

A Review of Faridabad as a Smart City

Divya Khatri

Deenbandhu Chotu Ram University of Science and Technology, Murthal, Haryana, India

ABSTRACT

Urbanization now-a-days has become a universal phenomenon. Hence the developing countries will experience a fast pace of urbanization as compared to the developed countries. By 2030, it is estimated that 70% of the world's population would be living in the cities. In India Smart Cities Mission was launched by The Government of India on 25 June 2015. In January 2016, based on All India Competition 20 smart cities were added in round 1 of smart cities, and later on on May 2016 13 more cities were added in fast track round in which Faridabad was included. The basic objective of Smart City Mission is to promote sustainability and inclusivity in cities, providing core infrastructure and a better Quality of Life to its citizens with fxa clean and sustainable environment and application of 'smart' solutions.<https://mohua.gov.in/cms/smart-cities.php> Descriptive and analytical methods were used to conduct the study. For data collection primary survey and secondary data were used. There is a need in Faridabad city to develop infrastructure so that the requirements of urbanization and a developed city can be fulfilled. An inclusive approach is required to create a healthy relationship among the government, infrastructure, environment and its citizens. Faridabad is an industrial city, so it is important to understand the requirement of city in becoming one of the smart city.

Keywords – Urbanization, Smart city, Sustainability, Quality of Life

INTRODUCTION

Faridabad has been known as the oldest city of Haryana. It gradually emerged as an industrial city of Haryana with establishment of various manufacturers of shoes, tractors, switch gears, etc.

The aim of this research paper is to understand the smart city policy for Faridabad and finding out the challenges in the implementation of the smart city policy.

The main steps in achieving the aim are :

- To critically analyse Smart City policy for Faridabad.
- To study the progress of smart city policy in Faridabad.
- To analyse policy implementation hurdles in the policy.

Cities are the main part of growth for economy of every nation . nearly 31 percent of India's population lives in urban area and contribute 63 percent of India's GDP . it is

expected that 40% of India's population will be living in urban area and contribute 75% of India's GDP by 2030 . There is very severe need for comprehensive development of physical , institution , social and economical infrastructure to improve the quality of life and attracting companies for investment in city . Cities are increasingly required to become smart if want to stay competitive and provide a decent life for their citizen . Development of smart city is a step in that direction.

Cities are the main part of growth for economy of every nation . nearly 31 percent of India's population lives in urban area and contribute 63 percent of India's GDP . it is expected that 40% of India's population will be living in urban area and contribute 75% of India's GDP by 2030 . There is very severe need for comprehensive development of physical , institution , social and economical infrastructure to improve the quality of life and attracting companies for investment in city . Cities are increasingly required to become smart if want to stay competitive and provide a decent life for their citizen . Development of smart city is a step in that direction. Faridabad is a leading industrial center and situated in the NCR bordering the Indian capital New Delhi.

Government of India included it the second list of Smart Cities Mission on 24 May 2016 . Under this program Municipal Corporation of Faridabad is required to prepare a Smart City Proposal to compete for its position among first top twenty smart cities in India and formulate its own vision, sub-goals and strategies through active consultation of its citizens and all stakeholders.

Smart City

A smart city is an urban area where technology and data collection help improve quality of life as well as the sustainability and efficiency of city operations. Smart city technologies used by local governments include information and communication technologies (ICT).

<https://www.ibm.com/topics/smart-city>

Smart Cities Mission envisions developing an area within 100 cities in the country as model areas based on an area development plan, which is expected to have a rub-off effect on other parts of the city, and nearby cities and towns. Cities will be selected based on the Smart Cities challenge, where cities will compete in a countrywide competition to obtain the benefits from this mission. As of January 2018, 99

cities have been selected to be upgraded as part of the Smart Cities Mission after they defeated other cities in the challenge.

METHODOLOGY

The research will start with understanding the policy by reading pertinent literature . long extended interviews of experts like urban planner , architect etc. Literature study to develop better understanding about the city . The research will have direct conversation with the people of different age group and background of different challenges faced in implementation of this policy , this can be done through personal interview and filling of questionnaires .

Smart City Concept

The main objective of smart city is to promote cities that provide basic infrastructure and provide a good quality of life to its citizens and providing a clean and sustainable environment with ‘Smart’ Solutions.

Improving livability – Area based development can transform existing area that includes slums to better planned ones.

New area (greenfield) will be developed around city to accommodate the increasing population in the urban area with the application of smart solutions which will enable cities to use technology information and data to improve infrastructure and services. The main focus is on the sustainable and inclusive development, to create a replicable model which might act as a light house to the other aspiring cities. The core infrastructure elements in a smart city would include:

- Adequate Water Supply
- Assured Electricity Supply
- Sanitation, Including Solid Waste Management
- Efficient Urban Mobility And Public Transport
- Affordable Housing, Especially For The Poor
- Robust It Connectivity And Digitalization
- Good Governance, Especially E-Governance And Citizen Participation
- Sustainable Environment
- Safety And Security Of Citizens, Particularly Women, Children And The Elderly, And
- Health And Education.

Smart City Countenance

1. Promoting mixed land use in area based developments– planning for ‘unplanned areas’ which contain a range of

compatible activities as well as land uses close to one another to make land use more efficient.

2. Housing and inclusiveness - expanding housing opportunities for all.

3. Creating walkable localities –reducing congestion, resource depletion and air pollution, promote interactions, boosting local economy, and ensuring security. The road network is created for vehicles and public transport, and also for pedestrians and cyclists. Necessary administrative services are pprovided within the walking / cycling distance.

4. Developing and preserving open spaces - parks, playgrounds, and recreational spaces to improve the quality of life of individuals, reducing the urban heat island effects and promoting eco-balance.

5. Promoting a variety of transport options –TOD (Transit Oriented Development) ,public transport and last mile para-transport connectivity to be provided.

6. Making governance citizenfriendly and cost effective –Increasing reliability on online services to bring accountability and transparency especially during using mobiles to reduce cost. Creating e-groups to connect to people and get feedback, use online monitoring of various programs and activities with cyber tour of worksites.

7. Applying Smart Solutions to infrastructure and services - In areabased development to make them better. For eg. making areas less vulnerable to disasters, using limited resources, and to provide cheaper services.

Components of area-based development in the Smart Cities Mission are:

1. City improvement (retrofitting)

2. City renewal (redevelopment), and

3. City extension (greenfield development) plus a Pan-city initiative withsmart solutions covering larger parts of the city.

