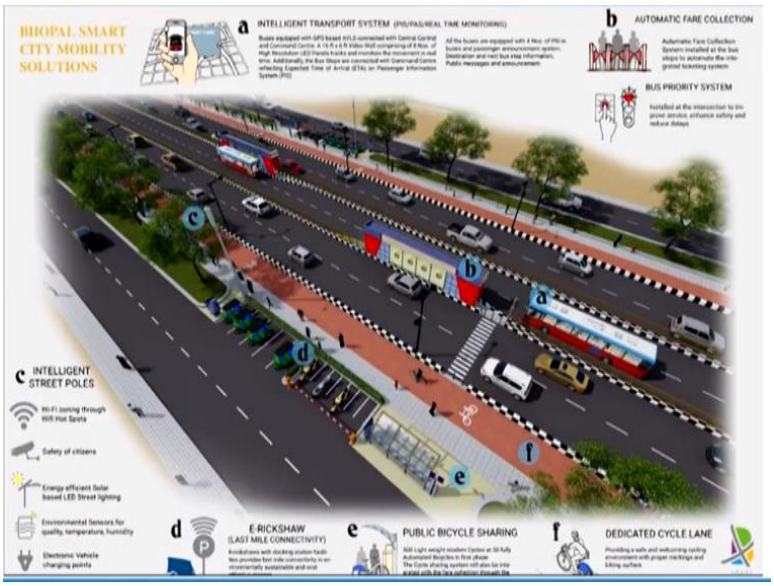

You may also see the smart mobility solutions proposed for the city with many interventions implemented already.

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You may also see the automatic fare collection and intelligence system incorporated in the city.

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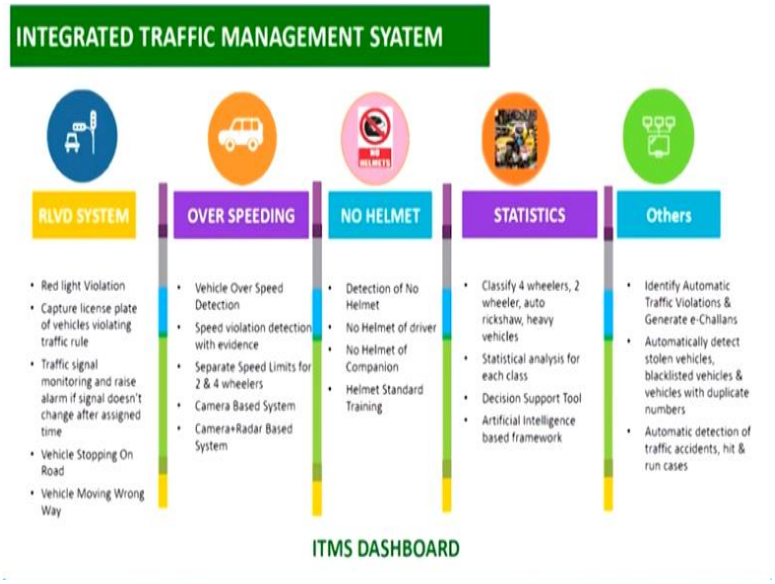

City has also worked on integrated management system it will identify and charge people for any violation.

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And also analyze the pattern like how they are improving in the process.

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As in the image you can see it can identify people who are violating wearing riding without helmets or their number plates can be identified and so on.

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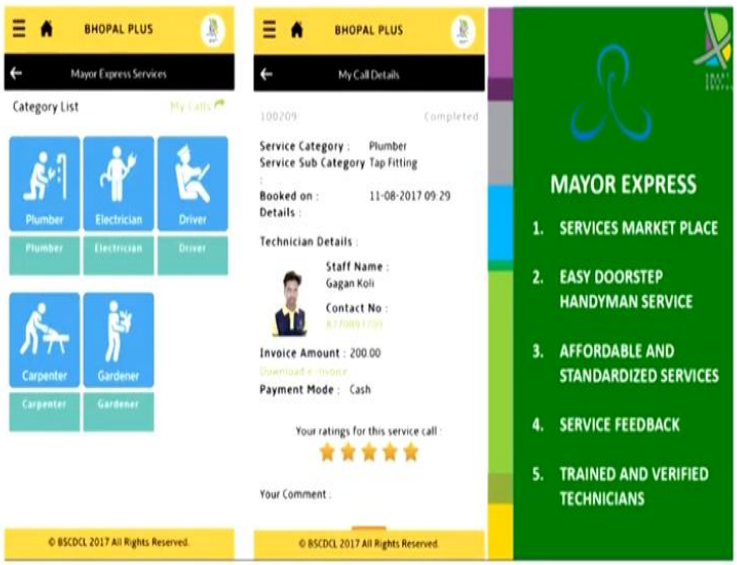