Retrofitting

- Retrofitting will introduce planning on an existing built-up area to attain smart city objectives, with other objectives to make the existing area more efficient and liveable.
- In retrofitting, an area that consists of more than 500 acres is identified by the city in consultation with the citizens.
- Later on depending upon the existing level of infrastructure services available in the identified

area and the vision of the residents, the city will prepare a strategy and work on it to become smart.

- This strategy can be completed in a short time span which can lead to its replication to another part of the city.

Redevelopment

- Redevelopment effects the replacement of an existing built-up environment and enables co-creation of a new layout with improved infrastructure using mixed land use and increased residential density.
- Redevelopment can be done in an area of more than 50 acres which is identified by Urban Local Bodies (ULBs) in consultation with the city's citizens.
- For instance, a new layout plan of the identified area is prepared with mixed land use, higher FSI than existing and higher ground coverage.
- Examples of a redevelopment model are
 - Saifee Burhani Upliftment Project in Mumbai (also called the Bhendi Bazaar Project), and
 - The redevelopment of East Kidwai Nagar in New Delhi being undertaken by the NBCC (National Building Construction Corporation).

Greenfield Development

- Greenfield development introduces most of the Smart Solutions in a formerly vacant area which can be more than 250 acres using innovative planning, plan financing and plan implementation tools (e.g. land pooling/ land reconstitution) with provision of affordable housing, especially for the poor.
- Greenfield developments are required around cities in order to fulfill the needs of the increasing population. A next example for it is the GIFT City in Gujarat.
- Greenfield developments can be located within the limits of the ULB or within the limits of the local UDA (Urban Development Authority).

Pan-City Development

Expected application of selected Smart Solutions to the existing city-wide infrastructure. Application of Smart Solutions will involve the use of technology, information and data to make infrastructure and services better. For example, applying Smart Solutions in the transport sector and reducing average commute time or cost of citizens will have positive effects on productivity and quality of life of citizens. Another example can be waste water recycling and smart metering which can make a huge contribution to better water management in the city.

Process of Selection of Smart City

- For the selection of the Smart Cities in India there's no particular model that has been adopted by Government of India.
- The focus is on to prepare a smart vision for the city based on the local context and availability of resources.

- Each city that is planning to bid for the selection prepares its own Smart City Proposal (SCP) which is a unique model based upon the local needs of city's population. SCP is based on the principles of different practiced and adopted planning schemes worldwide and it mostly focuses upon the urban infrastructure services and utilities like sewerage, water supply, transportation, etc.,
- The Indian Government announced to aid 100 smart cities in respective Five Year Plans and the process for selection is based upon a methodology which is divided into two stages; Intra-state level selection and National level selection of cities.
- In the first stage, all the states shortlist potential smart cities based on a scoring criteria given by the Indian Government. These cities deliver success in the scoring criteria and on the score achieved by the various cities the Government of India declares the list of 100 Smart Cities.
- In the later round, the selected cities prepare a SCP based upon their local context and again on the basis of the scoring criteria the chosen list of cities are declared which can precede with their plan of action. Whereas, those cities which are rejected in the second stage can improve their SCP for selection in 2nd stage (Smart City-Mission Statement & Guidelines, 2015). There are two stage in the selection process . after the number has been indicated to the respective chief secretaries , as outlined , the states and UTs will under take the following steps:

Stage-1 competition : state's shortlisted cities

Stage-2 criteria for evaluation proposal level evaluation.

SMART CITY CHALLENGES IN INDIA

Financing:

When it comes to funding Smart cities project it is not very privileged. Financing is one of the biggest challenges for a smart city project .

The total investment approved under the smart city plans of 90 cities has gone upto Rs 1, 91,155 crore (Source: Businessworld). With the presence of state-sponsored companies also the project seems to have no good start. The government is recently taking steps to finance these projects by making changes in the budget.

Lack of Center-State Co-ordination:

Proper implementation of a project can be done only if there is a coordination between the government bodies. There is a need of proper regulation when it comes to planning for the development of smart cities.

Availability of Master Plan:

Most cities in India do not have their master plans and development plans. This is a problematic situation if we talk about developing them into smart cities. The presence of both the requisites is the key to the implementation and encapsulation of the smart city project as that is where the changes would be monitored and there is no other way to make it simple, better and efficient.

No time figure attached to the plan:

The entire smart city plan is a one big plan which should get all the clearances if not before time then atleast on time. The most important step to be taken in this context would be setting up a single regulatory body which monitors all the requisite approvals for the project.

Availability of facilities:

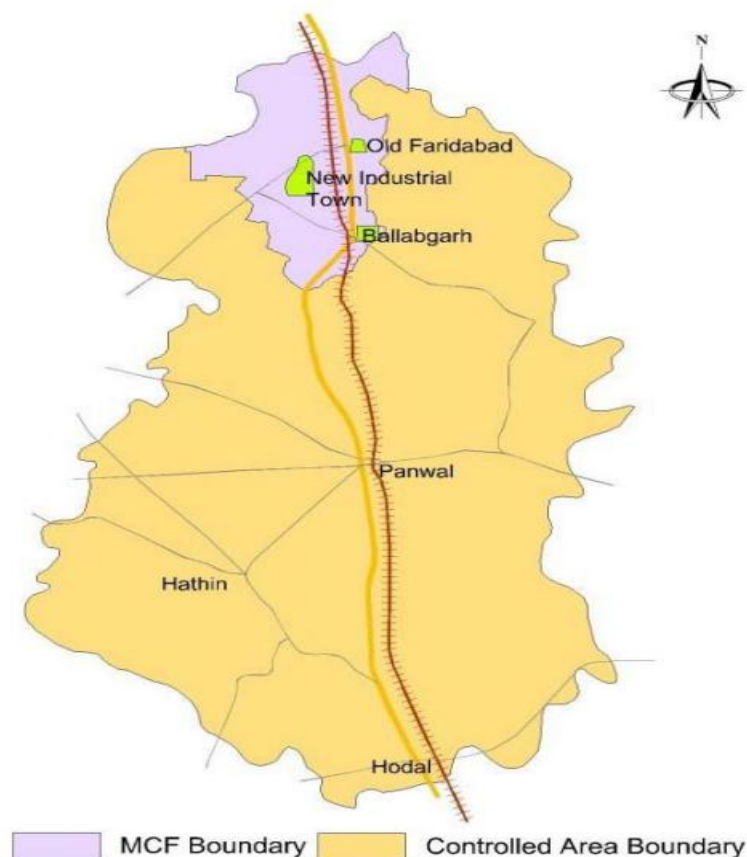
We are very much aware of the fact that India as of now is not that equipped when it comes to skilled manpower and advanced technology requirements for developing 100 smart cities. That is a huge number and requires lot of skilled efforts. If we talk about creating skilled labour and capacity building, not much funds have been allocated by

the center and state in such initiatives. Such projects involve training, research and a hefty database for execution. This is a huge problem in our country as it is an area which has not been focused upon as of now. These programs help in many ways like time bound completion.

Corruption:

This point probably was meant to be from the first as this is the root cause for all above challenges. But if we talk about it solely this is also a major challenge. Both at center and state level corruption is responsible for all the co-ordination mismatch and time lag happening. The financial constraint also somehow creeps in because of this issue. Corruption in India is a challenge which has always been a reason for non-execution or ineffective execution of most big projects in the country. All the above points are exemplary of the fact that the smart city project although being a dream project has many implementation challenges. The project had been launched with different names many times but the final outcome is still awaited.

CITY PROFILE



Source –Municipal corporation Faridabad

Figure – 1 Faridabad city profile

(a) Old Faridabad zone : Township of old-Faridabad is situated about 25 kilometres from Delhi. Its origin dates back to the Mughal period, in 1607 A.D

(b) Ballabgarh town: It lies along the Delhi-Mathura National highway. The town is about 48 km away from Gurgaon and 34.5 km from Delhi, to the south. It has also experienced industrial development all along the national highway with industrial units such as Goodyear tyres, Rajdoot motor cycles etc

(c) New Industrial Township (N.I.T.): It is situated on the Delhi-Mathura National Highway (NH-2), to its west, at a distance of 29 km from Delhi. It is divided into 5 residential units, known as Neighbourhoods, NH-I to NH-V. These units/neighbourhoods are located around a central-green separated from the industrial area. Due to its proximity to Delhi and the basic industrial infrastructure provided by the government there has been a rapid industrial developed in this zone as well as the neighbouring zones that is old Faridabad and Ballabgarh.

Demographic Profile Of City

Population : Faridabad municipal corporation came into existence in 1991 with the population of 6,70,770. population of city has reached to 10,55,938 by 2001 with a growth rate of 70.9% . further in 2011 city has grown its population to 14,14,050 with a growth rate of 33.02%. (Census of India 2011)

Physical Infrastructure

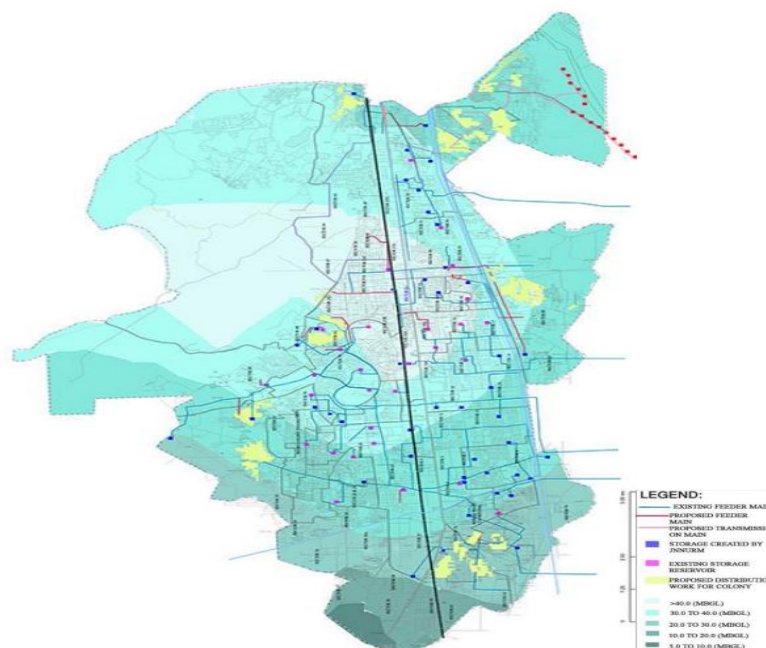
(1) Water Availability In The City And Reduction In Water Wastage

- Total supply of water is 200MLD from 1412 tube well and 7 rainy wells , water demand :266 MLD and there is a shortfall of 25%
- Ground water is depletion • Coverage 70% of population
- NRW reduced by 3% to 51% in 2015 with metering 55% household.
- Augmentation of water supply by commissioning 53 tube well , 10 rainy well. (CSP,2015:MCF)

Sewerage Network System

- Sewerage master plan was prepared -1992 proposed (2 sewerage treatment plants)
- One STP for zone I and III
- Other STP for zone II and IV
- Sewerage pumping station were proposed in following manner . Zone I (4), Zone II(6),Zone III(4),Zone IV(2)
- Present quantum of sewerage generated = 200MLD = 80% water supply
- Sewerage network =638 km = 52% (total road network=1218km)
- In terms population coverage network =50%city population
- Implies (large quantum of sewerage flows in open drains)+into Yamuna river (untreated)
- 13working condition (16 proposed SPSs/4 zones)
- Combined capacity(STPs)=115ML(MCF)

Challenge : complete sewerage system = high priority needs of the city = major implementation capability challenge for MCF.



Source –Municipal corporation Faridabad

Figure – 2 Sewerage network system

Solid Waste Management

There are 5 dumping sites of MCF.