You may further see dynamic mayor express which is; a service market place for availing all kind of services at affordable price. We also see construction of smart road all the details provided here

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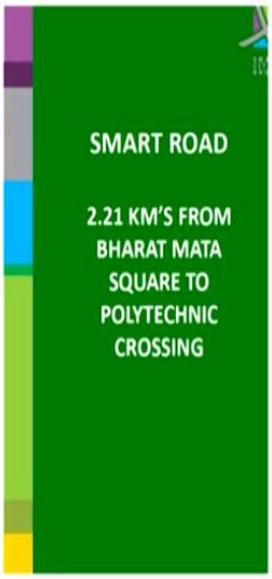
Smart Road is built on a stretch of 2.21 KM in Bhopal from Bharat Mata Square to Polytechnic Crossing and includes the following:

- 8 mtr wide driving lane on both sides
- 2 mtr wide cycle lane on both sides
- 2 mtr footpath on both sides
- Utility ducks, with additional duck in center.
- Underground wiring



How the city is planning? So it is planning to build this from Bharat Matha square to polytechnic crossing.

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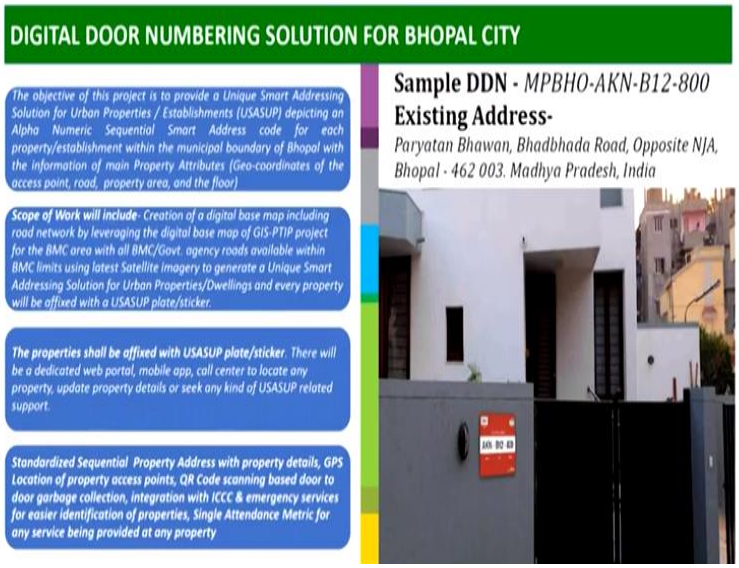

Digital door numbering for household you can see here water utility management system in the city.

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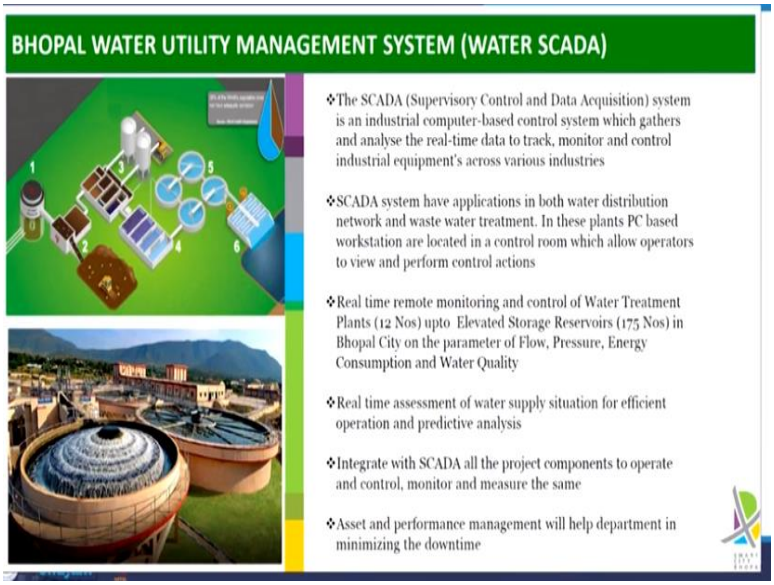