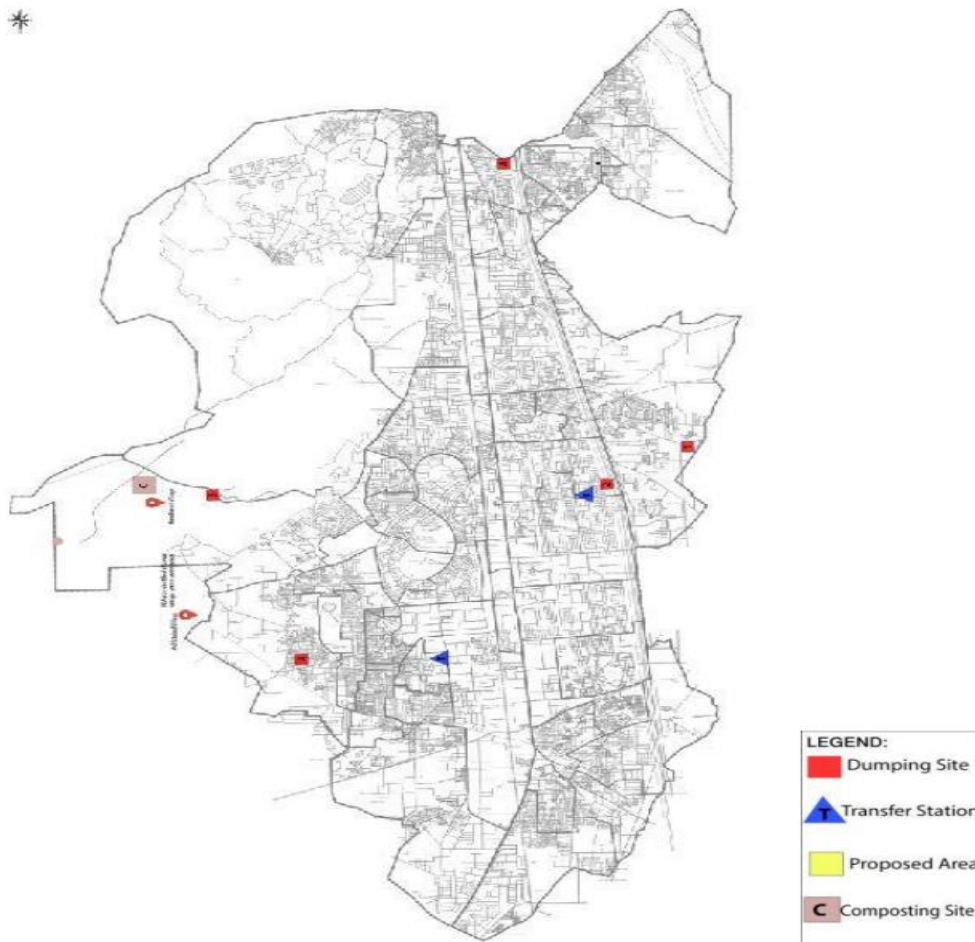
- (1).Kheri road basalwa dairy site , old Faridabad ,
- (2).BLB near ucchagaon , (
- 3). Nagla Enclave , NIT Faridabad ,
- (4). Near enclave ,NIT Faridabad ,
- (5).gurgaon road near village Bhakari.

As per MCF two-third (470) of the total solid waste of 618 TPD generated in MCF is reported to be collected out of which 270 is transported to landfill site and 200TPD for composting . rest of the 148 TPD remain un collected

which also reflect a very serious problem of solid waste management of Faridabad city.

Issue In Solid Waste

- Shortfall in the required capacity of the fleet by about 35 mt is exerting pressure on the present fleet of vehicles through over utilization in terms of the number of trip made. Non availability of intermediate transfer station is increasing the number of trips and thereby the O&M expenses on fleets.
- Only two dumpers placer are available with MCF. There is a need to increase the number of dual loaded dumper placer and to put in place intermediate transfer station in order to do away with the bin system of secondary collection and transportation.



Source –Municipal corporation Faridabad

Figure – 3 Solid waste dumping sites

Energy Availability And Reduction Of Outages In The City

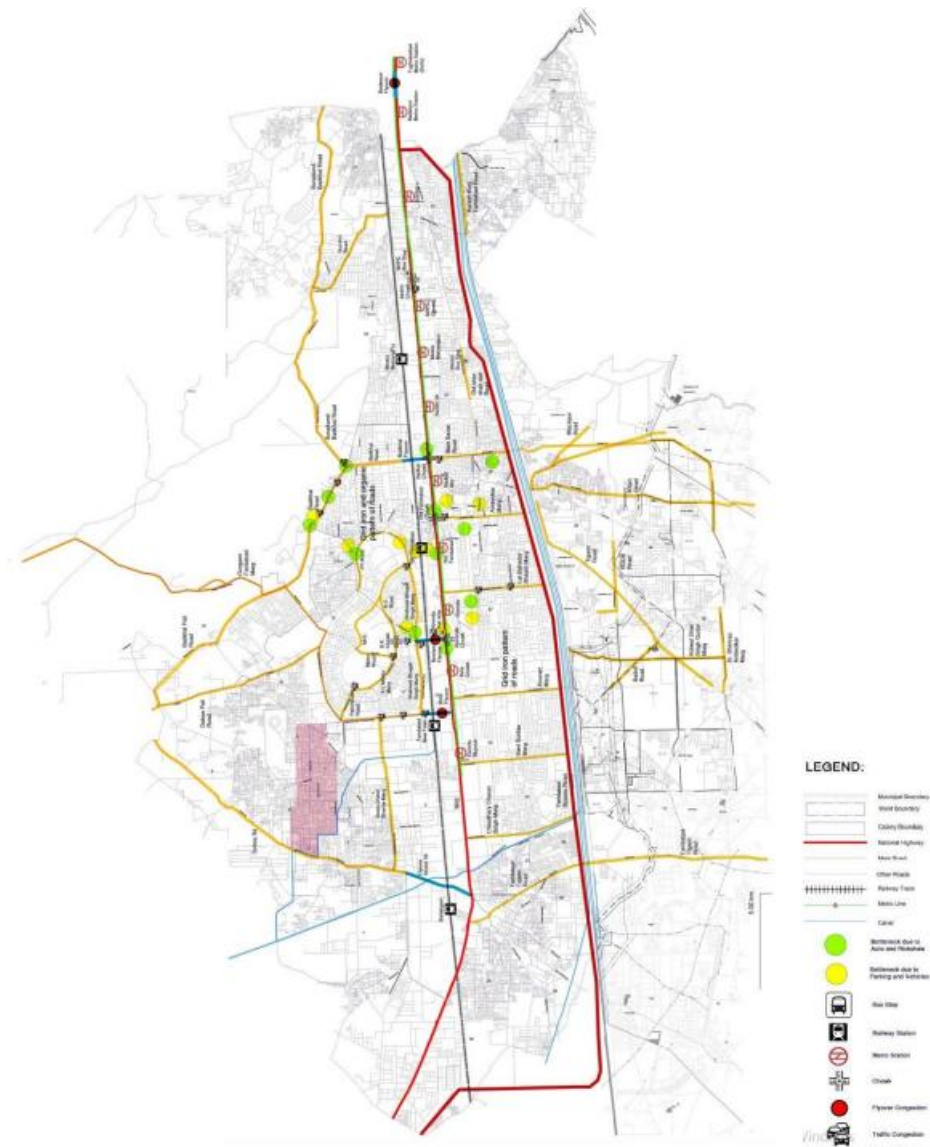
- Household coverage under grid based power :65.13%
- AT & C losses -27% to 14.4 % ; T&D losses - 22% to14.2%
- No scheduled outages
- Faridabad has been identified by MNRE for solar city initiative and prepare master plan .