You can see how they are planning the scada here modernization of the schools also has been planned and executed.

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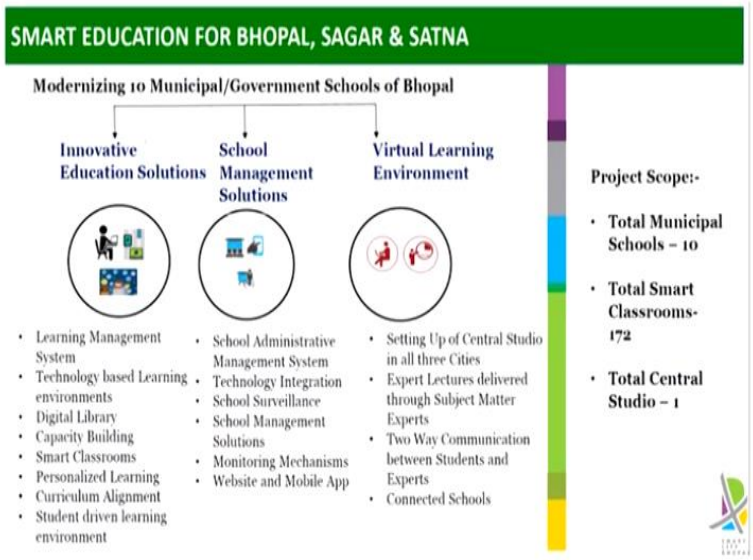

You can see smart education for Bhopal sagar and satna for the other places as well.

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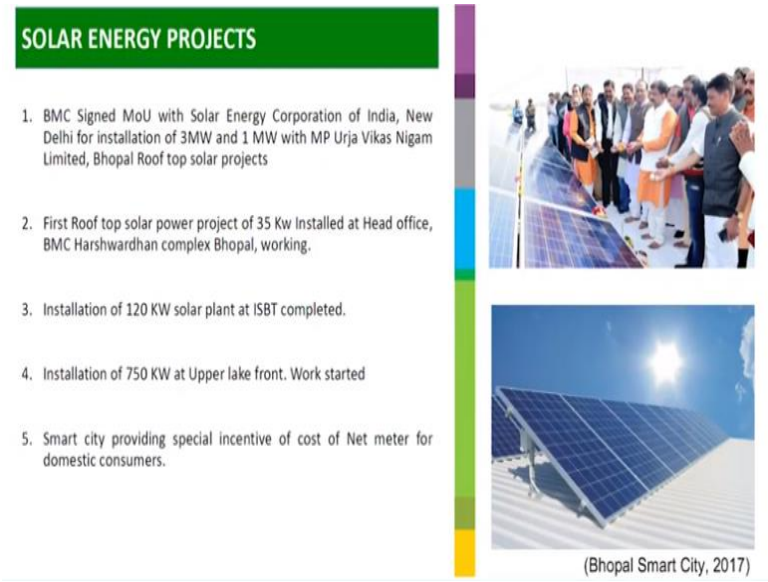

You may also see interventions of smart parking you may find solar energy and solid waste management project among other interventions as well. Implementation of smart bike for supporting pollution free vehicles smart bike is India's largest bike sharing PBS company in India and also operational in Bhopal, New Delhi, Hyderabad and Chandigarh.

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So you can see here so also 5 meter wide bicycle track is been proposed in the city.