- 10KW each rooftop off-grid solar power project installed at 3 sites , 2015.

ANALYSIS

- The per capita consumption of electricity in Faridabad has increased from 501 kwh in 2001 to 700 kwh in 2007-08.
- Total electricity consumption of the city as per the Dakshin Haryana bijli vitran nigam.
- The total electricity consumption has been reported as 2336 . 11 MU during 2010-11.the daily average power requirement was reported to be around 6.4 MU.
- The industrial sector is the major electricity consumer which can be seen from the charts above and utilizes around 53 % of the

ROAD NETWORK



Source –Municipal corporation Faridabad

Figure – 4 Road network system

Regional Connectivity

- Major airport near Faridabad
- Indira Gandhi international airport = 44.6kms via Gurgaon – Faridabad Road
- Jewar airport – straight line distance =39 kms
- Driving distance=82 kms
- Expressways already proposed
- KMP western peripheral expressway
- KGP eastern peripheral expressway
- Dedicated rail freight corridor (western corridor)

- Industrial model township (IMT)
- Yamuna expressway

Existing Scenario

- Per capita trip rate -0.62 (motorized mode)- 0.95(all modes)
- (2-wheeler +car)-predominant modes
- Average vehicle ownership=1.92 vehicle
- Total length (road)=1200 km
- (NH/SH/PWD)=80 km
- Average width (roads)=6.6 m
- Row right of way varies = 4m-30m
- 30% traffic – truck movement
- City bus fleet :250;private autos :22000,buses per 1000 population :0.14
- Road covered with footpath :8%,usable:5%
- Average trip length :14.3 km ; average travel speed :25km/hr
- Road accident per lakh population :21

ISSUES IDENTIFIED AFTER ANALYSIS

Transportation:

- Lack of alternate parallel corridor to NH: tremendous traffic congestion Entry and mix of regional traffic on city roads.
- Lack of an efficient public transport system: congestion on roads and roadsides+ increase in pollution+ accidents + traffic snarls increase in the number of private transport vehicles (Transport-mini-buses/6-seater/auto-rickshaws)Mixed mode.
- Lack of an integrated traffic and transportation system: lack of lane separators increased congestion interconnectivity - lack - public transport + various modes of travel.
- Lack of efficient road infrastructure+ absence (NMT infrastructure):road connectivity - developed areas (good) parking problems(main roads +intersections) Lack- Parking infrastructure travel delays +accidents +congestion+ pollution.
- Lack of coordination between land use and transportation systems :unwanted freight movement + parking inside the city degradation of the environment.
- Lack of efficient road infrastructure: inadequate- newly developed areas/ unauthorised colonies/ slum locations/ residential sectors adjoining industrial estates.

Water Supply:

- Decrease in Ground Water Table with respect to density Since ground water is the only source of irrigation in major part of the district, ground water aquifers are under great stress due to increased demand in irrigation and industrial sector. There are

frequent cases of well failure of tube well reported from all over the district.

- Frequent Failure- Tubewells Deposit mineral on the screen surface and in the pores of the formation.
- Decrease in Ground Water Table with respect to density Unaccounted-for water and high transmission and distribution losses. Transmission and distribution losses in the system account for more than 15% of gross supply=150 LPCD
- Un metered -Domestic 46.07% Non revenue water leads to less resource generation.

Sewerage:

- Inadequate sewerage network - 638 km = 52 % (total road network) ,Ever-increasing sewerage generation.
- Mixing up of (sewerage + storm water) predominant issue
- Environmental Pollution :Low system coverage.

STROM WATER DRAIN:

- Flooding of road infrastructure
- Inadequate strom water drainage network.

ELECTRICITY:

- Growing electricity demand with increase in population.
- Industries consuming 53% of the total electricity consumption of the city
- Defective meters in industries and house hold
- Transmission loss-20%
- Low tension distribution system.

SOLID WASTE MANAGEMENT:

- A limited extent of the city area is covered by door to door collection , including source segregation • Increased O&M fleet expenses
- Crude dumping is restored at the disposal site
- Mixing of segregated waste

SMART CITY PROPOSAL

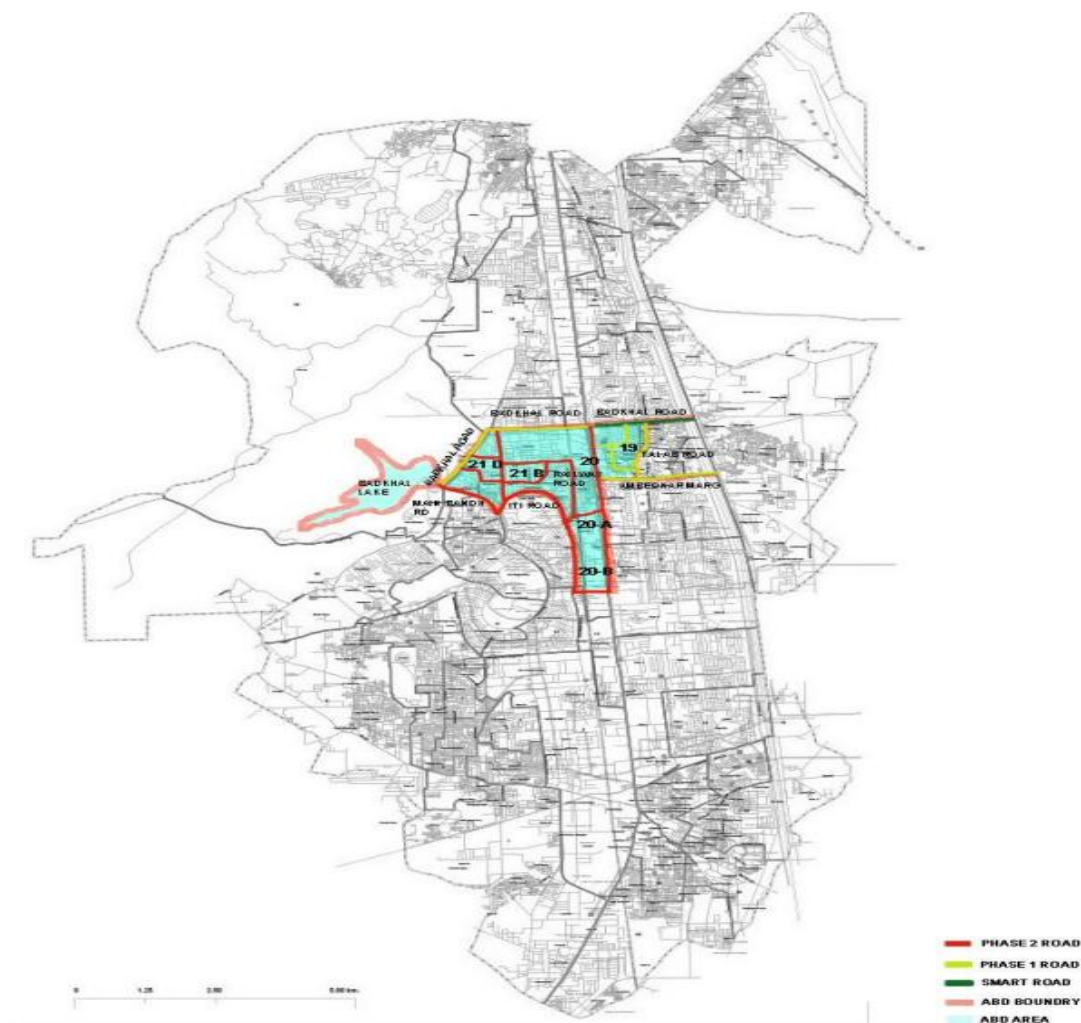
Area Based Development:

- The area-based proposal is the key element of the proposal.
- An area-based proposal will identify an area of the city that has been selected through desk research, analysis, meetings with public representatives, prominent citizens, and citizen engagement, as the appropriate site for either of three types of development: retrofitting (approx. 500 acres), redevelopment (approx. 50 acres) or Greenfield development (approx. 250 acres).

- Mapping of information and data is a key part of your Smart City Proposal.
- The base map should show the regional context in which your city is located and should contain the spatial and physical layout/morphology of your city, the street network, the open and green spaces , the geographical features and landmarks and the infrastructure. Including for transportation, water supply, sewerage, electricity distribution and generation, and so on.
- Only one 'Area' should be selected and attached in the form of a map containing the spatial and physical layout morphology of the Area. The Essential Elements and additional features that are proposed to be pan of the area-based development should be included.
- The selected area have diverse land use : group housing , commercial , industrial , institutional urban village etc.
- SCP is trying to transform the selected area into a compact , well planed urban space with inclusive, sustainable and rationally incremental economic development activities.
- Technology will be introduced to provide improved service level ,increased choices and convenience and the developed area will act as a beacon on light with a potential of replicability across other part of city .
- SCP has develop module with in which there are several sub project of similar nature .
- Smart mobility – focus on low carbon mobility with in the area
- Smart and suitable infrastructure.
- Smart urbanism –focuses on place making , developing vibrant built space using TOD.

Abd for Faridabad:

- And the area selected for area based development measures 1267 acres which include following sector 19,20,20A,21B and 21D .



Source –municipal Corporation Faridabad

Figure – 5 Faridabad ABD areas

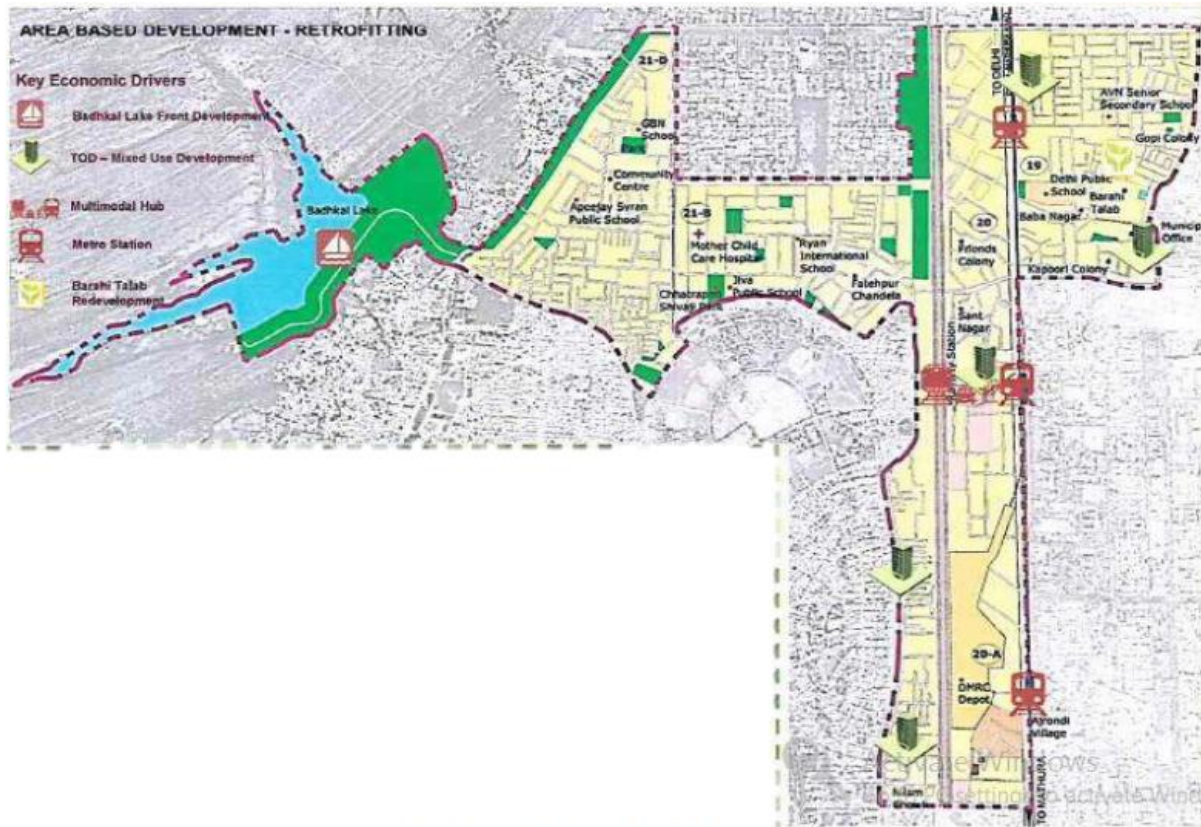
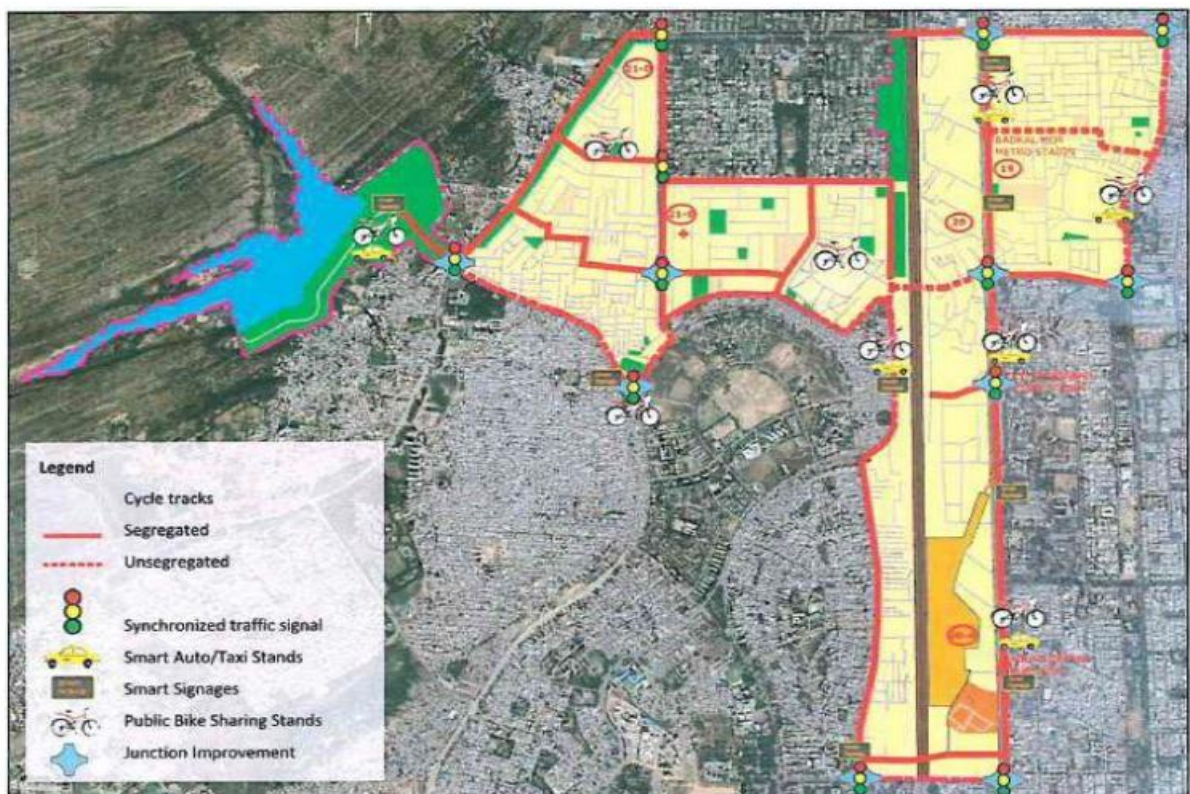