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In this initiative they have also covered the heritage conservation you can see how they have incorporated the smart roads system. You can also see how they have manage integrating the solid waste management. They have worked on end to end solutions from collection to disposal.

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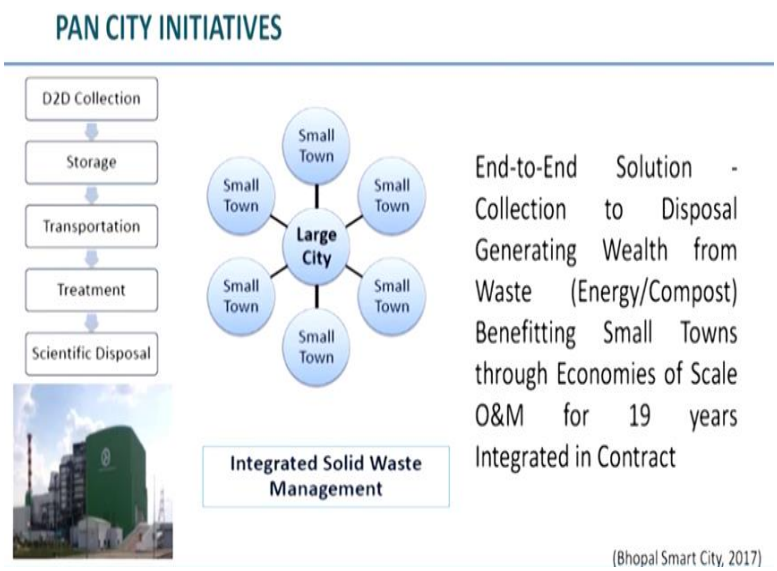

Generating a; wealth from waste and also looking at the energy and composed component benefiting small towns through economies of scale.

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You can see the use of smart bins in the city.

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Likewise you can see green and blue infrastructure how they have been planned to be developed in the city.

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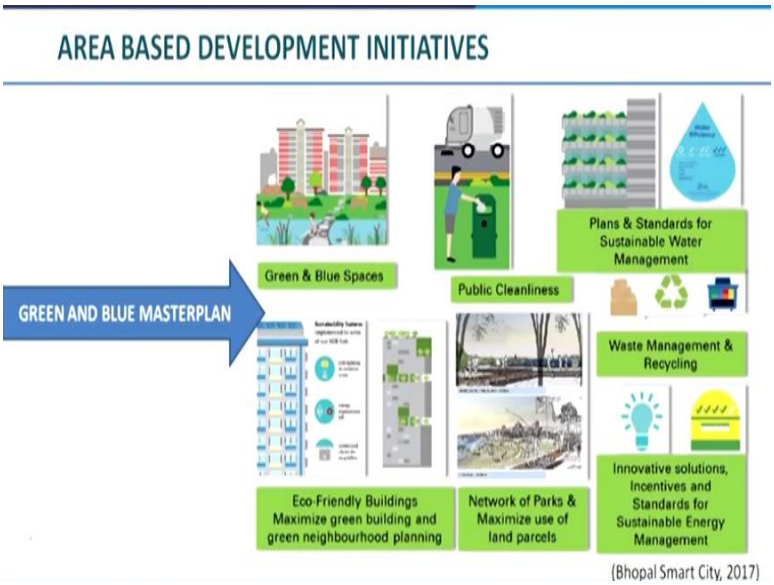

Lot of in the area based development how this green and blue master plan would be developed.

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Also looked into the tactical urbanism like smart street you can see this has been proposed in MP Nagar. We can see the automatic fair collection.

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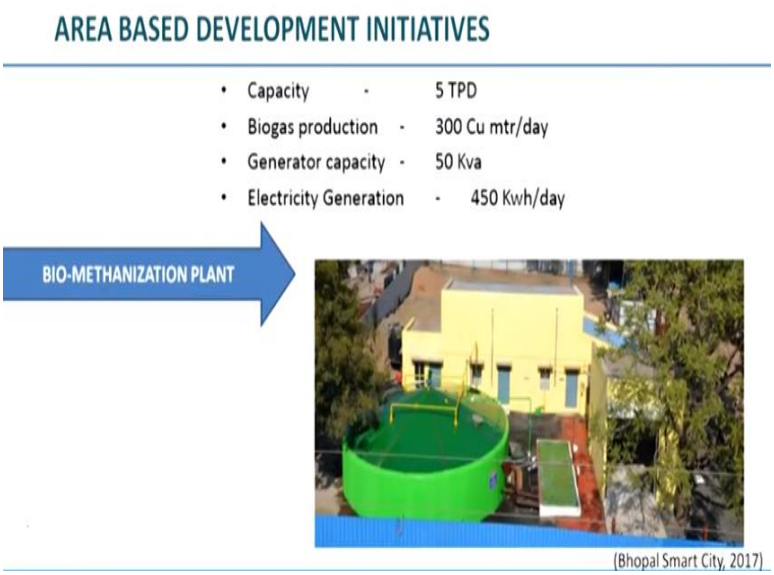

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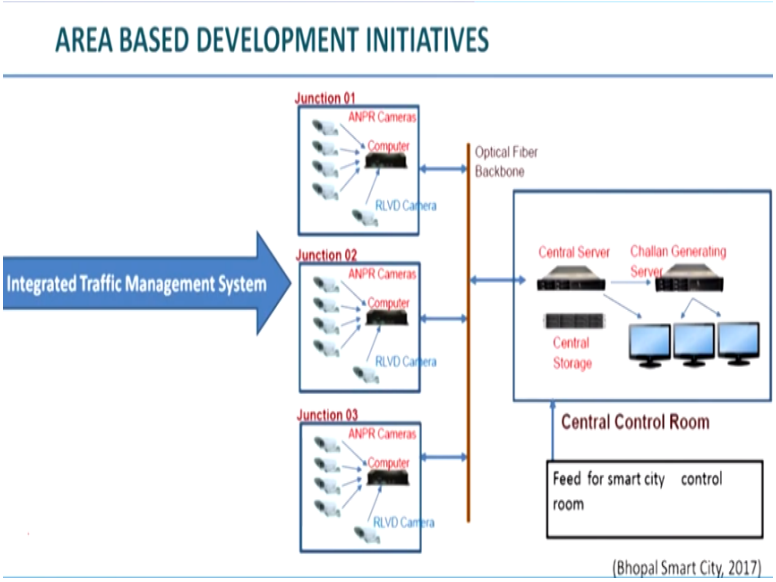

Implementation of bio methodization plant implementation of integrated traffic management system you can see here how the entire technologies has been planned.

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You can see how the integration of the entire transportation system has been done integrated ISBT with Habihganj railways station which gives 1 kilometer for the travelers to connect ISBT and Habibganj railway station.

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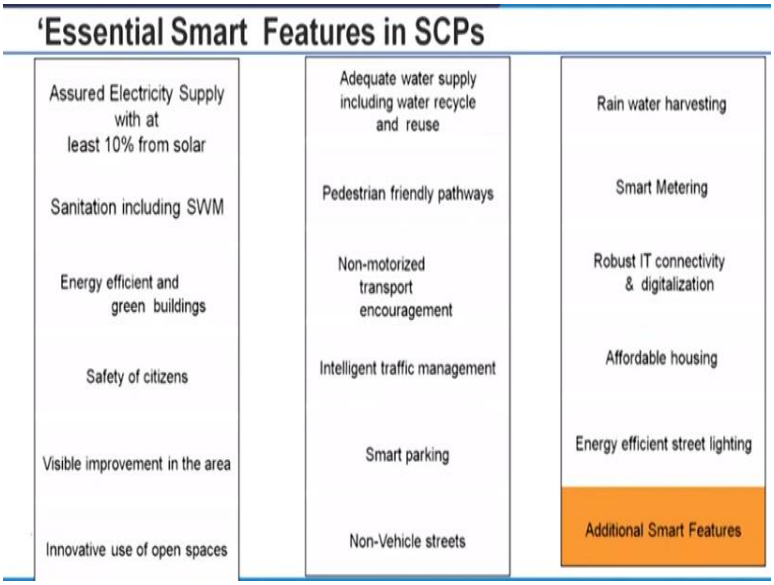

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For the seamless commute now let us look at how the planning interventions through the mission were funded for the selected cities. For the implementation every city was supposed to have a special purpose vehicle which was headed by full time CEO. Center had invested 48000 crores.