Fig: FARIDABAD ABD AREA



Source –municipal Corporation Faridabad

Figure –7 Smart mobility – ABD area networking plan

MEASURABLE IMPACT

Spatial Impact

- Increased density and compact development with consistent development controls, Complete streetscape design and place-making in the urban scape are proposed to be Incorporated in the TOD guideline.
- Creation of world-class recreation hubs as well as water body development are proposed at the Badhkal Lake front and at Barahi Talab with smart and sustainable features.
- Adding green lungs in the city such that each person in the ABD has access to well developed open spaces from current 4.3 sqm/person to 7.5 sqm/person.
- A visually coherent multi model hub is proposed near the railway station which will connect railway, metro, bus, IPT and private vehicle owners in a singular scheme.
- Drainage, sewerage and solid waste collection improvements shall help increase hygiene and maintain a neat and clean look in the urban environment.
- Under-grounding of overhead electrical cables and utilities will reduce visual clutter from 0% to 100% coverage in the area
- Streetscape improvement by provision of uniform street furniture targeted In 100% of the area.

Economic Impact

- Creation of vending zones shall regulate the 'flannel sector and provide Jobs for 2.400 vendors al Badhkal lake front and 550 vendors at barahi talab.
- Creation of space for conducting various event in the city such as music concerts, drama etc will increase revenue and provide a means for livelihood for craftsmen to sell their ware at badhkal lake front and at barahi talab.
- Reduction in traffic congestion by various smart mobility measures shall saves fuel and trailer time. The savings from fuel are targeted at Rs.17.14 Mn pa and from time at Rs 23.49 Mn pa from time.
- Improved revenue generation by smart, functional and effective meters.

- Water conservation use of renewable energy source and other green solutions have positive economic impact over the lifecycle of a project.