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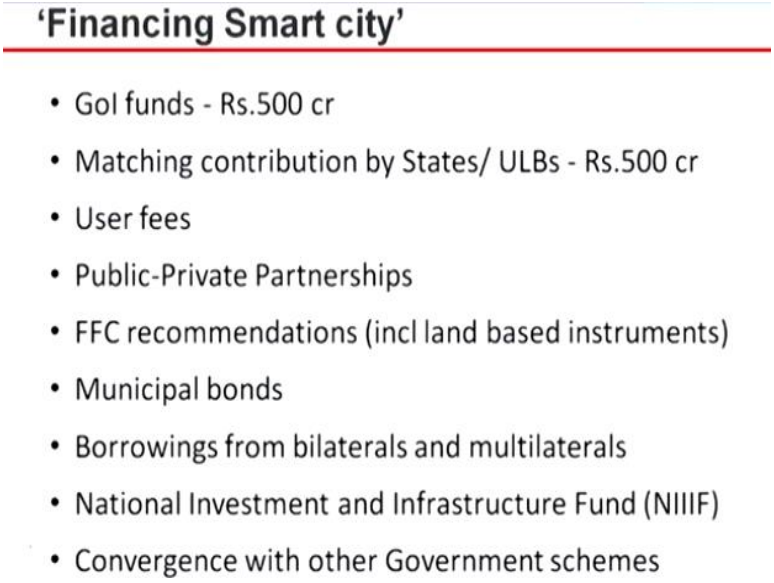

Which; means they will give very city 100 crores every year combining to 500 crores to each city in 5 years. Further they would be a matching contribution by state ULB's of 500 crores. So with the given grant of 1000 crores cities could explore other financial instruments as well such as public private partnership PPP model raise money through user fees issue of municipal bonds.

Borrow from bilateral and multilateral agencies converge with the other government schemes follow recommendations of foundation of futuristic cities FFC. And then look for national investment and infrastructure fund and IIF. Let us look at the meaning of convergence. For example we have AMRUT project which has already had 100 crores grant for water supply and improvement. So we can show that 100 crores as a convergence amount.

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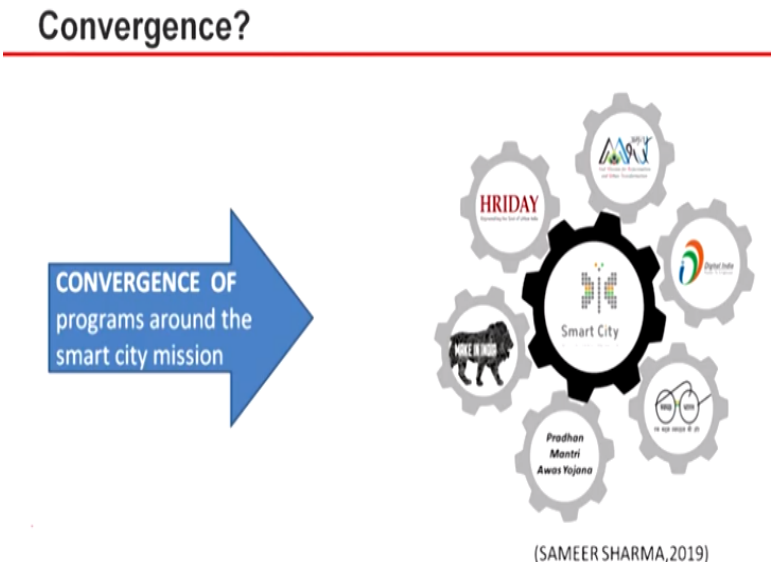

Likewise we could convert resources from schemes like HRIDAY digital India skill development and housing for all.

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Now coming to the monitoring process at the national level there was apex committee which was headed by the secretary who was reviewing this proposals.

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At the state level high parking steering committee was there so every proposal for the city had to go to high power steering committee before summation to the national level.