Social Impact

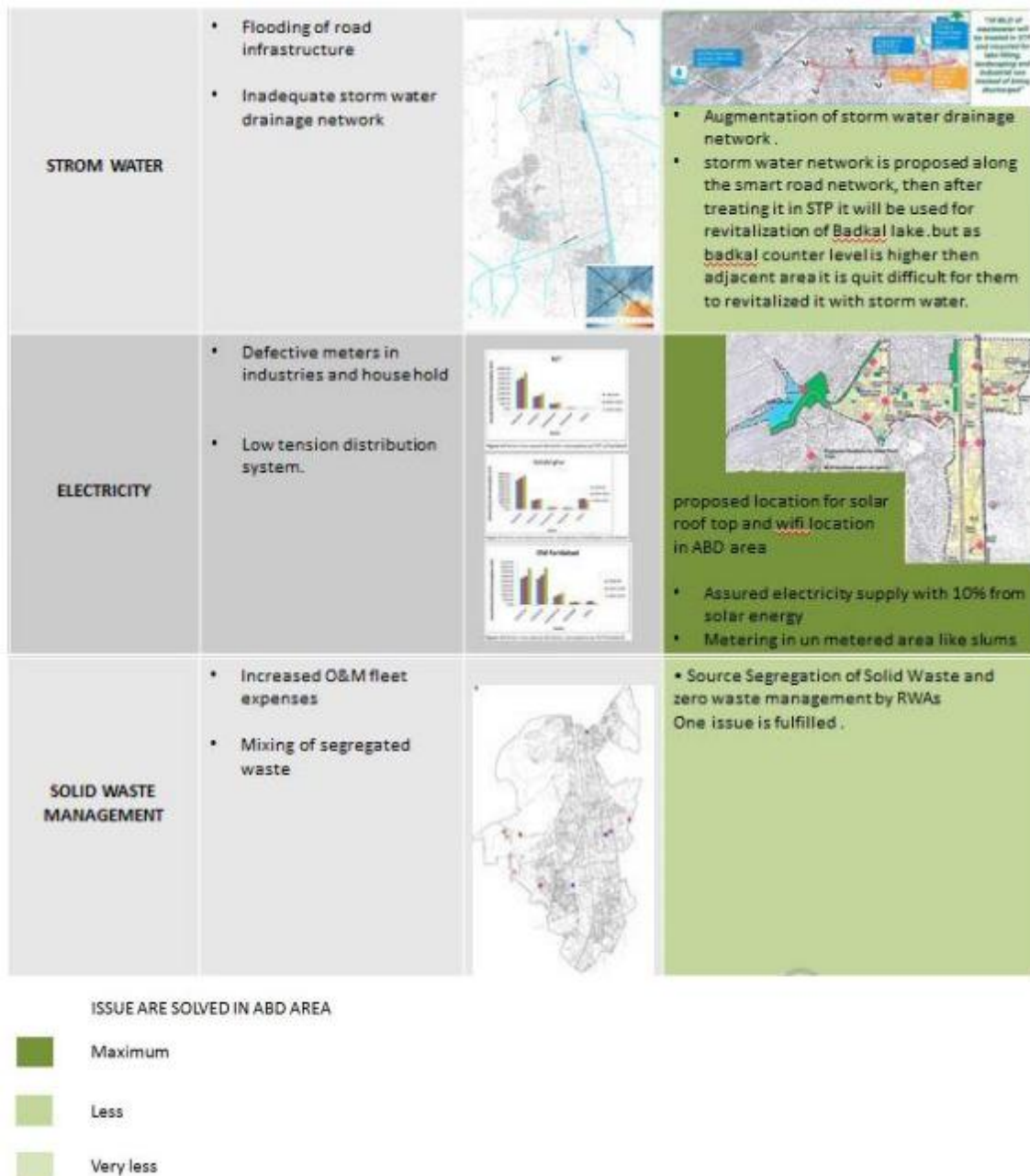
- Encouraging and safeguarding walking improves safety and reduction of accidents involving Pedestrians
- The area based development is designed to be barrier free targeted for 100% coverage which is currently zero .
- NMT is usually used by economically weaker section and their promotion encrouge social inclusiveness .
- Training of workers in the engineering design skill center and innovation labs shall creat employment for 5000 workers and help improve their social status .

Sustainability

- Implementation of NMT projects and e-rickshaws will result in improved modal trip share in favour of NMT Modes from a current average of 35% to 40% and thereby reduce carbon footprint by saving 664 tons CO2 per annum
- By implementing synchronised signalling, smart parking, smart signage and smart IPT stands will reduce idle KM spent by vehicles at red lights, looking for parking space and trip planning thus reducing carbon emissions
- 10% power of the energy needs from Solar is being targeted along with smart sensors for street lighting
- By rain water harvesting, storm water reuse, waste water recycling and decentralized STP's it is targeted to reduce the load on drainage infrastructure and 50 ML of water pa can be reused, 2 MLD water recycled and 10 MLD raw sewage treated and used for rejuvenation of Badkal Lake
- TOD and mixed use projects shall cause 24x7 intensive use of space by increasing density and promote the use of MRT

ANALYSIS

TITLE	ISSUE	PROPOSAL IN ABD
TRANSPORTATION	- Lack of an efficient public transport system. - Lack of an integrated traffic and transportation system. - Lack of efficient road infrastructure - Lack of efficient road infrastructure	 - Smart road is proposed for Badkal road. - some of the other road project in ABD area, where congestion is maximum in faridabad for decongestion of road ex barrier free footpaths, segregated and unsegregated non motorized transport root, synchronized traffic signal, intelligent car parking, smart signage and marking. 
WATER SUPPLY	- Decrease in Ground Water Table with respect to density - Decrease in Ground Water Table with respect to density - Decrease in Ground Water Table with respect to density - Un metered -Domestic	ABD area comes In water shade Zone so important water Conservation method should be taken for this area. Water Monitoring system  Rain Water Harvesting and Waste Water Recycling Leak management of pipes and fittings. Smart metering
SEWAGE	- Inadequate sewerage network - Mixing up of (sewerage + storm water) predominant issue - Environmental Pollution Low system coverage.	- Revamping of sewerage network infrastructure - On smart solution for sewage - On network plan for sewage 



REFERENCES

- [1]. CDP Faridabad
- [2]. corridors.pdf
- [3]. Comprehensive Mobility Plan for Faridabad
- [4]. DDP Faridabad
- [5]. Goldstein, S., Sly, D., Basic data needed for the study of urbanization, IUSSP Committee on Urbanization and Population Redistribution, Dolhain: Ordina Editions, 1974.
- [6]. <https://www.smartcityfaridabad.co.in/pdf/mcf-smart-city-book.pdf>
- [7]. <https://mohua.gov.in/cms/smart-cities.php>
- [8]. <https://hareda.gov.in/>
- [9]. <https://faridabad.nic.in/>
- [10]. <https://mohua.gov.in/cms/smart-cities.php>
- [11]. H. Schaffers, C. Ratti, N. Komninos Special issue on Smart Applications for Smart Cities – New approaches to innovation.
- [12]. India today. Retrieved from : <http://businesstoday.intoday.in/story/smart-cities-in-India-as-propertyinvestmentdestination/1/210791.html>.
- [13]. Investment opportunities in Corridors, NIMZ and Cluster under IIUS.h <http://www.embindia.org/files/Industrial>
- [14]. MCD Faridabad
- [15]. Ministry of Urban Development, Government of India. Retrieved from : <http://moud.gov.in/hr/day>.
- [16]. MoUD – Ministry of Urban Development, India. (2015). Standards for Smart City – A measurement tool for cities in the Smart City

- Mission.
N. Munier Introduction to Sustainability: Road to a Better Future Springer (2005)
- [17]. OECD, " Better Understanding our Cities", The Role of Urban Indicators, OECD Territorial Development: Paris, 1997.
- [18]. "Putting People First: Smart Cities and Communities" (link resides outside ibm.com), U.S. Department of Transportation, 9 June 2021.
- [19]. Regional plan 2021 national capital region
- [20]. "Smart cities: Digital solutions for a more livable future" (link resides outside ibm.com), McKinsey Global Institute, 5 June 2018.
- [21]. Shodhganga, Evolution of Faridabad
- [22]. Smart city Faridabad
- [23]. "Uncovering the Early History of 'Big Data' and the 'Smart City' in Los Angeles" (link resides outside ibm.com), Valliantos, Mark. Boom California, 16 June 2005.
- [24]. Urban and Regional Development Plans Formulation & Implementation Guidelines, 2014