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Now let us look at the challenges all these interventions were done but let us look at the challenges which the smart city addressed or was facing.

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For all the benefits offered by these smart cities there were also challenges to overcome. These included government official's widespread participation from citizen there were also need for the private and public sector to align with residents. So that everyone can positively contribute to the community. Smart city project needed to be transparent and available to citizens via an open data portal or mobile app.

This would allow residence to engage with the data and complete personal data like paying bills finding efficient transportation options and assessing energy consumption in the home. This all required a solid and secure system on data collection and storage to prevent hacking or misuse. Smart city data also needed to be in anomalized to prevent privacy issues from arising. The largest challenge was probably that of connectivity with the thousands or even millions of IoT devices needing to connect and work in unison.

This was allowed services to be joined up and ongoing improvements to be made as demand increases. Technology aside smart cities also needed to account on for social factors that provide a cultural fabric that is attractive to residents and offer a sense of place this is particularly important for those cities that are being created from the ground up and need to attract resident. Summarizing will see in this session we saw how this mission aligned the overall planning objectives of sustainability the discussions which we had enough initial classes what issues we.

We are having in sustainability so how we are looking at those aspects through the smart city mission. How we are looking at the aspect of inclusion how we are looking at the aspect of better quality of life safety security environment and so on. So how this mission really when you saw the various components are processed how it was allowing those things to happen? And how through interventions in 100 cities we reached to that larger national target with the same we connect these smaller pieces with the larger goals.

We saw how the process was bottom up approach like cities were competing at the state level and then been selected at this central level. So you can see the bottom of approach which also helps us to see how it aligns the process aligns with our constitutional amendment. Further we saw various components and smart city proposals to understand the ground interventions. We saw how through the framework of information and communication technologies.

We have attempted to address urban challenges and create a joined up technology enabled and sustainable infrastructure.

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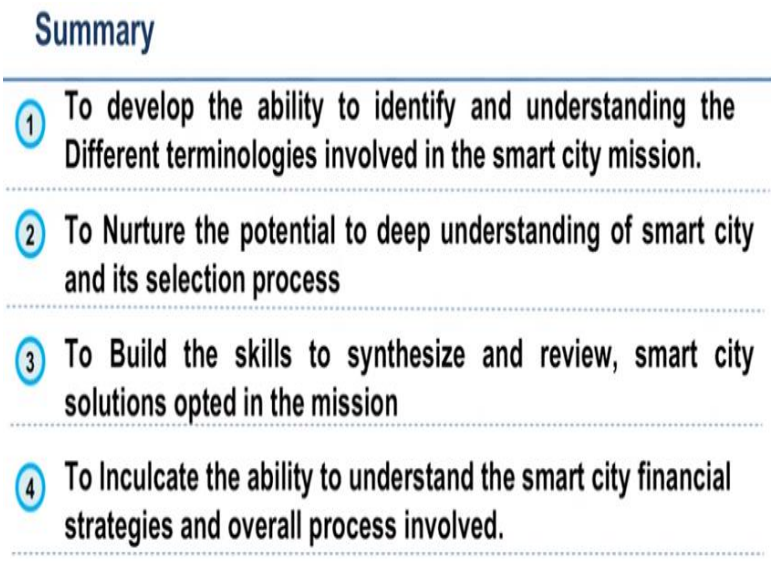

So we have also looked into different terminologies involved in smart cities we looked at the how smart city and its process takes place. We also looked into the various solutions and we also looked into the financial strategies we also looked into the monitoring strategies. And we also looked at one of the case where these interventions have done and we saw how these interventions are transforming things on the real ground.

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So these were the references which were used and I would also like to acknowledge architect Chandhan Chawla for her input on this session.

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Our coverage was limited with the scope to make you aware of the topic there are enormous readings and movies available to explore. Few are suggested here this is not an extensive list you may feel free to suggest more from your experience.

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Please feel free to ask questions let us know about your concerns you have to share your opinion, experiences and suggestions. Looking forward to; interacting and co-learning with you while exploring cities and urban planning thank you that is all for, today's class thank you.